MEMORIAL MEDICAL CENTER INTRAVENOUS MEDICATION USE GUIDELINES

Revised: 11-2010

PATIENT CARE UNITS:

- **A = Critical Care**: ICU, StepDown, Emergency Department, Cardio Vascular Lab, Operating Room, Post Anesthesia Care Unit
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- **C = Medical/Surgical**: Orthopedics, Adult Medical/Surgical, Dialysis, Infusion Therapy, Oncology, (See Chemotherapy (cytotoxic) drug administration policies)
- **D = Maternal/Child**: Mother/Baby, Labor & Delivery, Pediatrics (Pediatric doses are not inclusive; refer to medication references)
- ♥**ACLS Drugs: Any ACLS drug may be given on any unit during a code**

NOTE: Guidelines for IV medications apply to all patient care areas except Special Care Nursery

IV LINES:

- **CL-R = Central Line Required**
- **CL-P = Central line Preferred**
- **AL-R = Arterial Line Required**
- **PL = Peripheral**
- *** = See Auxiliary Information for additional information**

REFERENCES: Lippincott Nursing Drug Handbook 2007, Micromedex, Harriet Lane Handbook 2006

MEDICATION	UNITS	ADMINISTRATION				MONITOR		IV Lines	CHECKS			AUXILIARY INFORMATION
MEDICATION Generic (Brand) ♥***ACLS Drugs***	**Medication may be given**	**MMC Protocol or Pre-Printed Order (PPO)**	**IV Pump**	**Route**	**DOSE and ADMINISTRATION**	**READILY AVAILABLE AT BEDSIDE Cardiac, O2 Sat, BP**	**REQUIRED AT BEDSIDE Physician**		**Check Site Every Hour and PRN**	**2 RN Check**	**Set IV Pump for Hourly Infusion**	**COMMENTS**
Abciximab (ReoPro®) Glycoprotein IIb/IIIa inhibitor	**A,B***		**N** **Y**	IV Push Continuous	**Adult** 0.25 mg/kg bolus over 1 minute; 10-60 min prior to intervention; followed by 0.125 mcg/kg/min to **MAX dose: 10 mcg/min** for 12 hr. If PCTA, treat for 18-24 hrs Use sterile, 0.2-0.22 micron, low protein-binding filter							Maintain bleeding precautions, avoid unnecessary arterial and venous punctures; monitor platelet counts prior to, 2-4 hrs following dose and at 24 hr Recommendation: always administer aspirin and heparin *Can transfer to Telemetry Unit following sheath removal
♥**Adenosine** (Adenocard®) Antiarrhythmic	**A,B,D**		**N** **N**	IV Push IV Push	**Adult** 6 mg over 1-2 seconds; if tachycardia persists after 1-2 minutes, 12 mg may be given; repeat 12 mg as needed; **MAX single dose: 12 mg** **Pediatric** 0.1 - 0.2/mg/kg over 1-2 seconds; may increase dose by 0.05 mg/kg every 2 minutes to **MAX dose: 0.25 mg/kg (up to 12 mg)**	**X** **X**	**X*** **X***					**Required Monitoring: Continuous cardiac frequent blood pressure heart rate.** **Must have Crash Cart available.** ***WHEN GIVEN OUTSIDE OF CCU; Physician must be at bedside** Flush line to ensure delivery of adenosine.
Albumin (Human Serum Albumin) Plasma Volume Expander Colloid	**A,B,C,D**		**N*** **N*** **N*** **N***	Intermittent Continuous Intermittent Continuous	**Adult** *Hypovolemia:* 5% at 2-4 ml/min; 25% at 1 ml/min; may repeat in 15-30 minutes if needed Usual dose: 25 grams. **MAX:250 grams/48 hr** **Pediatric** *Hypovolemia: 10-20 ml/kg (*0.5 - 1 gm/kg/dose) rapid infusion; may repeat in 15-30 minutes if needed 10-30 ml/kg (0.5-1.5 gm/kg) over 0.5-2 hr; **MAX dose: 6g/kg/24 hr** Use 5 micron or larger filter							* Use infusion pump if administering through a PICC line Administer 5% undiluted; 25% may be administered undiluted or diluted. Use with manufacturer supplied administration set. May be added to neonate TPN **Complete infusion within 4 hr of opening vial.** **Contraindication: 25% in preterm infants due to risk of intraventricular hemorrhage** Solution should be clear amber color.
Alteplase (Activase®) Thrombolytic	**A** **NOT SDU** **A,B,C**	**X**	**N** **Y**	IV Push Continuous	**Adult** *Coronary Artery Thrombus :* Initial: 15 mg over 1-2 minutes, followed (weight adjusted dosing): Weight *greater* than 67kg: 50 mg over 30 minutes, then 35 mg over 60 minutes Weight *less* than 67 kg: 0.75 mg/ kg (not to exceed 50 mg) over 30 min; then 0.5 mg/kg (not to exceed 35 mg) over 60 min. *Acute Pulmonary embolism :* 100 mg over 2 hr *Acute ischemic stroke:* Load 0.09 mg/kg over 1 minute, followed by 0.81 mg/kg over 1 hr. **MAX total dose: 90 mg** **Central venous catheter clearance:* 2mg/2ml sterile water into occluded catheter, assess at 30 minutes, remove solution and clot and flush with normal saline; may repeat in 2 hr if required	**X** **X** **X**						Assess for hemorrhage during first hour of treatment. *Used only for central venous catheter clearance outside the CCU
Amikacin (Amikin®) Antibiotic aminoglycoside	**A,B,C,D**		**Y** **Y**	Intermittent Intermittent	**Adult** Up to 15mg/kg daily in 1-3 divided doses; infuse over 30 min **Adjust dose in renal failure** **Pediatric** Infants/children 15-22.5 mg/kg/24h divided every 8h Post conceptional age (wk) / Postnatal age (days) / Dose (mg/kg/dose) / Interval (hr): ≤ 29 / 0-28 / 7.5 / 24 / >28 / 10 / 24 30-36 / 0-14 / 10 / 24 / >14 / 7.5 / 12 ≥ 37 / 0-7 / 7.5 / 12 / >7 / 7.5 / 8							Pharmacy follows patients on an aminoglycoside and will assist in monitoring patient peak and trough levels as well as other monitoring. Call Pharmacy at ext 2235 for questions or assistance. Monitor urine output, BUN, creatinine, and peak and trough. Draw Peak level 30 minutes after 30 minute infusion; Draw Trough 30 minutes before next dose. Peak: 15-40mcg/ml; Trough 5-10mcg/ml.
Amino Acids	**A,B,C,D**	746-093 TPN PPO	**Y** **Y**	Continuous Continuous	DO NOT give by direct or intermittent administration **Adult** 1.2-1.8 g/kg/day; renal failure to 0.8-1.2g/kg/day **Pediatric** *Children greater than 10 kg:* 20-25 gram/first 10 kg plus 1-1.25 gram/kg for each additional kg over 10 kg/day *Children less than 10 kg:* 2-4 gram/kg/day			**CL-R***				Peripheral infusion: limit to 2.5% amino acids and dextrose 10%. ***Required Line: Central line when admixed with hypertonic dextrose; long term therapy**
Aminocaproic acid (Amicar®) Hemostastic Agent	**A,B**		**Y**	Continuous	**Adult** Initial dose: 5 grams over 1 hour, followed by 1 gram/hr; **MAX dose: 30 gms/24 hrs**							Rapid IV injection not recommended; may cause hypotension, bradycardia, or arrhythmias.
♥**Amiodarone** (Cordarone®) Antiarrhythmic, Class III	**A,B,D**		**N** **Y** **N** **Y**	IV Push Continuous* IV Push Continuous	**Adult** *Pulseless VT/VF (ACLS))) :* Load 300 mg over 2-3 minutes; may repeat 150 mg in 3-5 minutes as needed Maintenance first 24 hr: 360 mg at 1 mg/min over 6 hr; then 540 mg at 0.5mg/min over 18 hr. Maintenance: 0.5mg/min *Wide Complex Tachycardia :* 150 mg at 15 mg/min; may repeat every 10 minutes. **Pediatric** *Pulseless VT/VF :* 5 mg/kg rapid push; Maintenance: 10-15 mg/kg/day over 24 hr Perfusing Supraventricular/Ventricular Arrhythmias: Load: 5 mg/kg over 20-60 min; may repeat to **MAX: 15 mg/kg/day**	**X**		**CL-P** **CL-R***				**NOT compatible in NS;** Use in-line filter. **Preferred Line: Central line** ***Required Line: Central line for concentration greater than 2 mg/ml.** **Required Monitoring: heart rate, EKG,** also monitor pulmonary function, edema, muscle weakness, lethargy, liver enzymes *Consider transfer to CCU for continuous infusion
Amphotericin B (Fungizone®) Antifungal	**A,B,C,D**		**Y**	Intermittent	**Adult** *Test dose :*1 mg in 20 ml of 5% dextrose over 20-30 min; observe patient for 2 hr; follow with 0.25mg/kg over 4-6 hr. Titrate to 1 mg/kg *Maintenance :* 0.15-1.5 mg/kg per day over 4-6 hr **MAX concentration: 1 mg/10 ml** **Pediatric**							**Compatible only with D5W,** if using an existing line, flush with 5% dextrose prior to and after infusion. **Use in-line filter with mean bore diameter greater than 1 micron** Rapid infusion can result in CV collapse; adequate . hydration may reduce the risk of nephrotoxicity. Monitor pulse, respiration, temperature every 30 minutes

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MEDICATION	UNITS	ADMINISTRATION				MONITOR		IV Lines	CHECKS			AUXILIARY INFORMATION
MEDICATION Generic (Brand) ♥*ACLS Drugs*	Medication may be given	MMC Protocol or Pre-Printed Order (PPO)	IV Pump	Route	DOSE and ADMINISTRATION	READILY AVAILABLE AT BEDSIDE Cardiac, O2 Sat, BP	REQUIRED AT BEDSIDE Physician		Check Site Every Hour and PRN	2 RN Check	Set IV Pump for Hourly Infusion	COMMENTS
			Y	Intermittent	*Test dose:* 0.1-1 mg/kg **followed by remaining** *Initial dose:* 0.25-0.5 mg/kg/24 hr over 4-6 hr increase as tolerated by 0.25-0.5 mg/kg/24 hr daily or every other day *Maintenance:* 0.25-1 mg/kg/24 hr daily or every other day or 1.5 mg/kg/dose every other day; **MAX dose: 1.5 mg/kg/24 hr**							during infusion; May pre-medicate with acetaminophen, diphenhydramine with/without hydrocortisone. Protect from light. **Amphotericin formulations are not interchangeable**
Amphotericin B Lipid Complex (Abelcet®) Antifungal	**A,B,C,D**				**Adult and Pediatric**							**Do not use in-line filter.** If using an existing line, flush with 5% dextrose prior to and after infusion. The MMC Pharmacy and Therapeutics Committee approved automatic premedication orders for acetaminophen , 650 (1000) mg and diphenhydramine 25 (50) mg to be administered 30 – 60 minutes prior to amphotericin B lipid complex (Abelcet) infusions when Pharmacy dosing is requested. Physicians requesting dosing per Pharmacy who do not want their patients premedicated must write DO NOT PREMEDICATE with the initial order. Adequate hydration may reduce risk of nephrotoxicity **Amphotericin formulations are not interchangeable**
			Y	Intermittent	2.5-5 mg/kg/day over 2 hr; if infusion exceeds 2 hr, mix content by shaking infusion bag							
♥**Atropine** Anticholinergic	**A,B,C,D**				**Adult**	**X**						
			N	IV Push	CPR Initial: 0.5-1 mg; may repeat every 3-5 minutes to **MAX dose: 2.5 mg (0.4 mg/kg).** Subsequent doses every 4-6 hr.							bradycardia. Complete vagal block occurs with doses greater than 2.5 mg.
					Pediatric							
			N	IV Push	*CPR:* 0.02 mg/kg/dose every 5 minutes x 2-3 doses as needed; **MINIMUM dose: 0.1 mg; MAX single dose 0.5 mg in children, 1 mg in adolescents; MAX total dose: 1 mg in children, 2 mg adolescents.**							
Bivalrudin (Angiomax®) Anticoagulant	**A**				**Adult**							Maintain bleeding precautions; don't mix other drugs with bivalirudin before or during administration. Adjust dose for renal dysfunction according to calculated creatinine clearance - consult Pharmacy at ext 2235
			N	IV Push	Bolus: 1mg/kg before PTCA;							
			Y	Continuous	2.5 mg/kg/hr over 4 hr; may give additional at 0.2mg/kg/hour up to 20 hr; give with 325 mg aspirin							
♥**Calcium Chloride 10%** Calcium Salt Electrolyte Supplement **HIGH ALERT**	**A,B,C,D**				**Adult** Dose expressed in **mg or grams** Ca Chloride							DO NOT inject IM or SC, severe necrosis and sloughing may occur; monitor EKG if calcium is infused faster than 2.5 mEq per minute; calcium chloride is 3 times as potent as calcium gluconate; may be added to TPN; DO NOT infuse with Phosphate Calcium Chloride (10%) = 1 g Calcium Chloride/10 ml 1 g Calcium Chloride = 270 mg calcium = 13.6 mEq calcium
			Y	Intermittent	2-4 mg/kg (10%) slowly every 10 minutes if needed or 0.5-1 gram; **Max rate:** 50-100 mg/min (0.5-1 ml/min) (0.7-1.5 mEq/min); 272 mg CaCl = 13.6 mEq Calcium **Adjust dose in renal failure.**							
					Pediatric Dose expressed in **mg** Ca Chloride							
					20 mg/kg/dose; may repeat in 10 min if necessary **Max rate:** IV Push -100 mg/min, Infusion: 45-90 mg/kg/hr **Max Concentration:** 20 mg/ml							
Calcium Gluconate 10% (Kalcinate®) Calcium Salt Electrolyte Supplement **HIGH ALERT**	**A,B,C,D**				**Adult** Dose expressed in **grams** CaGluconate							May be added to TPN; DO NOT infuse with Phosphate Calcium Gluconate (10%) = 1 g CaGluconate/10 ml 1g Calcium Gluconate = 90 mg calcium = 4.6 mEq calcium
			Y	Intermittent	*Hypocalcemia:* 1.5-3.75 g every 6 hr or continuous							
			Y	Continuous	infusion at 5-15 g/24hr							
					Hypocalcemic tetany: 1-3 g; **Max rate: 200 mg/min**							
			N	IV Push	*Cardiac Arrest:* 0.5-0.8g/dose slowly every 10 min **Max rate: 100 mg/min**							
					Pediatric Dose expressed in **mg** CaGluconate							
					Hypocalcemia:							
			Y	Intermittent	*Neonate:* 50-200 mg/kg over 30 minutes every 6 hr or as continuous							
			Y	Continuous	infusion at 200-800mg/kg/24hr							
			Y	Intermittent	*Infant:* 50-125 mg/kg every 6 hr or as continuous							
			Y	Continuous	infusion at 200-500 mg/kg/24hr							
			Y	Intermittent	*Children:* 50-125 mg/kg every 6 hr or as							
			Y	Continuous	infusion at 200-500 mg/kg/24hr							
			N	IV Push	*Cardiac Arrest:* 100 mg/kg/dose every 10 minutes **Max rate: 100 mg/min**							
Ciprofloxacin (Cipro®) Antibiotic Quinolone	**A,B,C,D**				**Adult**							Administer slowly via a large vein to reduce risk of venous irritation; use cautiously in patients with CNS disorders or at increased risk for seizures **Pediatric Concerns:** cartilage toxicity; use only when necessary.
			Y	Intermittent	200 or 400 mg over 1 hr every 12 hours **Adjust dose in renal failure.**							
					Pediatric							
			Y	Intermittent	10-20 mg/kg/24hr divided every 12 hr given over 1 hr **MAX dose: 1.2g/24hr.** **Adjust dose in renal failure.**							
Cosyntropin (Cortrosyn®) Diagnostic Agent	**A,B,C**				**Adult**							Patient should not receive corticosteroids or spironolactone the day prior to and the day of test
			N	IV Push	*Adrenocortical Insufficiency* : 0.25-0.75 mg over 2 minutes; Obtain cortisol level 30 minutes prior to dose and 30-60 minutes after							
Desmopressin (DDAVP®) Antihemophilic	**A,B,D**				**Adult and Pediatric**							Monitor blood pressure and pulse during infusion
			Y	Intermittent	*Diabetes insipidis* :2-4 mcg/24 hr divided twice daily							
			Y	Intermittent	*Hemophilia and uremia:* 0.2-0.4 mcg/kg/dose over 15-20 min.							
Diazepam (Valium®) Benzodiazepine	**A,B,C,D**				**Adult**	**X**						**Required Monitoring: Emergency resuscitation equipment/02 available** Monitor respiratory rate, heart rate, blood pressure; Use large vein to avoid extravasation and phlebitis
			N	IV Push	2-10 mg, may repeat in 3-4 hr *Status epilepticus:* repeat every 10-15 minutes; **MAX dose: 30 mg; MAX rate: 5 mg/minute.**							
					Pediatric							
			N	IV Push	*Sedative/relaxant:* 0.04 - 0.2 mg/kg/dose every 2-4 hours. **MAX dose: 0.6 mg/kg in 8 hr period** *Status Epilepticus:* 0.2-0.75 mg/kg/dose every 15-30 min x 2-3 doses; **MAX dose:** (age adjusted dosing)**;** *less than 5 years:* 5 mg *greater than 5 years:* 10 mg **MAX rate: 2 mg/minute** **Diazepam emulsion**: preservative free							

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				IV Push	Administer undiluted at less than 2 mg/min. Emulsion: must use microfilter smaller than 5 microns or a polyvinyl chloride infusion set. *Seizure and SE: (age adjusted dosing)* *greater than 30 days of age-5 yrs* : 0.2-0.5 mg slow IV every 2-5 min to **MAX total dose: 5 mg** *children greater than 5 yr* : 1 mg slow IV every 2-5 min to **MAX total dose: 10 mg**							
Digoxin (Lanoxin®) Cardiac Glycoside	**A,B,C,D**		**N**	IV Push	IV dose: 20-25% less than oral dose over 5 minutes **Adult and Pediatric** Rapid Digitalization: Infuse drug slowly over at least 5 minutes ***Initial digitalizing dose:** give one-half of total digitalizing dose; then give remainder of total dose in two divided doses at 8-12 intervals. **Maintenance dose:** Infant/Children less than 10 yr: divide every 12 hr Children older than 10 yrs/Adults: once daily **Adjust dose in renal failure.**				**X**		Prior to administration: check apical pulse and verify there are no toxic drug levels (therapeutic digoxin range Monitor cardiac rhythm for 6-8 hours, observe for noncardiac toxicity (nausea, (anorexia, vomiting, confusion, and depression). Hold dose for heart rate less than 60 and notify physician. Notify physician of any significant changes in rate, rhythm, or quality of pulse.

Age	Digitalizing **Total** IVDose* microgram/kg*	Maintenance Daily IV Dose microgram/kg*
Premature infant*	15	3-4
Full term infant*	20	6-8
1 mo–2 yr*	30-40	7.5-9
2–10 yrs*	20-30	6-8
>10 yrs and < 100 kg*	8-12	2-3
Adults	0.5-1 mg	0.1-0.4 mg

Diltiazem (Cardizem®) Calcium Channel Blocker Antiarrhythmic	**A,B,C,D**	N		IV Push	**Adult and Pediatric** **Atrial arrhythmia or Paroxysmal supraventricular tachycardia** Initial dose, 0.25 milligrams per kilogram actual body weight or 20 milligrams over 2 minutes. **Maximum dose** = 0.35 milligrams per kilogram actual body weight or 25 milligrams Repeat bolus dose in 15 minutes with 0.35 milligrams per kilogram or 25 milligrams if ventricular response inadequate.							Monitoring: Do not administer infusion longer than 24 hours **IV Push:** Continuous ECG and BP **Continuous Infusion:** ICU - Continuous ECG and frequent BP (at least every 15 minutes) during initial infusion. Non-ICU Patient Care Areas - Continuous ECG and HR monitoring with BP checks every 4 hours during infusion
	A		Y	Continuous	Initial dose, 5 milligrams per hour Usual dose, 5 to 10 milligrams per hour Maximum dose, 15 milligrams per hour for up to 24 hours Continuous infusion may be started immediately following the bolus dosing and reduction in heart rate. Increase infusion in increments of 5 milligrams per hour to achieve ordered ventricular rate							
	B,C,D		Y	Continuous	If bolus dose is ordered, continuous infusion can be started immediately following bolus dosing and reduction in heart rate. Initiate physician order for continuous infusion; DO NOT titrate dose.							
♥**Dobutamine** (Dobutrex®) Sympathomimetic	**A, B, D**		**Y**	Continuous	**Adult and Pediatric** Initial: 2.5-20 mcg/kg/min; titrate every few minutes according to patient response to 20 mcg/kg/min. **MAX dose: 40 mcg/kg/minute.**	**X**		**CL-P***	**X****			Correct hypovolemia prior to use. **Required Monitoring:** Continuous cardiac monitoring, frequent blood pressure; heart rate, urine output Concentrated 1:1 solution may cause phlebitis Use separate IV line, avoid mixing with other drugs ***Central preferred, or PICC line or large peripheral** ****Required for peripheral site** **Avoid extravasation: TREAT extravasation with 5-10 mg phentolamine. SEE PHENTOLAMINE**
♥**Dopamine** (Intropin®) Catecholamine	**A*,B,D** **NOT SDU** **C-renal only**		**Y**	Continuous	**Adult and Pediatric** 1-20 mcg/kg/minute. **Dose related hemodynamics:** *Low dose* (2-5 mcg/kg/min IV) renal > cardiac *Intermediate dose* (5-15 mcg/kg/min) cardiac > renal *High dose* (greater than 20 mcg/kg/min) alpha adrenergic effects are prominent; decreased renal perfusion; **MAX recommended dose: 20-50 mcg/kg/min**	**X**		**CL-P***	**X****		**X**	**Required Monitoring: Dosing greater than 5 mcg/kg/min** Continuous cardiac monitoring, frequent blood pressure, heart rate, and urine output; Monitoring for renal dosing: blood pressure, heart rate, urine output **Transfer to CCU at dosing greater than 5 mcg/kg/min or BP titration** ***Central preferred, or PICC line or large peripheral** ****Required for peripheral site ; Use separate IV line** **Avoid extravasation: TREAT extravasation with 5-10 mg phentolamine. SEE PHENTOLAMINE**
Drotrecogin (Xigris®) Human activated protein C	**A**	**741-069**	**Y**	Continuous	**Adult** 24 mcg/kg/hr for total duration of 96 hr; if interrupted, restarted at the 24 mcg/kg/hr. Complete administration within 12 hr of solution preparation							Use separate IV line. Maintain bleeding precautions; No telephone or office fax orders are accepted
Droperidol (Inapsine®) Antiemetic	**A,B,C,D**		**N**	IV Push	**Adult** *Nausea/Vomiting:* 0.625-2.5 mg every 3-4 hr as needed; **MAX rate: 10 mg/minute.**							**Can cause QT interval prolongation**; Monitor blood pressure, heart rate, respiratory rate; observe for dystonia, extrapyramidal side effects, or temperature change.
			N	IV Push	**Pediatric** *Antiemetic/Sedation:* 0.03-0.07 mg/k/dose over 2-5 min; may give 0.1-0.15 mg/kg/dose; **MAX dose: 2.5 mg/dose;** As antiemetic: give as needed; for sedation: repeat dose in 15-30 minutes if necessary							
Enalaprilat (Vasotec®) Angiotensin-Converting	**A,B**		**N**	IV Push	**Adult** 0.625 mg if creatinine clearance less than 30 ml/min or administered with a diuretic to 1.25 mg as monotherapy, every 6 hours; **Administer over 5 minutes**	**X**						**Frequent Monitoring: Blood pressure**; watch for hypotensive effects within 0.5-3 hr; monitor renal function, potassium, urine output; discontinue if angioedema occurs,

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Enzyme Inhibitor					**Pediatric**							
			N	IV Push	5-10 mcg/kg over 5 minutes every 8-24 hr							
												-
♥**Epinephrine** (Adrenalin®) Adrenergic Agonist	**AD NOT SDU**		**N**	IV Push	**Adult** *Asystole and bradycardia:* 0.5-1 mg every 3-5 min; may increase to 5 mg every 3-5 minutes alternatively: initial 0.5-1 mg dose followed by a	**X**		**CL-R***				***Required Line: Central for continuous IV infusion Required Monitoring: Cardiac monitoring and blood pressure;** monitor pulmonary function, site of infusion for blanching and extravasation Follow push with rapid flush to ensure delivery of epinephrine
			Y	Continuous	1-4 mcg/min infusion and titrated to effect up to 10 mcg/min							
			Y	Continuous	**Pediatric**							
			N	IV Push	*Asystole and bradycardia: neonate:0.1-0.3 ml/kg of 1:10,000 solution* (0.01-0.03 mg/kg) every 3-5 min; *infant/children:* first dose 0.01 mg/kg of 1:10,000 solution (0.1 mg/kg), **MAX dose: 1 mg (10 ml);** subsequent doses: 0.1 mg/kg of 1:1000 solution every 3-5 min; if not effective, increase dose to 0.2 mg/kg of 1:1000 solution (0.2 ml/kg)							1 mg = 1ml of 1:1000 soln or 10 ml of 1:10000 soln
			Y	Continuous	0.1-1 mcg/kg/min infusion; titrated to effect							
Epoprostenol (Flolan®) Prostaglandin	**A,B**,C**		**Y**	Continuous	**Adult** *Initial rate:* 2 ng/kg/min; increase by 2ng/kg/min every 15 minutes or as tolerated; *Maintenance:* begin at 4 ng/kg/min less than *maximum tolerated initial rate . If maximum* tolerated rate is less than 5 ng/kg/min; begin maintenance at one-half maximum tolerated initial rate. Adjust dose based on symptoms of pulmonary hypertension			**CL-R***				**Initiate Therapy: CCU setting** ** Maintenance Monitor: improved pulmonary function, decreased exertional dyspnea, and fatigue; ***Required Line: Central venous catheter using an ambulatory infusion pump; IF A PICC LINE IS USED - DO NOT FLUSH THE LINE; patient may receive an excess of Epoprostenol** **DO NOT INTERRUPT THERAPY**
					-							
Eptifibatide (Integrilin®) Glycoprotein IIb/IIIa inhibitor	**A,B**		**N**	IV Push	**Adult** *Acute coronary syndrome* : bolus 180 mcg/kg over 1-2 minutes **(MAX dose: 22.6 mg)**, followed by							Maintain bleeding precautions, avoid unnecessary arterial and venous punctures; assess nose, mouth mucous membranes, and puncture sites for oozing; observe for mental status changes
			Y	Continuous	infusion of 2 mcg/kg/min, **MAX dose: 15 mg/hr up to 72 hr**							
			N	IV Push	*Creatinine 2-4 mg/dl:* same bolus, followed by							
			Y	Continuous	infusion 1mcg/kg/min, **MAX rate: 7.5 mg/hr**							
					Percutaneous coronary intervention: bolus							
			N	IV Push	180 mcg/kg over 1-2 minutes **MAX dose: 22.6 mg,**							
			Y	Continuous	followed by infusion of 2 mcg/kg/min; **Max dose: 15 mg/hr;** second 180 mcg bolus, 10minutes after first bolus, **MAX dose: 22.6 mg,** continue infusion until hospital discharge or 18-24 hr. **Minimum: 12 hr recommended;**							
			N	IV Push	*Creatinine 2-4 mg/dl:* same first and second bolus;							
			Y	Continuous	infusion of 1mcg/kg/min, MA**X rate: 7.5 mg/hr**							
Esmolol (Brevibloc®) Beta-Adrenergic Blocker	**A NOT SDU**		**Y**	Intermittent	**Adult** *SVT:* Load 500 mcg/kg over 1 minute, followed by 50 mcg/kg/min infusion for 4 minutes; if inadequate rebolus and titrate to response by increasing each maintenance infusion by 50 mcg/kg every 5-10 min to **MAX dose: 200 mcg/kg/minute**	**X**						**DO NOT GIVE IV PUSH; use infusion control device Required during continuous infusion of up to 48 hrs: Cardiac monitoring, blood pressure, heart rate, and respiratory rate**
			Y	Continuous	Omit loading dose when desired response achieved.							
			Y	Intermittent	*Peri-op tachy or HTN:* 80mg (1mg/kg) over 30							
			Y	Continuous	seconds, followed by 150 mcg/kg/min if needed, titrate as needed to **MAX rate: 300 mcg/kg/min**							
Fentanyl (Sublimaze®) Narcotic Analgesic	**A,B*,D**		**N**	IV Push	**Adult** *Adjunct to general anesthesia:* 2-50 mcg/kg, may give additional doses of 25-100 mcg IV as needed;	**X**						**Required: Naloxone (Narcan) and resuscitation equipment. Naloxone is the antidote. SEE NALOXONE** Monitor pain relief, respiratory rate, mental status, heart rate, sedation level, and blood pressure. Rapid administration may result in respiratory depression and/or chest rigidity making ventilation difficult. Protect from light. *Used in procedural setting; not on Telemetry Unit
			N		*Adjunct to regional anesthesia:* 50-100 mcg over 1 minute							
			Y	Continuous	1-3 mcg/kg/hr; titrate to effect							
					Pediatric							
			N	IV Push	1-2 mcg/kg/dose every 30-60 min as needed;							
			Y	Continuous	1-3 mcg/kg/hr; titrate to effect							
Flumazenil (Romazicon®) **Benzodiazepine Antidote**	**A,B,C,D**		**N**	IV Push	**Adult** *Conscious sedation reversal:* 0.2 mg over 15 seconds; repeat in 1 minute if desired level of consciousness is not obtained. *Over-dose reversal* **:** 0.2 mg over 30 seconds; may increase dose at one minute intervals (0.3mg, then 0.5 mg) **MAX cumulative dose: 1 mg/5 minutes** repeat at 20 min intervals; **MAX dose: 3mg/hr**							Monitor patient for return of sedation or respiratory depression. **DOES NOT REVERSE NARCOTICS**
					Pediatric							
				IV Push	*Conscious sedation reversal:* 0.01 mg/kg							
			N		**MAX dose: 0.2 mg;** followed by 0.005-0.01 mg/kg **MAX dose 0.2 mg every minute to MAX cumulative dose: 1 mg;** may repeat in 20 min; **MAX dose: 3 mg/1 hr.**							
Fosphenytoin (Cerebyx®) Anticonvulsant	**A,B,C,D**				***Doses expressed as Phenytoin Equivalents (PE)**							*** 1 mg phenytoin = 1 mg PE (Phenytoin Equivalent) Therapeutic Interchange for Phenytoin in cardiac event**
					Adult							
			Y	Intermittent	*Status Epilepticus:* Load: 15-20 mg PE/kg at 100-150 mg PE/minute. Maintenance: 4-6 mg PE/kg/day **Adjust dose in renal and hepatic failure.**							Monitor blood pressure, vital signs, and plasma phenytoin level; Injection should be followed with normal saline flushes to avoid local vein irritation
				IV Push	*Ventricular arrhythmias unresponsive to lidocaine or procainamide or digitalis-induced arrhythmias* 50-100 mg PE every 10-15 minutes as needed to a **MAX dose: 15mg/kg; Max rate: 50 mg/minute**							
					Pediatric							

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CL-R = Central Line Required

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REFERENCES: Lippincott Nursing Drug Handbook 2007, Micromedex, Harriet Lane Handbook 2006

MEDICATION	UNITS	ADMINISTRATION				MONITOR		IV Lines	CHECKS			AUXILIARY INFORMATION
MEDICATION Generic (Brand) ♥*ACLS Drugs*	Medication may be given	MMC Protocol or Pre-Printed Order (PPO)	IV Pump	Route	DOSE and ADMINISTRATION	READILY AVAILABLE AT BEDSIDE Cardiac, O2 Sat, BP	REQUIRED AT BEDSIDE Physician		Check Site Every Hour and PRN	2 RN Check	Set IV Pump for Hourly Infusion	COMMENTS
			Y	Intermittent	*Status Epilepticus:* Load:15-20 mg PE/kg at 3mg PE/kg/min, **MAX rate: 150 mg PE/min;** followed by 5-10 mg/kg/day divided in 2-3 doses							
												Monitor blood pressure, vital signs, and plasma *phenytoin* level;
Furosemide (Lasix®) Loop Diuretic	**A,B,C,D**		**N**	IV Push	**Adult** 20-40 mg administered over 1-2 min; if no response 20 mg 2 hr later; may increase succeeding doses by 20 mg increments to 80 mg not more than every 2 hr until desired diuretic response obtained							Monitor weight and I & O, blood pressure, serum electrolytes, renal function. Doses greater than 100 mg must be diluted Protect from light; do not refrigerate.
			Y	Intermittent	**Doses greater than 50 mg should be infused 100 mg *or less:* not to exceed 10 mg/minute 100 mg *or more:* not to exceed 4 mg/minute**							
			Y	Continuous	Load 40 mg, then rate based on creatinine clearance, **MAX rate: 4 mg/min**							
					Pediatric							
			Y	Intermittent	*Neonates:* 0.5-1mg/kg/dose every 8-24hr, **MAX single dose: 2 mg/kg**							
			Y	Intermittent	*Infants/Children* 0.5-2 mg/kg/dose every 6-12 hr **MAX single dose: 6mg/kg**							
Gentamicin (Garamycin®) Antibiotic Aminoglycoside	**A,B,C,D**		**Y**	Intermittent	**Adult** 1-7 mg/kg/dose over 30 min							Pharmacy follows patients on an aminoglycoside and will assist in monitoring patient peak and trough levels as well as other monitoring. Call Pharmacy at ext 2235 for questions or assistance. Draw peak level 30 min after 30 min infusion; draw trough 30 min prior to next dose. Peak: 5-10 mcg/ml; Trough 1-2 mcg/ml. Monitor urine output, BUN, creatinine, and peak and trough.
					Pediatric							
			Y	Intermittent	Children: 6-7.5 mg/kg/24h divided every 8h; infuse over 30 min.							

Post conceptional age (wk)	Postnatal age (days)	Dose (mg/kg/dose)	Interval (hr)
≤ 29	0-28	2.5	24h
	>28	3	24
30-36	0-14	3	24
	>14	2.5	12
≥ 37	0-7	2.5	12
	>7	2.5	8

					Adjust dose in renal failure.							
Glucagon Antidote Hypoglycemia	**A,B,C,D**		**N**	IV Push	**Adult** 0.5-1 mg over 1 minute; may repeat in 15 minutes if needed **1 unit = 1 mg**							*Dose Preparation:* dose less than 2 mg: use diluent that accompanies drug *dose greater than 2 mg:* use sterile water for injection Use immediately after reconstitution; **Unstable diabetics may not respond to glucagon - give dextrose IV instead**
					Pediatric Neonate/Infant: 0.025-0.3 mg/kg/dose every 30 min as needed Children: 0.03-0.1 mg/kg/dose every 20 min as needed; **Max dose 1 mg/dose**							
Haloperidol lactate (Haldol®) Antipsychotic					**Administer IM only.** Previously administered IV; however, not FDA approved for IV administration. 2007 the FDA reported increased incidence of sudden death, Torsades, and QT prolongation with IV haloperidol administration.							
Heparin (Liquaemin®) Anticoagulant **HIGH ALERT**	**A,B,C,D**	Nomogram*	**N**	IV Push	**Adult** Weight-based protocol: 80 units/kg; followed by					**X**		***MMC HEPARIN NOMOGRAM - prepared by Pharmacy;** contact pharmacy at ext 2235 Prior to initiating heparin: obtain INR, PT and APTT Monitor platelet count and signs and symptoms of abnormal bleeding Protamine is a heparin antagonist and is used for reversal of severe bleeding due to heparin. **SEE PROTAMINE.** **High Alert Message**: Use the MMC HEPARIN NOMOGRAM for anticoagulation therapy. The MMC Laboratory Heparin "Therapeutic Range" is specific to MMC laboratory instrumentation and current lot of reagents.
			Y	Continuous	15 units/kg/hour; dose titrated according to APTT. APTT Goal: 1.5-2.5 times normal.							
					Pediatric					**X**		
			N	IV Push	Infant/children: 50 units/kg followed by							
			Y	Continuous	10-25 units/kg/hr or 50-100 units/kg/dose every 4 hr *Flush:* *Peripheral:* 1-2 ml of 10 units/ml solution every 4 hr *Central:* 2-3 ml of 100 units/ml solution every 24 hr Flush dose should be less than heparinizing dose **Neonates: Use preservative-free heparin.** *TPN:* central line and arterial lines: add heparin to make final concentration: 0.5-1unit/ml.							
Hydralazine (Apresoline®) Vasodilator	**A,B,C,D**		**N**	IV Push	**Adult** *Hypertension :* 10-20 mg/dose or 0.1-0.2 mg/kg as needed; increase within this range every 4-6 hr as needed based on blood pressure response							**Resuscitation equipment should be available.** Recommended Monitoring: blood pressure every 5 minutes until stable; then every 15 minutes x 4, then as ordered Frequently monitor blood pressure, heart rate, and orthostatics Solution color change does not indicate loss of potency Goal: mean arterial pressure reduction of 25% or less over 1 min to 2 hour with further reduction to 160/80 mm
			N		*Pre-eclampsia/eclampsia:* 5 mg/dose, followed by 5-10 mg every 20-30 minutes as needed; **MAX rate: 10 mg/min**							
					Pediatric							
					Hypertensive Crisis: 0.1-0.2 mg/kg/dose every 4-6 hr **Max single dose: 20 mg; Max total daily dose: 1.7-3.5 mg/kg/day**							Hg over 2-6 hours
Hydromorphone (Dilaudid®) Analgesic Opioid Agonist **HIGH ALERT** **DO NOT CONFUSE with MORPHINE.**	**A**,B,C,D**				- ******DO NOT CONFUSE WITH MORPHINE******							Patient Controlled Analgesia (pca) pumps on all units ****Non PCA continuous infusion reserved for CCU Required: Naloxone (Narcan) = Antidote and resuscitation equipment. SEE NALOXONE MMC Hydromorphone Guidelines** 1. The ordering physician is consulted when a dilaudid order is greater than 2 mg. An MMC Pharmacist will consult the ordering physician on the need for this type of medicine and the dose. If physician cannot be reached then the dose automatically An becomes 1-2mg every 4 hours 2. All patients receiving dilaudid are placed on cardiac monitoring and continuous Pulse Oximetry monitoring prior to administration and for the 60 minute period following administration. This monitoring is documented by the RN administering the medication 3. Assess and document respiratory rate prior to administration of dilaudid 4. Dilaudid IV is administered very slow push over at least 2-5 minutes for every dose 5. Reassess and document pain scale at a minimum of 30 minutes and maximum of 60 minutes after a dose of hydromorphone 6. DOSING: If dilaudid is ordered as a range order of 1 to 2 mg every 4 hours, the lowest dose in the range (1 mg) is administered, and the administering RN must wait at least 30-60
			N	IV Push	**Adult** 1-4 mg **very slowly over 2-5 min** every 4-6 hr as needed **READ COMMENTS**; may be given subcutaneously	**X**						
					Pediatric 0.015 mg/kg/dose over 2-5 min every 4-8 hr as needed							

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MEDICATION	UNITS	ADMINISTRATION				MONITOR		IV Lines	CHECKS			AUXILIARY INFORMATION
MEDICATION Generic (Brand) ♥***ACLS Drugs***	**Medication may be given**	**MMC Protocol or Pre-Printed Order (PPO)**	**IV Pump**	**Route**	**DOSE and ADMINISTRATION**	**READILY AVAILABLE AT BEDSIDE Cardiac, O2 Sat, BP**	**REQUIRED AT BEDSIDE Physician**		**Check Site Every Hour and PRN**	**2 RN Check**	**Set IV Pump for Hourly Infusion**	**COMMENTS**
												minutes before giving a second 1 mg dose. Patient is eligible for the next dose 4 hours after the second 1 milligram dose 7. A patient who received a second 1 mg dose (total of 2 mg initial) and experienced adequate pain relief based on the MMC pain management guidelines AND who did not require management of respiratory depression, is eligible for a 2 mg dose of hydromorphone at the next scheduled time interval 8. Dilaudid orders must be checked by 2 RNs for accuracy using the 5 R's prior to administration, and this must be documented on the MAR
Ibutilide (Corvert®) Antiarrhythmic Class III	**A,B**		**Y**	IV Push	**Adult** *less than 60 kg:* 0.01 mg/kg over 10 minutes *greater than 60 kg:* 1 mg over 10 minutes if arrhythmia is not terminated within 10 minutes, a second dose may be administered.	**X**						Monitor: continuous cardiac monitoring at least 4 hours following infusion or until QTc has returned to baseline; Stop infusion if arrhythmias is terminated, patient develops ventricular tachycardia or marked prolongation of QT or QTc interval
Insulin (Humulin-R®) Antidiabetic **HIGH ALERT**	**A,B,C,D**	**Insulin Drip PPO**	**N** **Y** **N** **Y** **Y** **Y** **Y**	IV Push Continuous IV Push Continuous Intermittent Continuous	**Adult** IV recommended only for DKA, hyperkalemia, intensive blood glucose control in ICU, circulatory collapse, or evaluation of growth hormone reserves. *DKA:* 015-0.33 units/kg; followed by 0.1 unit/kg/hr to glucose level of 250 mg/dl; then begin SC insulin and separate D5W infusion Dosage initiated and titrated based on blood sugar *Low dose* : Load: 2.4-7.2 units followed by continuous infusion: 2.4-7.2 units/hour *High-dose:* 50-100 units IV and 50-100 units SC *Circulatory collapse* : - give total IV; subsequent doses based on patient response and blood glucose, acetone, or ketones at 1-2 hour intervals *hyperkalemia:* 5-10 units insulin with 50 ml D5W over 5 minutes INSULIN DRIP: intensive blood glucose control IV bolus and initial infusion rate divide initial blood glucose by 100, then round to nearest 0.5 units for bolus and initial infusion rate Adjust insulin infusion rate based on blood glucose **Adjust dose in renal failure.** **Pediatric** Diluted concentrations of 0.1 unit/ml or 1 unit/ml may be necessary for neonates. *DKA* : 0.1 unit/kg/hr regular insulin as continuous drip. *Severe hyperkalemia* : (greater than 7 mEq/l): 0.1 unit/kg with 25% glucose 0.5g/kg (2ml/kg) over 30 minutes; may repeat in 30-60 minutes OR begin D25W 1-2 ml/kg/hr with 0.05-0.1unit insulin/kg/hr **Adjust dose in renal failure.**					**X** **X**		Novolin Regular is the only insulin that can be given intravenously; only form to be added to TPN Discard insulin infusion after 24 hours Insulin drip with new IV tubing: to ensure proper drug delivery, fill tubing with insulin infusion solution, wait 30 min, flush line and connect tubing to patient. **HIGH ALERT MESSAGE: DO NOT USE "U" for units. Spell out the word "units".** Once punctured - date vial for 28 days
Iron Dextran Complex (Infed®) Iron Salt	**A,B,C,D**		**Y** **Y** **Y**	Intermittent Continuous Intermittent	Dose depends upon iron deficiency, may be administered undiluted **Adult** *_Test dose:_ 25 mg over30 seconds, observe over 1 hour for allergic reaction; give remaining dose, **MAX rate: 50mg/min; MAX dose: 100 mg;** flush with 10 ml of NS Continuous when added to TPN **Pediatric** *_Test dose:_ Infant: 12.5, Children: 25 mg , observe over 1 hour for allergic reaction; give remaining dose at 50mg/min; **MAX dose: 50 mg;** flush with 10 ml of NS							**Epinephrine should be available to treat allergic reactions** *Test dose required prior to first therapeutic dose.
♥**Isoproterenol** (Isuprel®) Adrenergic Agonist	**A,D**		**N** **Y**	IV Push Continuous	**Adult** Dosage based on desired clinical response; **MAX dose: 20 mcg/minute** *Heart block:* Initial 0.02-0.06 mg over 1 minute; followed by 0.01-0.2 mg additional doses *Shock:* 0.5 to 5 mcg/min by infusion; titrate according to heart rate; central venous pressure, BP, and urine flow **Pediatric** 0.05-2 mcg/kg/min; begin at minimum dose and increase every 5-10 min by 0.1 mg/kg/min until desired patient response or side effects. **MAX dose: 2 mcg/kg/min**	**X**						**Required Monitoring: cardiac, heart/respiratory rate;** monitor arterial blood gas, arterial blood pressure; HR greater than 100 bpm: decrease infusion rate or temporarily discontinue infusion, notify MD. HR greater than 130 may induce ventricular arrhythmias Side effects: sweating, nervousness, hypotension weakness, dizziness, palpitations, and tremor,
IVIG (Gamimune®) (Gamunex®) (Gamigard®) (Carimune®) Immune globulin	**A,B,C,D**			Intermittent	**Adult** *Idiopathic Thrombocytopenia Purpura (ITP):* 400 mg/kg/day for 2-5 days, followed by 400-1000 mg/kg as single infusion to keep platelet count above 30,000/mm3 ***Initial rate:* 0.5 ml/kg/hr increased every 30 minutes to MAX rate: 4 ml/kg/hr** **Pediatric** *Idiopathic thrombocytopernia Purpura (ITP):* 800-1000 mg/kg IV in 1-2 doses *Kawasaki's disease:* 2g/kg IV as a single dose over 10-12 hr or 400 mg/kg daily on four consecutive days; start within the first 10 days of illness.							**Epinephrine should be available to treat allergic reactions** Monitor blood pressure, renal functional and urine output Recommended: patients beginning therapy with IVIG or switching one IVIG product to another be started at lower rates and advanced to maximal rate if they have tolerated several infusions at intermediate rates of infusion; individualize rates for each patient. Patients with renal disease or at risk for thrombotic events should not be infused rapidly with any IVIG product. **CARIMUNE:** Initial flow rate of 10-20 drops (0.5-1.0 mL) per minute.; after 15-30 minutes increase rate 30-50 drops (1.5-2.5 mL) per minute; following first bottle of 3% solution, if patient shows good tolerance, subsequent infusions rate increases gradually allowing 15-30 minutes before each increment. **GAMMAGARD LIQUID** :initial rate of 0.5 mL/kg/hr (0.8 mg/kg/min); gradually increase every 30 minutes to rate of 5.0 mL/kg/hr (8.9 mg/kg/min;) if well tolerated; subsequent initial

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												infusion rate and rate of escalation based on previous infusion history; however, maximum rate attained during first infusion may be appropriate for subsequent therapy. **GAMUNEX**: initial infusion rate of 0.01mg/kg/min for 30 minutes; if well tolerated, gradually increase rate to maximum of 8 mg/kg/min
Ketamine					12/06 Nursing Protocol in process for use in pain management that has not responded to other pain medications Contact Med-Surg Director for appropriate monitoring of patient until protocol is released							
Ketorolac (Toradol®) Nonsteroidal Anti-inflammatory	**A,B,C,D**		**N**	Intermittent	**Adult** 15-30 mg over 15-20 min every 6 hr as needed **MAX daily dose:120 mg; MAX duration: 5 days MAX daily dose: 60 mg if age greater then 60; impaired renal function or weight less than 50 kg** **Pediatric**							Monitor signs of pain relief, observe for weight gain, edema, bleeding, bruising, mental confusion, and disorientation. **MAX DURATION OF THERAPY: 5 days (includes combination of parenteral with oral therapy)** MMC P&T Committee approval for Pharmacy dose modification based on patient criteria. When patient meets MMC P&T Committee criteria for ketorolac dosage adjustment: age 65 years or older, weight less than 55 kg, creatinine clearance less than 40 ml/min, MMC Pharmacy will automatically adjust dosage and place notification of adjustment sticker in patient's chart.
			N	Intermittent	0.5 mg/kg/dose every 6 hr; **MAX dose: 30 mg every 6 hr or 120 mg/24 hr. MAX duration: 5 days**							
Labetalol (Normodyne®) Beta-Adrenergic Blocker	**A,B,C,D**		**N**	IV Push	**Adult** 20 mg over 2 minutes, repeat with 40-80 mg over 2 minutes at 10 minute intervals; **MAX total dose:300 mg**	**X**						**Required Monitoring continuous IV:** Cardiac and blood pressure. **Goal:** mean arterial pressure reduction of ≤25% over 1 minute to 2 hour with further reduction to 160/80 mm Hg over 2-6 hours IV Push: Maintain patient in supine position for 3 hours, monitor blood pressure every 5 minutes for 30 minutes; then every 30 minutes for 2 hours; then hourly for 6 hours,
	A,B		**Y**	Continuous	50-200 mg at 1-3 mg/min; titrate based on clinical response; may repeat every 6-12 hr. **Pediatric**							
	A,B,C,D		**N**	IV Push	*Hypertensive Emergency:* intermittent dose - 0.2-1 mg/kg/dose every 10 min as needed **MAX dose: 20 mg/dose**							
	A,B		**Y**	Continuous	0.4 -1 mg/kg/hr; **MAX dose: 3 mg/kg/hr**							
Levofloxacin (Levaquin®) Fluoroquinolone Antibiotic **NON-FORMULARY**	**A,B,C,D**		**Y**	Intermittent	**Adult** 250-750 mg/24hr over 1 hr. **Adjust dose in renal failure.**							May cause QT prolongation; use cautiously in patients with CNS disorders or at increased risk for seizures; hypotension may result with more rapid infusion; give 750 mg over 90 minutes **Pediatric Concerns:** cartilage toxicity; use only when necessary.
Levothyroxine (Synthroid®) Thyroid Product	**A,B,C,D**		**N**	IV Push	**Adult** *Myxedema:* Initial: 200 to 500 mcg over 2-3 minutes; Day 2 if no response: 100 to 300 mcg Maintenance: 50-200 mcg daily **Pediatric**							IV form must be prepared immediately prior to administration and should not be admixed with other solutions; notify physician of chest pain, increased pulse, palpitations, or heat intolerance
			N	IV Push	Recommended IV dose: 50-75% of oral dose; the following is 50% of recommended oral dose: Infuse over 2-3 minutes							

Age	IV Dose mcg/kg/day	IV Dose mcg/day
0-6 mo	4-5 mcg/kg/day	12.5-25 mcg/day
6-12 mo	3-4 mcg/kg/day	25-37.5 mcg/day
1-5 yr	2.5-3 mcg/kg/day	37.5-50 mcg/day
6-16 yr	2-2.5 mcg/kg/day	50-75 mcg/day
> 12 yr	1-1.5 mcg/kg/day	≥ 75 mcg/day

♥**Lidocaine** (Xylocaine®) Antiarrhythmic Class IB	**A,B,D**		**N**	IV Push	**Adult** 50-100 mg or 1-1.5 mg/kg over 2-3 minutes; **MAX rate: 50 mg/min**; may repeat dose in 3-5 minutes to **total of 300 mg or 3 mg/kg total bolus over 1 hour**	**X**		**CL-P**				**Required Monitoring for continuous IV: Cardiac and blood pressure. If titration required: transfer to CCU** Central line preferred; must be diluted prior to injection to avoid over dose and possible cardiac arrest.
			Y	Continuous	*Simultaneously* at 20-50 mcg/kg/min (1-4 mg/min)							
			N	IV Push	**Pediatric** 1 mg/kg/dose slow bolus, may repeat two times at 10-15 minute intervals to **Max total dose: 3-5 mg/kg,**							
			Y	Continuous	within first hour; followed by infusion of 20-50mcg/kg/min							
Lorazepam (Ativan®) Benzodiazepine Sedative/Hypnotic	**A,B,C,D**		**N**	IV Push	**Adult** *Status Epilepticus:* 0.05-0.1mg/kg/dose over 2-5 minutes; **MAX single dose: 4 mg;** may repeat in 10-15 minutes; **MAX total dose: 8mg/12 hr**	**X**						**Required: Emergency resuscitation equipment and oxygen** Monitor respirations every 5-10 minutes; periodic pulse and blood pressure, initiate fall precautions
	A	**Y**	**Y**	Continuous	*Sedation:* 0.04-0.5 mg/kg; **MAX dose: 4 mg** *Sedation(ICU Ventilated):* Give bolus of 1 mg IV. Initiate *infusion at 1 mg/hr.* Titrate by 1 mg/hr every hour until desired sedation level according to Ramsey Sedation Scale Maximum dose: 4 mg/hr.	**X**						**Required:** Emergency resuscitation equipment and oxygen **Required:** Continuous Cardiac Monitoring/Pulse Oximetry
	A	In Process	**Y**	Continuous	*Alcohol Withdrawal:* Titrate per patient response based on CIWA Score. Max dose: Undefined	**X**						**Required:** Emergency resuscitation equipment and oxygen **Required:** Continuous Cardiac Monitoring and Continuous Pulse Oximetry Required **Recommended:** Serum Osmolality, CO2, and Anion Gap for infusions greater than 20 mg/hr for 48 hours due to increased risk for propylene glycol Immediately prior to administration, dilute with equal amount of sterile water for injection, sodium chloride injection or 5% dextrose injection
			N	IV Push	**Pediatric** *Status Epilepticus:* 0.05-0.1mg/kg/dose over 2-5 minutes; may repeat 0.05 mg/kg one time in 10-15 minutes; **MAX single dose: 4 mg** *Anxiolytic/Sedation:* 0.05 mg/kg/dose every 4-8 hr; **MAX single dose: 2 mg**							**Flumazenil is antidote. SEE FLUMAZENIL**
♥**Magnesium Sulfate** Electrolyte Replacement	**A,B,D**		**N**	IV Push	**Adult** Dilute dose to 20% or less; **Max rate: 150 mg/minute or less**	**X**						Monitor vital signs every 15 minutes during IV infusion. Rapid infusion: monitor arrhythmias, hypotension, respiratory and CNS depression Magnesium levels should be monitored to avoid
			Y	Continuous	*Preeclampsia:* 4g IV load; then 1-3g/hr,							

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REFERENCES: Lippincott Nursing Drug Handbook 2007, Micromedex, Harriet Lane Handbook 2006

MEDICATION	UNITS	ADMINISTRATION				MONITOR		IV Lines	CHECKS			AUXILIARY INFORMATION
MEDICATION Generic (Brand) ♥*ACLS Drugs*	Medication may be given	MMC Protocol or Pre-Printed Order (PPO)	IV Pump	Route	DOSE and ADMINISTRATION	READILY AVAILABLE AT BEDSIDE Cardiac, O2 Sat, BP	REQUIRED AT BEDSIDE Physician		Check Site Every Hour and PRN	2 RN Check	Set IV Pump for Hourly Infusion	COMMENTS
HIGH ALERT			Y	Intermittent	**MAX dose: 30-40g/24 hr** *Hypomagnesia:* 1 to 5 g over 3 hr							overdose; monitor for diarrhea **HIGH ALERT MESSAGE: MAGNESIUM SULFATE AVAILABILITY IS LIMITED TO SELECT MMC PATIENT CARE AREAS.**
			N	IV Push	*Paroxysmal atrial tachycardia* : 3 to 4 gram over 30 seconds							
					Life-threatening ventricular arrhythmias :							
			N	IV Push	2 to 6 g over several minutes; followed by							
			Y	Continuous	a continuous infusion of 3-20 mg/minutes for 5-48 hr (based on patient response and magnesium levels) **May be added to TPN**							
					Pediatric							
			N	IV Push	*Reactive Airway Disease-Adjunct:* 25 mg/kg/dose							
Mannitol (Osmitrol®) Osmotic Diuretic	**A,B,C,D**				**Adult and children over 12 years of age**							**USE AN IN-LINE FILTER NEEDLE FOR ALL MANNITOL INFUSIONS**
			Y	IV Push	*Test dose (oliguria/renal function):* 200 mg/kg or 12.5g as a 15% to 20% IV over 3-5 min.							Monitor urine output, serum electrolytes and osmolality. if crystals are present; warm in water bath; allow to cool to room temperature Store in warmer at temperature of 35-50° C.
			Y	Intermittent	*Reduction intraocular/intracranial pressure:* 1.5-2 g/kg as a 15%-20% solution over 30-60 min.							
					Oliguria: 50 to 100 g IV as a 15% -25% solution							
			Y	Intermittent	over 90 minutes to several hours.							
			Y	Intermittent	*Prophylaxis oliguria/acute renal failure:* 50-100 gram of a concentrated solution; followed by a 5%-10% solution; concentration determined by fluid requirements							
					Pediatric < 12 years of age							
			Y	Intermittent	*Reduction intraocular/intracranial pressure:* 2 g/kg or 60g/m2 as a 15%-20% solution over 30-60 minutes.							
Meperidine (Demerol®) Opioid Analgesic	**A,B,C,D**		N	IV Push	**Adult** 50-150 mg/dose every 3-4 hr as needed; **MAX dose: 600 mg/day** 25-50 mg prior to Ampho B or blood products **Adjust dose in renal and hepatic failure.**							Monitor pain relief, respiratory rate, mental status heart rate, sedation level, and blood pressure. **NOT RECOMMENDED for use in chronic pain**
			Y	Continuous	dilute to 1 mg/ml and give at rate of 0.5-1mg/min; titrate to clinical response							
					Pediatric							
			N	IV Push	1-1.5 mg/kg/dose every 3-4 hr as needed; **MAX dose: 100 mg**							
Methylergonovine (Methergine®) Ergot Alkaloid	**A,D**		N	IV Push	**Adult** 0.2 mg over 1 minute after delivery; may repeat as required at intervals of 2-4 hr							Monitor blood pressure and uterine contractions; May cause nausea, vomiting, dizziness, increased blood pressure, headache, ringing in the ears, chest pain, or shortness of breath.
Metoprolol (Lopressor®) Beta-Adrenergic Blocker	**A,B**		N	IV Push	**Adult** *Acute MI:* 2.5-5 mg rapid IV at 2-5 minute intervals: **MAX dose: 15 mg over 10-15 minutes,** followed by oral dosing *Atrial tachycardia following AMI:* 2.5-5 mg rapid IV at 2-5 minute intervals: **MAX dose: 15 mg over 10-15 minutes;** discontinue when therapeutic response achieved or SBP less than 100 mmHg or HR less than 50.	X						**Required Monitoring: cardiac, heart rate, blood pressure**
Midazolam (Versed®) Benzodiazepine	**A,B,D**		N	IV Push	**Adult** *Moderate sedation:* up to 2.5 mg over 2 minutes, repeat in 2 minutes at 25% of initial dose over 2minutes; incremental increase as needed to 5 to 10 mg; maintenance: incremental titration of 25% of dose used to reach desired response *Anesthesia induction:* 0.2-0.3mg/kg over 20-30 sec, incremental titration of 25% as needed to complete induction	X	X					**Required Monitoring: Cardiac, respiratory depression.** **Flumazenil (Romazicon®) is the ANTIDOTE** **SEE FLUMAZENIL.**
	A		Y	Continuous	*Continued sedation:* 100 mg in 250 ml infused at 0.01 to 0.05 mg/kg over several minutes,; repeat every 10-15 min for adequate sedation. maintenance: 0.02-0.1 mg/kg/hr **Adjust dose in renal failure.**							
					Pediatric							
	D		N	IV Push	*less than 5 years*: 0.05-0.1 mg/kg/dose over 2-3 min; repeat in 2-3 min intervals **to MAX total dose:6 mg** *6 to 12 years:* 0.025-0.05 mg/kg/dose over 2-3min; repeat in 2-3 min intervals **to MAX total dose:10mg** *greater than 12 years:* adult dose **to MAX total dose: 10 mg**	X	X					
	A		Y	Continuous	*less than 32 weeks:0.5 mcg/kg/min* *greater than 32 weeks:* 1 mcg/kg/min *Infant/children:* 1-2 mcg/kg/min. **Adjust dose in renal failure.**							
Milrinone (Primacor®) Phosphodiesterase Inhibitor	**A,B****		N	IV Push	Loading dose: 50 mcg/kg over 10 minutes, followed	X						**Required: Cardiac and blood pressure**
			Y	Continuous	by 0.375 to 0.75 mcg/kg/min; titrated according to hemodynamic and clinical response **Adjust dose in renal failure**							monitor serum potassium. ****If initiating or titration required: transfer to CCU**
Morphine (Astramorph®, Duramorph®) Narcotic Analgesic HIGH ALERT	**A,B,C,D**	**PPO**	N	IV Push	**Adult** 2.5-15 mg over 4-5 min every 4 hr as needed,							Monitor pain relief, respiratory rate, mental status, heart rate, sedation level, and blood pressure. **Required: Resuscitation equipment and naloxone (Narcan®) re available. Naloxone is antidote SEE NALOXONE.** **HIGH ALERT MESSAGE: DO NOT CONFUSE with HYDROMORPHONE.**
			Y	Continuous	Loading dose of 15 mg followed by continuous infusion of 0.8-10mg/hr							
					Epidural : 5 mg; if inadequate response at 1 hr, 1-2 mg at intervals sufficient to assess efficacy; **MAX dose: 10mg/24hr** **Adjust dose in renal failure**							
					Intrathecal: single 0.2 to 1 mg dose; **repeat dose**							

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MEDICATION Generic (Brand) ♥*ACLS Drugs*	Medication may be given	MMC Protocol or Pre-Printed Order (PPO)	IV Pump	Route	DOSE and ADMINISTRATION	READILY AVAILABLE AT BEDSIDE Cardiac, O2 Sat, BP	REQUIRED AT BEDSIDE Physician		Check Site Every Hour and PRN	2 RN Check	Set IV Pump for Hourly Infusion	COMMENTS
			N	IV Push	**NOT recommended** **Pediatric** **Dosing ranges; titrate to effect** *neonate:* 0.05-0.2 mg/kg/dose slow IV every 4 hrs *infant/children:* 0.1-02 mg/kg/dose every 2-4 hr **MAX dose: 15 mg/dose**							
			Y	Continuous	*neonate:* 0.01-00.2 mg/kg/hr *infant/children:* 0.01 - 0.04 mg/kg/hr **Adjust dose in renal failure**							
Moxifloxacin (Avelox) Fluoroquinolone Antibiotic	**A,B,C,D**		**Y**	Intermittent	**Adult** 400 mg/24hr over 1 hr. **No dosage adjustment in renal failure.**							May cause QT prolongation; use cautiously in patients with CNS disorders or at increased risk for seizures; don not give as rapid or bolus infusion. Pediatric Concerns: cartilage toxicity; use only when necessary.
♥**Naloxone** (Narcan®) **Narcotic Agonist Antidote**	**A,B,C,D**			IV Push	**Adult** *Narcotic overdose:* 0.4-2 mg every 2-3 min as needed							Monitor respiratory rate, heart rate, and blood pressure. The duration of action of the narcotic may be longer than that of the naloxone and patients may relapse into respiratory depression; frequent monitoring of respiratory rate is necessary as additional naloxone doses may be required.
				Continuous	dilute to 10 ml; 80 mcg/min, **MAX rate: 0.4 mg/15 sec**							
				IV Push	**Pediatric** *less than 20 kg:* 0.1 mg/kg/dose; repeat in 2-3 min as needed *greater than 20 kg or greater than 5 years:* 2mg/dose; repeat in 2-3 min as needed							
				Continuous	0.005 mg/kg loading dose followed by 0.0025 mg/kg/hr has be recommended. Range reported - 0.0025-0.16 mg/kg/hr; taper gradually Neonatal concentration (0.02 mg/ml) is no longer recommended due to large volumes of administration, 2 mg=100ml.							
Nesiritide (Natrecor®) Human B-type natriuretic peptide	**A,B**	**N3.15**		Intermittent	**Adult** 2 µg/kg bolus over one minute followed by a							Withdraw the bolus (2 mcg/kg) from the prepared infusion bag; Prior to connecting to access port or administering bolus or infusion: prime the IV tubing with infusion solution Monitor blood pressure; if hypotension occurs, the dose should be reduced or the drug discontinued. **See Nesiritide PPO and contact physician for additional orders**
			Y	Continuous	continuous infusion of 0.01 µg/kg/min Titration of infusion dose: 1 mcg/kg bolus followed by 0.005 mcg/kg/min; **MAX frequency: 3 hr** **MAX infusion dose: 0.03 mcg/kg/min** Bolus volume (mL) = patient wt (kg) x 0.33 Infusion flow rate (mL/hr) = patient wt (kg) x 0.1							
Nitroglycerin (Tridil®) Vasodilator	**A,B****		**Y**	Continuous	**Adult** 5 mcg/min, increased by 5 mcg/min every 3-5 min to 20 mcg/min; if no response at 20 mcg/min, increase by 10 mcg/min every 3-5 min., up to 100 mcg/min may be required; tolerance develops at 200 mcg/min							Monitor blood pressure and heart rate. Must be glass bottle; Use the nonabsorbable polyvinyl tubing available for infusing nitroglycerin ****If titration required: transfer to CCU**
Nitroprusside (Nipride) Vasodilator	**A** **NOT SDU**		**Y**	Continuous	**Adult** 0.25-0.5 mcg/kg/min; increase in increments of 0.5 mcg/kg/min; titrate to desired hemodynamic response; **MAX dose: 10 mcg/kg/min.**	**X**						**Required Monitoring: blood pressure; fluid intake and output** **Controlled rate infusion device required** Goal: mean arterial pressure reduction of 25% or less over 1 min to 2 hour with further reduction to 160/80 mm Hg over 2-6 hours Rapid infusion may cause nausea, vomiting, restlessness, headache, dizziness, abdominal pain Recommended: thiocyanate levels in infusions greater than 72 hr is; levels greater than 100 mcg/ml are associated with cyanide toxicity Nitroprusside is converted to cyanide which is then converted to thiocyanate. Cyanide toxicity can produce hypotension, methemaglobinemia and metabolic acidosis. Thiocyanate toxicity can produce psychosis and seizures. Protect from light; any green, blue, or red solution should be discarded
♥**Norepinephrine** (Levophed®) Adrenergic Agonist	**A** **NOT SDU**		**Y**	Continuous	**Adult** *Initial:* 8-12 mcg/min and titrate to desired blood pressure response; *Maintenance* : 2-4 mcg/min			**CL-R**				**Required: Central line to avoid extravasation;** If necessary to start as peripheral infusion; monitor IV site hourly until CL is placed **Controlled rate infusion device required** TREAT extravasation with 5-10 mg phentolamine in
Oxytocin (Pitocin®) Hormone	**A,D**	**PPO**	**Y**	Continuous	**Adult** 0.001-0.002 units/minute, titrate increase every 15-30 minutes based upon contractions **Max dose: 0.006 units/minute**							Monitor fluid intake and output during infusion; fetal monitoring; monitor uterine contractions, heart rate, blood pressure, intrauterine pressure every 5 minutes Overdose symptoms include: tetanic uterine contractions, uterine rupture, SIADH, and seizure. **Controlled rate infusion device required**
Parenteral Nutrition **Central**	**A,B,C,D**	**746-093 Adult**	**Y**		**Adult and Pediatric** **Concentration greater than 10%** Administer at prescribed rate; DO NOT increase rate to "catch up" or decrease rate to conserve Initial rate unless otherwise indicated: 40 ml/hr					**X**		**Required Central Line: concentration greater 10%** Baseline Assessment: vital signs, weight, electrolytes, BUN, creatinine. Direct patient observation during first 10 minutes of infusion for signs and symptoms of anaphylaxis If TPN contains lipids, DO NOT use 22 micron filter Change tubing and filter every 24 hours
Parenteral Nutrition **Peripheral**	**A,B,C,D**	**746-093 Adult**	**Y**		**Adult and Pediatric** Administer at prescribed rate; DO NOT increase rate to "catch up" or decrease rate to conserve Initial rate unless otherwise indicated: 40 ml/hr					**X**		**Required Central Line: concentration greater 10%** Baseline Assessment: vital signs, weight, electrolytes, BUN, creatinine. Direct patient observation during first 10 minutes of infusion for signs and symptoms of anaphylaxis If TPN contains lipids, DO NOT use 22 micron filter Change tubing and filter every 24 hours

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Phenobarbital (Luminal®)	**A,B,D**			IV Push	**Adult** *Status epilepticus :* 10-20 mg/kg over 10-15 minutes; repeat if necessary; **MAX rate: 60 mg/min**	**X**	**X**					**Required: resuscitation equipment;** Monitor blood pressure and heart rate Administer slowly under close supervision; Observe patient for excessive sedation and respiratory depression; Avoid abrupt discontinuation
Barbiturate Sedative				IV Push	**Pediatric** *Status epilepticus:* 15-20 mg/kg in a single or divided dose; followed by 5 mg/kg every 15-30 minutes if required. **MAX dose: 30 mg/kg** **MAX rate: not to exceed 1 mg/kg/min**							
Phentolamine generic available only	**A,B,C**		**N**		**Adult** *Drug extravasation:* 5-10 mg in 10 ml normal saline; Inject in divided dose around extravasation site							Extravasation treatment: within 12 hr using a 27-30 gauge needle; may repeat if necessary **SEE EXTRAVASATION POLICY THAT ACCOMPANIES THIS DOCUMENT**
Previous Brand (Regitine®)	**A**		**N**	IV Push	*Diagnosis of pheochromocytoma:* 5 mg							
Alpha-adrenergic Blocker	**D**		**N**		**Pediatrics** *Drug extravasation :* 0.5-1 mg/ml with normal saline; Inject 1-5 ml in 5 divided doses around extravasation site. **MAX TOTAL dose: 0.1-0.2 mg/kg or 5 mg**							
Extravasation Antidote	**A**		**N**	IV Push	*Diagnosis of pheochromocytoma:* 0.05-1 mg/kg/dose; **MAX dose: 5 mg**							
	D		**N**		**Neonates** *Drug extravasation:* 0.25-0.5 mg/ml with normal saline; Inject 1 ml in 5 dived doses of 0.2 ml around extravasation site. **MAX total dose: 0.1 mg/kg or 2.5 mg**							
Phenylephrine (Neo-Synephrine®)	**A** **NOT SDU**			IV Push	0.1-0.5 mg/dose over 30 seconds every 10-15 min as needed;	**X**		**CL-P***			**X****	***Central line preferred, or PICC line or large peripheral vein** ****Required for peripheral infusion:** **Required Monitoring: blood pressure, heart rate, CO, PAWP, central venous pressure, urine output** **Avoid extravasation: TREAT extravasation with 5-10 mg phentolamine. SEE PHENTOLAMINE**
Adrenergic Agonist			**Y**	Continuous	*Severe hypotension and shock:* Initial: 100-180 mcg/min; titrate to clinical response Maintenance:40-60 mcg/min							
									X*			
Phytonadione (AquaMEPHYTON®)	**A,B,C,D**		**N**	IV Push	**Adult** 10 mg slow IV; may repeat every 6-8 hr as needed.							Despite dilution and slow IV or IM administration of phytonadione, severe reactions, including hypersensitivity, anaphylaxis, shock, cardiac and/or respiratory arrest, and fatalities have occurred during and immediately after Injection. Some patients have exhibited these reactions during first dose. IV and IM routes should be restricted to to those situations where the subcutaneous route is not feasible and the serious risk involved is considered justified. Monitor blood pressure, heart rate, PT and INR. Protect from light; wrap in aluminum foil or other dark cover
Fat Soluble Vitamin			**Y**	Intermittent	May be given in 50 ml saline over 30 minutes **MAX rate: 1 mg/minute.**							
					Pediatric							
			N	IV Push	*Oral Anticoagulation overdose:* Infant: 1-2 mg/dose, slow IV every 4-8 hr Children: 2.5-10 mg/dose slow IV							
			N	IV Push	*Vitamin K Deficiency:* 1-2 mg/dose x one dose, slow IV							
Potassium Chloride	**A,B,C,D**		**Y**	Continuous	*Peripheral line concentration:* **ABSOLUTE MAX: 80 mEq/L; usual max: 40 mEq/L**	**X***						***Required Monitoring: Continuous cardiac monitoring for rates greater than 10 mEq/hour.**
Potassium Salt			**Y**	Continuous	*Central line concentration:* up to 20 mEq/100 ml **MAX dose/24hr: 3 mEq/kg or 400 mEq**							**Must dilute prior to administration;** may add to TPN. Monitor serum potassium, glucose, chloride, urine output, and cardiac monitoring
HIGH ALERT	**C,D**		**Y**	Intermittent	*General floors* : 10 mEq/100 ml over 1 hour							
	A,B		**Y**	Intermittent	*Cardiac monitored units* : 20 mEq/hr **Max rate: 20 mEq/hour.**							**DO NOT GIVE IV PUSH** **HIGH ALERT MESSAGE: POTASSIUM CHLORIDE AVAILABILITY IS LIMITED TO SELECT MMC PATIENT CARE AREAS.**
					Pediatric							
			Y	Intermittent	0.5-1 mEq/kg/dose at rate of 0.5 mEq/kg/hr over 1-2 hours **Max rate: 1 mEq/kg/hr** **Max total daily dose: 3 mEq/kg/day or 400 mEq/day**	**X**						
Potassium Phosphate	**A,B,C,D**				**Adult** 0.15-0.3 mmols/kg over 12 hr, repeat as needed or 15 mmols/dose over 2 hr if serum phosphate < 2mg/dl Alternatively:	**X**						**Required Monitoring: Continuous cardiac monitoring** Phosphate should be order in mMols and the mEq of potassium should be stated (e.g. 15 mMols phosphate will provide 22 mEq of potassium)
			Y	Intermittent	*Low dose:* 0.16 mmols/kg over 4-6 hr							
Phosphate salt			**Y**	Intermittent	*Intermediate dose (serum phosphate 1.6-2.2mg/dl):* 0.32 mmols/kg over 6 hr.							**HIGH ALERT MESSAGE: POTASSIUM PHOSPHATE IS NOT STORED IN MMC PATIENT CARE AREAS** **ALL ORDERS FOR POTASSIUM PHOSPHATE ARE PREPARED, LABELED, AND DISPENSED FROM THE PHARMACY DEPARTMENT**
HIGH ALERT					*High dose* (serum phosphate <1.5 mg/dl): 0.64 mmols/kg							
					Pediatric							
			Y	Intermittent	*Low dose (recent/uncomplicated loss):* 0.08 mg/kg over 6 hr	**X**						
			Y	Intermittent	*Intermediate dose (serum phosphate 0.5-1 mg/dl):* 0.16-0.24 mmols/kg over 4-6 hr.							
					High dose (serum phosphate <0.5 mg/dl): 0.36 mmols/kg over 6 hr.							
♥**Procainamide** (Pronestyl®)	**A,B,C**		**N**	IV Push	**Adult** Load: 100 mg over 2 minutes every 5 minutes until arrhythmias controlled **Max total dose: 1000 mg**	**X**						**Required Monitoring: Cardiac and blood pressure** Monitor for prolonged QT intervals and QRS complexes, heart block, or increased arrhythmias; Laboratory monitoring; complete blood count; Serum levels of procainamide and NAPA in patients with renal failure or receiving constant infusion greater than 3 mg/min for longer than 24 hrs
Antiarrhythmic, Class IA			**Y**	Continuous	Alternative Load: 500-600 mg at constant rate over 25-30 min; followed by continuous infusion of 2-6 mg/minute							
					Pediatric Load: 2-6 mg/kg/dose over 5 minutes; **Max dose: 100 mg/dose**; may repeat every 5-10 min to **Max loading dose: 15mg/kg/load;** **Do Not Exceed 500 mg/30 min.**							
			Y	Continuous	20-80 mcg/kg/min: **Max dose: 2 g/24 hr.**							
Promethazine (Phenergan®)	**A,B,C,D**		**Y**	Intermittent	**Adult** *Nausea/Vomiting:* 12.5-25 mg over at least 10 minute every 4 hr as needed							**Recommended routes of administration are IM or rectal** **Recommended:** Limit dose to no more than 12.5mg IV for any one dose Before administering Phenergan IV, educate patient to immediately inform you if burning or pain occurs during or after the infusion. If this occurs immediately discontinue infusion, monitor condition of infusion site, and report this to the provider. Phenergan ordered IV will be administered in the following manner: 1. Dilute in at least 25 ml IV solution minibags to reduce vesicant effects
Phenothiazine Derivative					**MAX concentration: 25 mg/ml;**							
			Y	Intermittent	**Pediatric- children greater than 2 yrs of age** *Nausea/Vomiting:* 0.25-1mg/kg/dose every 4-6 hr as needed							

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REFERENCES: Lippincott Nursing Drug Handbook 2007, Micromedex, Harriet Lane Handbook 2006

MEDICATION	**UNITS**	**ADMINISTRATION**				**MONITOR**		**IV Lines**	**CHECKS**			**AUXILIARY INFORMATION**
MEDICATION Generic (Brand) ♥***ACLS Drugs***	**Medication may be given**	**MMC Protocol or Pre-Printed Order (PPO)**	**IV Pump**	**Route**	**DOSE and ADMINISTRATION**	**READILY AVAILABLE AT BEDSIDE Cardiac, O2 Sat, BP**	**REQUIRED AT BEDSIDE Physician**		**Check Site Every Hour and PRN**	**2 RN Check**	**Set IV Pump for Hourly Infusion**	**COMMENTS**
												and enable slow administration (premix in AcuDose or Pharmacy) 2, Administered over a minimum of 10 minutes using an IV pump 3. Check patency of access site prior to administration 4. Remain with the patient for first 1-2 minutes of the infusion to check for signs of extravasation 5. For patients with a running IV line, connect tubing at the port furthest from the vein
Propofol (Diprivan®) General Anesthetic	**A,D NOT SDU**		**N Y N Y**	IV Push Continuous IV Push Continuous	**Adult** Avoid bolus injection. 5 mcg/kg/min over 5-10 minutes, followed by 5-10 mcg/kg/min until desired level of sedation Maintenance: 5-50 mcg/kg/min Adjust dose at minimum period of 5 minute intervals **Pediatric** *Induction:* age 3 and older: 2.5-3.5 mg/kg over 20-30 seconds *Maintenance:* 125-300 mcg/kg/min	**X X**						Propofol (Diprivan) is administered only to intubated, mechanically ventilated adult Intensive Care Unit-appropriate patients to provide continuous sedation and control of stress responses. In this setting, Propofol should be administered only by persons (including ICU and ER RNs) skilled in the medical management of critically ill patients and trained in cardiovascular resuscitation and airway management. Do not discontinue abruptly; wean to avoid rapid awakening of patient Sedation with Propofol: 1. Initiate infusion rate slowly in order to minimize hypotension*. 2. The infusion rate should be increased by increments of 5-10 mcg/kg/min. 3. A minimum period of 5 minutes between adjustments should be followed. 4. Maintenance rates of 5 to 50 mcg/kg/min are appropriate 5. Assess sedation effects (with Ramsey Sedation Scale) every 2-3 hours during infusion and every 1 hour while titrating. 6. Should not be infused for longer than 5 days without providing a drug holiday**. *In the event of hypotension (systolic blood pressure less than 90 mmHg), Propofol is to be turned down or off. If hypotension continues, notify physician immediately. **RN will notify physician as 5-day deadline approaches. Monitor triglyceride levels at least weekly while on infusion. Change IV tubing every 12 hours
Propranolol (Inderal)	**A,B,D**		**N Y**	IV Push Intermittent	**Adult** *Arrhythmias* : 1-3 mg at 1 mg/min or less; may repeat in 2 minutes; subsequent doses may be given after 4 or more hours 0.1 mg-0.2mg increments over 10-15 minutes **Pediatric** *Arrhythmias:* 0.01-0.1 mg/kg over 10 min; may repeat every 6-8 hr. **Max dose: Infant:1 mg/dose** **Children 3 mg/dose**							Prior to administration: assess blood pressure, heart rate, apical pulse; if severe hypotension develops, consult prescriber **IV and Oral doses are NOT equivalent**
Protamine Heparin Antidote	**A,B,C,D**		**N**	IV Push	**Adult and Pediatric** Dosage determined by heparin dose; 1 mg protamine neutralizes 90 units beef lung heparin or 115 units porcine intestinal heparin 10mg/ml over 1-3 min; no more than 50mg/10min **Ratio of Protamine:Heparin** *Few minutes since heparin:* 1-1.5 mg protamine for each 90 or 115 units of heparin given *30-60min since heparin:* 0.5-0.75 mg protamine for each 90 or 115 units of heparin given *2hours or longer since heparin:* 0.25-0.375 mg protamine for each 90 or 115 units of heparin given **Max dose/10 minutes: 50 mg;** **MAX rate: 5 mg/min** **MAX concentration: 10 mg/ml**	**X**						**Monitor for severe hypotension or anaphylaxis** Rapid infusions can cause hypotension, dyspnea, bradycardia, and pulmonary hypertension,
Reteplase (Retavase®) Tissue plasminogen activator	**A NOT SDU**	**PPO**	**N**	IV Push	**Adult** *AMI:* Two 10 unit bolus injections, each given over 2 minutes; the second 10 unit dose given 30 minutes after the initiation of the first injection	**X***				**X**		***Required Monitoring: EKG for arrhythmias** Do not administer with other IV medications Monitor for sign of serious bleeding or anaphylaxis after first dose Alteplase (Activase®) used for central venous catheter clearance. SEE ALTEPLASE.
♥**Sodium Bicarbonate** 8.4% (Neut®) Sodium Salt	**A,B,C,D**		**Y Y**	Intermittent Intermittent	**Adult** IVP may be administered undiluted; IVPB and continuous must be diluted prior to administration; dosage determined by severity of the acidosis. *Metabolic acidosis:* 2-5 mEq/kg over 4-8 hrs.; subsequent doses based on patient acid-base status *Cardiac Arrest:* 1 mEq/kg, followed by 0.5 mEq/kg every 10 min depending on arterial blood gasses **Pediatric** *Metabolic acidosis:* 2-5 mEq/kg over 4-8 hrs.; subsequent doses based on patient acid-base status *Cardiac Arrest* : 0.5-1 mEq/kg, followed by 0.5 mEq/kg every 10 min depending on arterial blood gasses Infant/Children under 2 yrs: 1 mEq/kg of **4.2% solution**; may repeat based on blood gas values to **Max daily dose: 8 mEq/kg**							Monitor blood pH, arterial pO2 and pCO2, electrolyte concentrations Not compatible with TPN
Sodium Chloride 3% Sodium Salt **HIGH ALERT**	**A,B,C,D**			Intermittent	**Determine sodium mEq replacement:** **Formula**=(Desired sodium mEq/L - actual sodium mEq/l) x (0.6 x wt [kg]). **Adult** *Symptomatic hyponatremia:* replacement based on patient sodium mEq. Administer one-half dose over 8 hr; check serum electrolyte concentrations to assess need for additional sodium chloride. IV treatment Continue until serum sodium is 125-130 mEq/L or neurologic symptoms improve. **Max rate: 100 ml/hr** **Pediatric** *Symptomatic hyponatremia:* replacement based on patient sodium mEq. Use 125 mEq/L as desired concentration; correct serum sodium in 5 mEq/L dose increments. **Max rate: 1 mEq/kg/hr**			**CL-P CL-P**				Administer in a large vein, avoid extravasation; May add to TPN; adjust dose based on patient status 1 ml of 3% sodium chloride = 0.36 mEq Na = 30 mg Na **HIGH ALERT MESSAGE: ALL ORDERS FOR CONCENTRATED SODIUM CHLORIDE ARE PREPARED, LABELED, AND DISPENSED FROM THE PHARMACY DEPARTMENT**

MEMORIAL MEDICAL CENTER INTRAVENOUS MEDICATION USE GUIDELINES

Revised: 11-2010

PATIENT CARE UNITS:

A = Critical Care: ICU, StepDown, Emergency Department, Cardio Vascular Lab, Operating Room, Post Anesthesia Care Unit

B = Telemetry: Cardiac monitored patients, Endoscopy, Imaging, Ambulatory Surgery, HealthPlex

C = Medical/Surgical: Orthopedics, Adult Medical/Surgical, Dialysis, Infusion Therapy, Oncology, (See Chemotherapy (cytotoxic) drug administration policies)

D = Maternal/Child: Mother/Baby, Labor & Delivery, Pediatrics (Pediatric doses are not inclusive; refer to medication references)

♥**ACLS Drugs: Any ACLS drug may be given on any unit during a code**

NOTE: Guidelines for IV medications apply to all patient care areas except Special Care Nursery

IV LINES:

CL-R = Central Line Required

CL-P = Central line Preferred

AL-R = Arterial Line Required

PL = Peripheral

*** = See Auxiliary Information for additional information**

REFERENCES: Lippincott Nursing Drug Handbook 2007, Micromedex, Harriet Lane Handbook 2006

MEDICATION	UNITS	ADMINISTRATION				MONITOR		IV Lines	CHECKS			AUXILIARY INFORMATION
MEDICATION Generic (Brand) ♥*ACLS Drugs*	Medication may be given	MMC Protocol or Pre-Printed Order (PPO)	IV Pump	Route	DOSE and ADMINISTRATION	READILY AVAILABLE AT BEDSIDE Cardiac, O2 Sat, BP	REQUIRED AT BEDSIDE Physician		Check Site Every Hour and PRN	2 RN Check	Set IV Pump for Hourly Infusion	COMMENTS
					Max dose 100-150 mEq/day							
Tirofiban (Aggrastat®) Glycoprotein IIb/IIIa inhibitor **NON-FORMULARY**	**A,B**		**Y**	Continuous	**Adult** *Medical or PCI treatment of Acute Coronary Syndrome:* 0.4 mcg/kg/min for 30 minutes, followed by 0.1 mcg/kg/min; continue dosing through angioplasty and for 12-24 hr following angioplasty or atherectomy; **Adjust dose in renal failure**							Monitor platelet count, hemoglobin and hematocrit prior to treatment, within 6 hours following loading dose and at least daily during therapy Requires concurrent heparin therapy, monitor APTT levels
Tobramycin (Nebcin®) Aminoglycoside Antibiotic	**A,B,C,D**		**Y** **Y**	Intermittent Intermittent	**Adult** 1-2.5 mg/kg/dose over 30 minutes every 8 hr; obtain trough drug level prior to 3rd dose **Adjust dose in renal failure.** **Pediatric** Children: 6-7.5 mg/kg/24 hr over 30 minutes divided every 8 hr; Cystic Fibrosis: 7.5-10 mg/kg/24 hr divided every 8 hr; ***Neonate, IM/IV*** (see table below)							Pharmacy follows patients on an aminoglycoside and will assist in monitoring patient peak and trough levels as well as other monitoring. Call Pharmacy at ext 2235 for questions or assistance. Draw peak level 30 minutes after 30 minute infusion; draw trough 30 minutes before the next dose. Monitor urine output, BUN, creatinine, peak and trough Peak: 5-10 mcg/ml; Trough 1-2 mcg/ml.
Trimethoprim-Sulfamethoxazole (Bactrim IV®, Septra IV® Antibiotic	**A,B,C,D**		**Y** **Y**	Intermittent Intermittent	Dosing is based on trimethoprim component **Adult** 8-10 mg/kg/day in 2-4 divided doses; infuse over 1-1.5 hr **MAX total daily dose: 960 mg (trimethoprim)** *PCP treatment:* 15-20 mg/kg/day in 3-4 divided doses for 14-21 days **Pediatric** *Minor infections* : 8-10 mg/kg/24 hr divided in 2 daily doses over 1-1.5 hr *Severe infection/PCP* : 20 mg/kg/24 hr divided every 6-8 hr over 1-1.5 hr *PCP prophylaxis:* 5-10 mg/kg/24 hr (150 mg/m2/daydivided in 2 daily doses x 3 days/wk) infuse over 1-1.5 hr; **MAX total daily dose: 320 mg** **Adjust dose in renal failure.**							Not recommended for use in infants less than 2 months; may cause kernicterus DO NOT use at term during pregnancy; consult OB physician for patients greater than 37 weeks
Vancomycin (Vancocin®) Antibiotic	**A,B,C,D**	**Rx**	**Y** **Y**	Intermittent Intermittent	**Adult** MMC Dosing: Initial Dose: Patient weight 55 kg or greater - 1000 mg (1 gm); Patient less than 55 kg - 750 mg Interval (based on estimated CrCl) Estimated CrCl 50ml/min or greater - every 12 hrs; Estimated CrCl less than 50 ml/min - every 24 hrs **Pediatric** *CNS:* Infants/children: 60mg/kg/24 hr divided every 6-8 hr *Other Infections* : 40 mg/kg/24 hr divided every 6-8 hr. **MAX: 1g/dose**							Pharmacy follows patients on vancomycin and will assist in monitoring patient peak and trough levels as well as other monitoring. Call Pharmacy at ext 2235 for questions or assistance. Obtain trough level with 3rd dose and every 10 days and serum creatinine twice weekly during therapy in patients with normal renal function; or as needed in presence of changing renal function Monitor for Red Man Syndrome (facial flushing with infusion); slow future infusions to 2 hr and consider premedication:antihistamine and acetaminophen. **May be infused over 120 minutes if 60 minutes not tolerated.**
♥**Vasopressin** (Pitressin®) Antidiuretic Hormone	**A,D** **NOT SDU**		**Y** **Y**	Continuous Continuous	**Adult** *Upper GI bleed* ; 0.2-0.4 units/min; **titrate to Max dose: 1unit/min** **Pediatric** *Upper GI bleed:* 0.002-0.005 units/kg/min; titrate to **Max dose:** 0.01 units/kg/min/12 hr, then taper over 24-48 hrs.			**CL-P**				Observe for signs of IV infiltration at IV site and for adequate peripheral perfusion; monitor urine output.
Verapamil (Calan®) Calcium Channel Blocker	**A,B,D**		**N**	IV Push	**Adult** 5-10 mg (0.075-0.15 mg/kg) over 2 minutes; repeat dose in 15-30 minutes if no response **Pediatric** *1-16 years of age:* 2-5 mg (0.1-0.3 mg/kg) over 2 minutes; **MAX single dose:** 5 mg; repeat in 30 minutes if no response; **MAX second dose: 10 mg** *less than 1 year of age:* 0.75-2 mg (0.1-0.2 mg/kg) over 2 minutes; repeat in 30 minutes if no response	**X***						**Required Monitoring: Continuous EKG and blood pressure, apnea, bradycardia, hypotension** Avoid IV use in neonates:
Vitamin K (AquaMephyton®)					**SEE PHYTONADIONE**							

Post conceptional Age (wk)	Postnatal Age (days)	Dose (mg/kg/dose)	Interval (hr)
≤ 29*	0-7	5	48
	8-28	4	36
	>28	4	24
30-33	0-7	4.5	36
	>7	4	24
≥34	0-7	4	24
	>7	4	12-18

Neonatal Weight (Kg)	Age	Dose (mg/kg/dose)	Interval (hr)
<1.2	Any	15	24h
1.2-2	<7days	10-15	12-18
	>7days	10-15	8-12
>2	<7 days	10-15	8-12
	> 7days	15-20	8
	>7	2.5	8

Non-Chemotherapeutic Vesicant Extravasation/Infiltration