Los Angeles General Medical Center

Adult Medication Guidelines

Attachment 911-A

Doses listed are "usual" doses and may be exceeded if clinically required.

Medication	Classification	Route	ICU/ ED **	PCU*	PACU	Acute Care Units	IVP Max single dose	IVP Max rate	Comments-Special Considerations and Precautions
Acetazolamide (Diamox®)	Carbonic Anhydrase Inhibitor	IV push	√	√	√	√	500 mg	500 mg/min	Usual dose: 250 – 500 mg.[4,5] Rate of administration: IV Push up to 500 mg over 3 min. Reconstitute 500 mg vial with 5 mL sterile water or normal saline (100 mg per mL). No more than 1 gm per 24 hours.
		IVPB	√	√	√	√			
		Continuous infusion							
Acetylcysteine (Acetadote)	Antidote	IV push							**Acetaminophen overdose:** **Dose 1** – 150 mg/kg over 1hr. **Dose 2** – 50 mg/kg over 4hrs. **Dose 3** – 100 mg/kg over 16hrs
		IVPB	√	√	√	√			
		Continuous infusion	√	√	√	√			
Adenosine (Adenocard®)	Antiarrhythmic	IV push	√	√	√		12 mg	6 mg/sec	**Usual dose:** 6 mg IV push over 1 – 2 seconds via peripheral line followed by 20 ml rapid saline flush.[4,5] **May repeat** with 12 mg for 2 doses with 1 – 2 minutes between doses. *Continuous ECG monitoring required to assess therapeutic efficacy or arrhythmic potential.* **Note:** preliminary results in adults suggest adenosine may be administered via a central line at a lower dose (**initial adult dose:** 3mg).
		IVPB							
		Continuous infusion							
Alteplase (Activase)	Thrombolytic	IV push	Only in Cardiac Arrest	Only in Cardiac Arrest	Only in Cardiac Arrest	Only in Cardiac Arrest	50 mg	50 mg/2 mins	**Acute ischemic stroke**: **Loading dose** 0.09 mg/kg (max 9 mg), then 0.81 mg/kg (max 81 mg) over 1hr. Perform neurological assessments and measure BP q15mins for first 2 hrs then q30mins for next 6hrs, then q1h until 24hrs after treatment. **Pulmonary embolism**: 100 mg IVPB over 2hrs. Monitor BP and HR continually and for at least 24hrs after administration. **In cardiac arrest:** 50mg iv over 2mins may be given by provider; repeat in 15mins if ROSC not achieved. **Intracatheter:** May be given by hemodialysis nurses to clear obstructed hemodialysis catheters, and PICC nurses to clear PICCs .
		IVPB	√		√ CT				
		Continuous infusion							

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Aminocaproic acid (Amicar)	Antifibrinolytic	IV push							**Acute bleeding: loading dose** 4-5 g, **then** 1g/hr x 8hrs or **until bleeding controlled**. Maximum daily dose is 30g.
		IVPB	√	√	√	√			
		Continuous infusion	√		√				
Aminophylline	Phosphodiesterase enzyme inhibitor	IV push							**Usual loading dose:** 5.7 mg/kg, **maintenance** 0.38-0.51 mg/kg/hr. *Obtain serum theophylline prior to loading dose in patients recent on aminophylline or theophylline.*
		IVPB	√	√	√				
		Continuous infusion	√		√				
Amiodarone (Codarone®)	Antiarrhythmic	IV push	Only in Cardiac Arrest	Only in Cardiac Arrest	Only in Cardiac Arrest	Only in Cardiac Arrest	300 mg	Rapid IVP only in pulseless VT/VF	Usual dose: 150-300 mg[4,5] **Cardiac Arrest: Pulseless Ventricular Tachycardia/Ventricular Fibrillation:** 300 mg IV push x1, may repeat 150 mg IV push x1. **Stable Ventricular Tachycardia:** 150 mg over 10 min (mix in 100 ml D5W). *Monitoring parameters: blood pressure, heart rate, ECG.*
		IVPB	√	√	√				
		Continuous infusion	√	√	√				
Angiotensin II (Giapreza)	Vasopressor	IV Push							**Usual initial rate**: 10-20 ng/kg/min (max 80 ng/kg/min x 3 hrs **then** 40 ng/kg/min). *Monitor blood pressure and heart rate. Administer through central line.*
		IVPB							
		Continuous infusion	√						
Argatroban	Anticoagulant	IV Push							Usual initial dose 0.2-2 mcg/kg/min. *Check aPTT and INR every morning and 2 – 6 hours after initiation or any rate change.* Restricted to hematology.
		IVPB							
		Continuous infusion	√	√	√	√			
Atropine Sulfate	Anticholinergic	IV Push	√	√	√	√	2 mg	1 mg/min	**Usual dose**: 0.5 – 1 mg.[4,5] Administer by **rapid** IV push. **May repeat every** 3-5 minutes up to 3 mg (or 0.04 mg per kg) when in monitored unit
		IVPB							

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		Continuous infusion							**Note**: doses less than 0.5 mg and slow injection have been associated with paradoxical bradycardia.
Benztropine (Cogentin®)	Anticholinergic	IV Push	√	√	√	√	2 mg	slow iv push	Usual dose: 1 – 2 mg IV slow IV push.[4,5] No significant difference in onset of IM or IV injection, therefore, there is usually no need to use the IV route. *Improvement is sometimes noticeable a few minutes after injection. Monitoring parameters: symptoms of extrapyramidal syndrome or Parkinson syndrome, pulse, anticholinergic effects.* **Orthostatic hypotension is prominent side effect. One-hour bedrest post injection is recommended.[1]**
		IVPB							
		Continuous infusion							
Bumetanide (Bumex®)	Diuretic, Loop	IV Push	√	√	√	√	2 mg	1 mg/min	Usual dose: 0.5 – 1 mg IV push slowly over 1 – 2 minutes. May repeat in 2 – 3 hours for up to 2 doses if needed. Maximum dose: 10 mg per day.[4,5] **Continuous infusion**: Usual dosage range 0.5-2 mg/hr.
		IVPB	√	√	√	√			
		Continuous infusion	√	√					
Calcitriol	Vitamin D Analog	IV Push	√	√	√	√	4 mcg	Bolus over 1- 5 mins	Usual dose range: 0.5 – 4 mcg IV push as a bolus.[4,5]
		IVPB							
		Continuous infusion							
Calcium Chloride10% (1 gm per 10 ml)	Electrolyte Supplement, Parenteral	IV Push	√	Only in Cardiac Arrest	√	Only in Cardiac Arrest	1 g	100 mg/min	Usual dose: 1 gm IV push.[4,5] Do **not** exceed 100 mg per min except in emergency situations. *Administration via a central or deep vein is preferred.* **Do not infuse calcium chloride solution in the same IV line as phosphate containing solution.**
		IVPB	√		√				
		Continuous infusion	√						
Calcium Gluconate 10% (1 gm per 10 ml)	Electrolyte Supplement, Parenteral	IV Push	√	√	√		1 g	200 mg/min	Usual dose: 1 gm IV push at a maximum rate of 200mg per minute.[4,] [5] **Do not infuse calcium gluconate solution in the same IV line as phosphate containing solution.**
		IVPB	√	√	√	√			
		Continuous infusion	√						
Chlorpromazine (Thorazine®)	Antipsychotic	IV Push	Comfort care only	Comfort care only	Comfort care only	Comfort care only	12.5 mg	1 mg/min	**For Comfort Care (end of life care) only.** Provider order must state that this is for end of life care. **Usual dose for comfort care**: 12-50 mg. Administer slow IV push at a rate not to exceed 1 mg/min.[4,5] Slow infusion in IVPB is preferred route of administration. *To reduce the risk of hypotension, patients must remain lying*
		IVPB	√	Comfort care only	Comfort care only	Comfort care only			
		Continuous infusion							

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									down and be observed for at least 30 minutes following administration[5].
Cistracurium besylate (Nimbex)	Neuromuscular Blocker	IV Push	√	Only for Intubation	Only for Intubation	Only for Intubation	0.2 mg/kg	5 sec	**Initial dose for neuromuscular block**: 0.15-0.2 mg/kg over 5-10 seconds.[4,5] **Maintenance dosing**: 0.03 mg/kg 40 to 60 minutes after initial dose. **Continuous infusion**: 1-3 mcg/kg/min. Usual max 10 mcg/kg/min. *Monitor train of four (TOF).* **Ventilation required prior to and during administration. Cistracurium does not relieve pain or produce sedation. Patient must receive analgesia and sedation prior to receiving paralytic agent. .**
		IVPB							
		Continuous infusion	√						
Cosyntropin (Cortrosyn®)	Diagnostic Agent, Adrenocortical Insufficiency	IV Push	√	√	√	√	0.25 mg	2 min	Usual dose: 0.25 – 0.75 mg. Administer IV push slowly over 2 minutes.[4,5] Reconstitute with normal saline.
		IVPB							
		Continuous infusion							
Crotalidae polyvalent immune FAB (Crofab)	Antivenin	IV Push							**Initial dose:** 4-6 vials; until local manifestations, coagulation tests and systemic signs are normal. (Max initial dose is 12 vials). **Maintenance**: 2 vials q6h up to 18h. **Rate:** 25-50ml/h x first 10mins; may increase to 250ml/h if patient tolerates. **Monitor for signs and symptoms of anaphylaxis**.
		IVPB	√	√	√	√			
		Continuous infusion							
Dantrolene (Ryanodex)	Skeletal muscle relaxant	IV Push	√	√	√	√ for MH crisis	2.5 mg/kg	over 1 min	**Malignant hyperthermia crisis:** 2.5 mg/kg; may repeat doses of 1 mg/kg until symptoms subside Max cumulative dose 10 mg/kg. *Monitor for cardiac arrhythmias, vital signs (including core temperature), and respiratory status* **Approved for use in L+D
		IVPB	√	√	√	√			
		Continuous infusion							
Deferoxamine (Desferal)	Antidote	IV Push							**Acute iron toxicity**: 1000mg x1, **then** 500 mg q4h x 2 doses. May give additional doses every 4-12hrs based on clinical response (max 6000mg/day). *Urticaria, flushing, hypotension and shock have occurred following rapid IV administration.* **Rate not to exceed 15 mg/kg/hr.**
		IVPB	√						
		Continuous infusion							

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Desmopressin acetate **(DDAVP)**	Vasopressin analog	IV Push	√	√	√	√	4 mcg	4 mcg/min	Usual dose: 1-4 mcg daily.[4,5] IV push for diabetes insipidus diagnosis only. **Bleeding (off-label):** 0.3-0.4 mcg/kg IVPB over 15 mins
		IVPB	√	√	√	√			
		Continuous infusion							
Dexmedetomidine	Sedative	IV Push							**Usual initial rate:** 0.2 mcg/kg/hr. Max 1.4 mcg/kg/hr. **Titrate to goal RASS**. May be used for agitation in non-mechanically ventilated patients; monitor for respiratory depression.
		IVPB							
		Continuous infusion	√						
Dexamethasone Sodium Phosphate (Decadron®)	Corticosteroid	IV Push	√	√	√	√	10 mg	10 mg/min	**Usual dose:** 2 – 10 mg IV over at least 1 minute.[4,5] *Rapid administration may be associated with perineal irritation.* Dose highly variable based on disease (20 – 40 mg used in some chemotherapy regimens). **Acetate** injection is **NOT** for IV use. Doses > 10mg should be given as IVPB over 5-15 minutes.
		IVPB	√	√	√	√			
		Continuous infusion							
Dextrose 50% ($D_{50}W$)	Carbohydrate Caloric Agent	IV Push	√	√	√	√	25 g	25 g/5min	**Usual dose:** 20 – 50 ml of 50% dextrose injection administered IV slowly at approximately **10 ml per minute**.[2,3] **In hyperkalemia: usual dose** is 25 gm (50 ml) dextrose 50% (followed by insulin-see below). Central line recommended for concentrated IV dextrose >10%.
		IVPB							
		Continuous infusion	√						
Diazepam (Valium®)	Benzodiazepine	IV Push	√	√	√	√		5 mg/min	Usual dose 2 – 10 mg. Higher doses may be appropriate (in ED/ICU) for treatment of severe alcohol withdrawal. Do not dilute or add to IV solutions. **Maximum rate 5 mg per minute.**[4,5] *Flush with saline before and after administration.* **Note**: Flumazenil is the reversal agent.
		IVPB							
		Continuous infusion							

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Digoxin (Lanoxin®)	Antiarrhythmic Cardiac glycoside	IV Push	√	√	√		0.5 mg	5 min	**Usual total digitalizing dose:** 0.5 – 1 mg. **Give one-half** of the total digitalizing dose (TDD) in the **initial dose**, then give **one-quarter** of the TDD in each of **two subsequent doses** at 4-8 hour hour intervals.[4,5] *Obtain ECG 6 hours after each dose to assess potential toxicity. Continuous ECG monitoring required to assess therapeutic efficacy or arrhythmic potential. Monitor potassium levels.* **Inject slowly over ≥ 5 minutes**. Doses greater than 0.5 mg should be placed in 50 ml D5W and infused over 30 min.
		IVPB	√	√	√				
		Continuous infusion							
Digoxin immune Fab (Digibind)	Antidote	IV Push							**Acute ingestion of unknown amount:** 10 vials IV over at least 30mins. May give **second dose** of 10 vials as needed. *Monitor serum potassium, temperature, blood pressure and ECG .*
		IVPB	√						
		Continuous infusion							
Diltiazem (Cardizem®)	Antiarhythmic (Class IV) Calcium Channel Blocker	IV Push	√	√	√		25 mg	2 min	**Usual dose:** 0.25 mg per kg actual body weight (for the average adult this is 20 mg).[4,5] Give IV push over 2 minutes. **May repeat** after 15 minutes with 0.35 mg/kg (approximately 25 mg for the average adult). *Bolus requires continuous ECG and blood pressure monitoring*. Severe bradycardia and hypotension can occur with high loading doses. **Continuous infusion usual initial rate**: 5 mg/hr (max 15 mg/hr).
		IVPB	√	√	√				
		Continuous infusion	√	√					
Diphenhydramine (Benadryl®)	Antihistamine	IV Push	√	√	√	√	50 mg	25 mg/min	Usual dose: 10 – 50 mg IV push at 25 mg per minute every 2 – 4 hours, not to exceed 400 mg per day.[5]
		IVPB	√	√	√	√			
		Continuous infusion							
Dobutamine (Dobutrex)	Inotrope	IV Push							Usual initial dose: 0.5-1 mcg/kg/min. Max 20 mcg/kg/min. May cause reflex hypotension.
		IVPB							
		Continuous infusion	√		√				
Dopamine (Intropin)	Vasopressor	IV Push							**Usual dosage range**: 2-20 mcg/kg/min **PCU:** Low dose, non-titrating.
		IVPB							
		Continuous infusion	√	√(see comments)	√				

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Enalaprilat (Vasotec IV ®)	ACE Inhibitor	IV Push	√	√	√		5 mg	5 min	**Usual dose** 0.625 – 1.25 mg slow IV push **over 5 minutes** every 6 hours.[4,5] Maximum single dose 5 mg. **Note**: Discontinue diuretic, if possible, for 2 – 3 days before beginning enalapril therapy.
		IVPB	√	√	√				
		Continuous infusion							
Epoprostenol (Flolan)	Prostacyclin	IV Push							Usual initial dose: 2 ng/kg/min. **Restricted to cardiology and pulmonology**. Therapy initiation requires DHS prior authorization. Dedicated central line only (peripheral line may be used temporarily). **Must not be suddenly discontinued.**
		IVPB							
		Continuous infusion	√						
Epinephrine	Adrenergic Agonist	IV Push	Only in Cardiac Arrest	Only in Cardiac Arrest	Only in Cardiac Arrest	Only in Cardiac Arrest	1 mg	1-2 secs	1 mg/10ml syringe IV push over 1-2 seconds may repeat every 3 to 5 minutes during arrest.[4,5] **Continuous infusion**: 1-10 mcg/min. Central line administration is preferred.
		IVPB							
		Continuous infusion	√		√				
Esmolol (Brevibloc)	Beta blocker	IV Push							Usual initial dose: 500-1000 mcg/kg over 1 min, then 50 mcg/kg/min. Max 300 mcg/kg/min. *Symptomatic hypotension may occur with loading doses.* **PCU** non-titrating dose for hypertension
		IVPB							
		Continuous Infusion	√	√					
Etomidate (Amidate®)	General Anesthetic	IV Push	√	Only for Intubation	Only for Intubation	Only for Intubation		1 min	Initial: 0.2 – 0.6 mg per kg IV push over 30 – 60 seconds for induction of anesthesia.[4,5]
		IVPB							
		Continuous infusion							
Famotidine (Pepcid®)	H_2-Receptor Blocker	IV Push	√	√	√	√	20 mg	10 mg/min	Usual dose: 20 mg IV push over 2 – 3 minutes[4,5] (no faster than 10 mg per min) **Approved for use in L&D
		IVPB	√	√	√	√**			
		Continuous infusion							

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Fentanyl (Sublimaze®)	Analgesic, Narcotic	IV Push	√	√	√(L&D)**			1 min	Usual dose: 50 – 100 mcg IV push over 1 – 2 minutes.[5] Muscular rigidity may occur with rapid IV administration. *Cardiovascular and respiratory depression are associated with high dose and rapid administration.* **Mechanical ventilation required with continuous infusion.** **Approved for use in L&D
		IVPB							
		Continuous infusion	√		√				
Flumazenil (Romazicon®)	Antidote for Benzodiazepine	IV Push	√	√	√	√	0.5 mg	15 sec	**Usual dose:** 0.2 mg IV push over 15 seconds for reversal of conscious sedation or general anesthesia.[4,5] **May repeat** after one minute to a maximum of 1 mg total per dose. If resedation occurs, repeat doses may be given at 20 minute intervals as needed at 0.2 mg per minute to a maximum of 1mg total dose. No more than 3 mg should be given in any hour.
		IVPB							
		Continuous infusion							
Fosphenytoin (Cerebyx)	Anticonvulsant	IV Push	√					150 mg/min	**Usual dose: loading dose** 20 mg PE /kg, **then** 4-6 mg PE/ kg/day in divided doses. Slower administration reduces incidence of cardiovascular events. **Maintenance doses in acute care units for patients unable to receive oral phenytoin; IVPB NTE (Not to exceed) 25 mg PE/min. *Monitor BP, ECG, and respiratory function.*
		IVPB	√	√		√**			
		Continuous infusion							
Furosemide (Lasix®)	Diuretic, Loop	IV Push	√	√	√	√	200 mg	40 mg/ min	**Usual dose:** 20 – 40 mg, **may be repeated** in 1 – 2 hours as needed and increased by 20 mg per dose until the desired effect has been obtained. **Usual dosing interval** is 6 – 12 hours. Administer undiluted 40 mg dose IV push slowly over 1 to 2 minutes. If unable to get an adequate response with a 40 mg dose, may consider increasing dose to 80 mg. *Rapid and high dose can cause irreversible hearing loss*[5]. **Continuous infusion usual initial rate:** 10-40 mg/hr.
		IVPB							
		Continuous infusion	√	√					

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Glucagon	Antihypoglycemic	IV Push	√	√	√	√		2 mg/min	**Usual dose:** 0.5 – 1 mg IV push at 1 mg per min, may repeat in 15 minutes as needed.[5] **If patient fails to respond to glucagon, IV dextrose must be given**. **Beta-blocker overdose (unlabeled use):** 3 – 10 mg IV bolus over 3-5 minutes followed by **continuous infusion** 3 – 5 mg per hour[5]. *Caution is indicated if administered to patients on therapeutic doses of beta-blockers, monitor heart rate. Doses > 1 mg are associated with increased nausea and vomiting[5].* **Note:** 1 unit = 1 mg.
		IVPB							
		Continuous infusion	√						
Glycopyrrolate (Robinul®)	Anticholinergic Agent	IV Push	√	√	√	√	0.2 mg	0.2 mg/min	Usual dose: 0.1-0.2 mg IV every 4 hour for excessive secretions. Administer over 1-2 minutes.
		IVPB							
		Continuous infusion							
Haloperidol (Haldol®)	Antipsychotic	IV Push	√	√	√	Comfort Care only	5 mg	5 mg/min	**ICU/ED/PAR:** Usual dose: 0.5 –10 mg slow IV push. (Max 5 mg over 1 minute)[5]. **10 mg may be required but must be administered by the provider.** *ECG monitoring **required** per the Haloperidol Lactate Intravenous-ICU/ED Nursing Clinical Standard* **Acute Care Units: For Comfort Care (end of life care) only.** Provider order must state that this is for end of life care. **Usual dose** 0.5-3 mg, (up to 5 mg may be needed) slow IV push (over 1 minute) undiluted. May be given as frequently as q4 hours. *ECG monitoring **not required** for this indication.* **Note**: decanoate injectable formulation should be administered **IM only, do not administer decanoate IV**.
		IVPB							
		Continuous infusion							

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									Observe for tremor and abnormal movement or posturing (extrapyramidal symptoms).
Heparin	Anticoagulant	IV Push	√	√	√	√	Loading dose	IV bolus over 1 min	Usual initial dose: **Loading dose** before IV infusion therapy: 60 - 80 units per kg IV push, followed by **Maintenance Infusion Rate:** 12-18 units/kg/hr. **Monitor anti-Xa and/or aPTT q6h and after each rate change.**
		IVPB							
		Continuous infusion	√	√	√	√			
Hydralazine (Apresoline®)	Vasodilator	IV Push	√	√	√(L&D)**		20 mg	5 mg/min	**Usual dose**: 5 – 20 mg IV push[5]. **Hypertension**: 10 mg per dose every one hour as needed. **Note**: 5 mg IV is approximately equal to 25 mg PO. *Hypotensive effect may be delayed and unpredictable in some patients. Monitor blood pressure and heart rate.* **Approved for use in L&D; IVP over 2 minutes
		IVPB							
		Continuous infusion							
Hydrocortisone Sodium Succinate (Solu-Cortef®)	Corticosteroid	IV Push	√	√	√	√	100 mg	100 mg/ 30 sec	**Initial dose** 100 – 500 mg **depending on the severity** of the condition. Administer over 30 seconds to several minutes depending on the dose. (Comes in Mix-O-Vial that contains diluent). Doses > 500 mg must be given over 10 minutes[5].
		IVPB							
		Continuous infusion							
Hydromorphone (Dilaudid®)	Analgesic, Narcotic	IV Push	√	√	√	√	2 mg	2 min	Usual dosage range: 0.2 – 0.6 mg IV push every 2 –3 hours as needed; patients with prior opiate exposure may tolerate higher initial doses. IV push must be given **slowly** over 2 – 3 minutes (rapid IV push has been associated with an increase in side effects, especially respiratory depression and hypotension)[4].
		IVPB							
		Continuous infusion	√	√(PCA)	√	√(PCA)			
Hydroxocobalamin (Cyanokit)	Antidote	IV Push							**Cyanide poisoning:** 5 g IVPB over 15mins; **may repeat** 5g dose IVPB over 15-120mins as needed (**max** total dose **10 g**). *Monitor BP and HR during and after infusion.*
		IVPB	√						
		Continuous infusion							
Insulin **Regular**	Antidiabetic	IV Push	√	√	√	Only for Hyperkalemia			**Loading dose in ketoacidosis** 0.1 unit per kg followed by

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Doses listed are "usual" doses and may be exceeded if clinically required.

Medication	Classification	Route	ICU/ ED **	PCU*	PACU	Acute Care Units	IVP Max single dose	IVP Max rate	Comments-Special Considerations and Precautions
(Humulin R® or Novolin R®)	Agents, Insulins	IVPB							infusion as ordered. **In hyperkalemia** after bicarbonate and dextrose 50% given, follow with 6 – 10 units of regular insulin. Insulin should be given IV push to avoid delayed hypoglycemia that can follow subcutaneous insulin. **Only Regular Insulin can be given IV.**[5]
		Continuous infusion	√	√	√				
Isoproterenol (Isuprel)	Beta agonist	IV Push							Usual dosage range: 2-10 mcg/min. *Monitor ECG, heart rate and respiratory rate.*
		IVPB							
		Continuous infusion	√						
Immunoglobulin	Blood product derivative	IV Push							Doses vary depending on indication. Infusions should be started at lowest recommended rate and titrated to max as tolerated.
		IVPB	√	√	√	√			
		Continuous infusion							
Ketamine	Anesthetic	IV Push							*Restricted to anesthesiology, L&D, emergency medicine, palliative care, critical care and specialties/areas approved per facility moderate sedation policies. **Intractable epilepsy**: Loading dose 0.5-1 mg/kg at 0.5 mg/kg/min. May repeat in 1-2 mins (up to total 2 mg/kg). **Maintenance dose** 5-20 mcg/kg/min **Sedation/analgesia (intubated patients)**: Loading dose 0.5-1 mg/kg IV push over 1 min (by provider). **Maintenance dose** 5-50 mcg/kg/min. **Analgesia (non-intubated patients):** ICU/ED: Loading dose 0.1-0.5 mg/kg IV push over 1 min (by provider). Maintenance dose 1-15 mcg/kg/min. PCU: 0.5-3 mcg/kg/min; titrated by provider (requires lock box). *Monitor heart rate, blood pressure, respiratory rate and oxygen saturation.*
		IVPB							
		Continuous infusion	√	√					

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Ketorolac Tromethamine (Toradol®)	Analgesic, Non-Narcotic	IV Push	√	√	√	√	30 mg	15 sec	Usual IV dose: 30 mg as a single dose or 30 mg every 6 hours (maximum daily dose: 120 mg). Administer IV push over a minimum of 15 seconds; Do **not** use in patients with advanced renal impairment. Elderly older than 65 years old and patients with renal insufficiency or weight less than 50 kg should use half the recommended dose, **not** to exceed 60 mg per day IM or IV. [5]
		IVPB							
		Continuous infusion							
Labetalol (Trandate®)	Alpha/Beta-Adrenergic Blocker	IV Push	√	√	√(L&D)**		20 mg	10 mg/min	**Usual dose:** 10-20 mg IV push at a rate of 10 mg/minute; may administer 10 – 20 mg at 10-minute intervals, up to 300 mg total dose. *Cardiac and blood pressure monitoring required for IV administration.[5]* **Continuous infusion:** usual initial rate 0.5-2 mg/min. **Approved for use in L&D; IV push over 2 minutes **Note:** Cardiac monitor **no**t required for L&D.
		IVPB							
		Continuous infusion	√		√(L&D)**				
Levothyroxine (T4, Synthroid®)	Thyroid Product	IV Push	√	√	√	√		100 mcg/min	Usual IV dose: **Hypothyroidism** 50-75% of oral dose given IV push. **Myxedema coma** 300-500 mcg IV followed by 50-100 mcg daily. Reconstitute vial with 5 ml normal saline; use immediately after reconstitution.[5,6] **Organ donor management: Loading dose** 20 mcg, **then** 10 mcg/h infusion. *Monitor heart rate and blood pressure.*
		IVPB							
		Continuous infusion	√						
Lidocaine	Antiarrhythmic	IV Push	√	√	√	Only in Cardiac Arrest	Loading dose	50 mg/min	**Usual loading dose**: 1-1.5 mg per kg bolus IV push over 2 – 3 minutes; **may repeat doses** of 0.5 – 0.75 mg per kg in 5 – 10 minutes up to a total of 3 mg per kg. **Continuous infusion:** 1 – 4 mg per min. Total dose should not exceed 200 – 300 mg during a one-hour period or 3 mg per kg total dose. *Monitor serum drug levels for elderly, hepatic insufficient and CHF patients. Continuous ECG monitoring required.[5]*
		IVPB							
		Continuous infusion	√		√				

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Lorazepam (Ativan®)	Benzodiazepine	IV Push	√	√	√	√		2 mg/min	**Usual dose:** 0.5 – 2 mg. IV push **slowly**. Do not exceed 2 mg per minute or 0.05 mg per kg over 2 – 5 minutes push rate[5] **Severe alcohol withdrawal:** Up to 16 mg single dose may be required in the ICU/ED. **Status epilepticus:** 4 mg per dose slow IV push over 2 – 5 minutes; may repeat in 10 – 15 minutes[6] ***Never give intra-arterially*** *since it may cause arteriospasm that can lead to gangrene, possibly requiring amputation.* **May require ventilation with doses greater than 4 mg.** **Continuous infusion:** usual initial rate 1 mg/h (max 15mg/h). **Titrate to goal RASS**. Mechanical ventilation **required** with continuous infusion. **Note:** Flumazenil is the reversal agent.
		IVPB							
		Continuous infusion	√		√				
Magnesium Sulfate	Electrolyte Supplement, Parenteral	IV Push	Only in Cardiac Arrest	Only in Cardiac Arrest	Only in Cardiac Arrest	Only in Cardiac Arrest		1 min (ACLS)	Usual dose: 1-2 gm in **persistent pulseless VT or VF** with suspected hypomagnesemia over 1-2 minutes. Must dilute each 1g of magnesium in at least 3ml of NS prior to administration (max concentration 200mg/ml).
		IVPB	√	√	√	√			
		Continuous infusion	√		√				
Meperidine (Demerol®)	Analgesic, Narcotic	IV Push	√	√	√	√		10 mg/min	Usual dose: 12.5 – 50 mg IV push slowly over 5 minutes, use of a 10 mg per ml concentration has been recommended. *Avoid repeated administration of meperidine in patients with renal dysfunction. Contraindicated in patients taking MAOIs.*
		IVPB							
		Continuous infusion							
Methylprednisolone Sodium Succinate (Solu-Medrol®)	Corticosteroid	IV Push	√	√	√	√	125 mg	3 mins	Usual dose: 10 – 40 mg IV over a period of several minutes and repeat at intervals depending on clinical response. Administer 125 mg over 3 – 15 minutes[5]. Doses 250 mg and above IVPB only. **Only sodium succinate may be given IV.** Do **NOT** administer high-dose (greater than 250 mg) IV push; *hypotension, cardiac arrhythmia, and sudden death have been reported in patients given high-dose methylprednisolone IV push over less than 20 minutes;* Maximum concentration IV push: 125 mg per ml.
		IVPB	√	√	√	√			
		Continuous infusion	√	√					

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Metoclopramide (Reglan®)	Antiemetic	IV Push	√	√	√	√	10 mg	1 min	**Usual dose:** 10 mg IV push over 1 – 2 minutes[5]. *Rates greater than 10 mg per minute cause intense anxiety and restlessness.* **Higher** doses (greater than 10 mg) should be given IVPB. Reduce dose for elderly and renal insufficient patients. **IVPB:** 10-20mg in 50ml NS or D5W, infuse over at least 15 mins.
		IVPB	√	√	√	√			
		Continuous infusion							
Metoprolol (Lopressor®)	Beta-Adrenergic Blocker	IV Push	√	√	√		5 mg	1 mins	Usual dose: **Hypertension/A.Fib/A.Flutter:** 1.25 – 5 mg IV push over 2-5 minutes (maximum dose = 15 mg over 15 minutes for acute treatment of rate control) **Myocardial Infarction (acute):** 5 mg rapid IV push every 5 minutes for total 3 doses. *Monitor ECG and blood pressure*[5] **IVPB**: 5-10 mg in 50 ml over 30-60 mins when used as substitute for oral metoprolol; *Not for acute management of BP.*
		IVPB	√	√	√	√			
		Continuous infusion							
Midazolam (Versed®)	Benzodiazepine	IV Push	√	√	√			2 min	Usual dose: Conscious Sedation: 0.5 – 2 mg slow IV push over at least 2 minutes; slowly titrate to effect by repeating doses every 2 – 3 minutes if needed; usual total dose: 2.5 – 5 mg; use decreased doses in elderly. **Usual initial rate:** 1 mg/hr (max 20 mg/hr). **Titrate to goal RASS** - Mechanical ventilation **required** with continuous infusion. **Note**: Flumazenil is the reversal agent.
		IVPB							
		Continuous infusion	√		√				
Milrinone	Inotrope	IV Push							Usual initial rate: 0.375 mcg/kg/min (max 0.75 mcg/kg/min). Each **rate change requires** physician order. May cause arrhythmias. *Monitor ECG, blood pressure and heart rate*.
		IVPB							
		Continuous infusion	√		√				
Morphine Sulfate	Analgesic, Narcotic	IV Push	√	√	√	√		4 min	Usual dose: 2 – 4 mg IV push over 4-5 minutes every 3 – 4 hours[4,5]; patients with prior opiate exposure may require higher initial doses.
		IVPB							
		Continuous infusion	√	Comfort care only	Comfort care only	Comfort care only			
Naloxone	Antidote for Narcotic	IV Push	√	√	√	√	2 mg	30 sec	**Usual dose in narcotic overdose:** 0.4 – 2 mg IV push over 30 seconds every 2 – 3 minutes as needed; may need to repeat

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(Narcan®)		IVPB							doses every 20 – 60 minutes as the narcotic may have a longer time of action in the body than naloxone. **Note:** this is the opiate (morphine, codeine, etc) reversal agent. Lower initial doses (0.02-0.2 mg) are recommended for patients with opioid dependence to avoid profound withdrawal, seizures and arrhythmias.[5] **Continuous infusion:** 0.2-0.6 mg/h
		Continuous infusion	√		√				
Neostigmine (Prostigmin®)	Cholinergic Agent	IV Push	√				5 mg	1 min	Usual dose: 0.25 – 2.5 mg IV push over 1 – 5 minutes, total dose not to exceed 5 mg. **Pretreatment with atropine** is recommended[5].
		IVPB							
		Continuous infusion							
Nicardipine (Cardene)	Calcium channel blocker	IV Push							Usual initial rate: 5 mg/hr (max 15 mg/hr). *Monitor blood pressure and heart rate.*
		IVPB							
		Continuous infusion	√		√				
Nitroglycerin	Vasodilator	IV Push							Usual initial rate: 5-20 mcg/min (max 400 mcg/min). May cause reflex tachycardia. *Monitor blood pressure and heart rate.* **PCU for chest pain only**
		IVPB							
		Continuous infusion	√	√(see comments)	√				
Nitroprusside (Nipride)	Vasodilator	IV Push							Usual initial rate: 0.5 mcg/kg/min. Max rate: 10 mcg/kg/min for 10 minutes. Rates > 2 mcg/kg/min increases risk of cyanide and thiocyanate toxicity. *Monitor blood pressure, heart rate and for signs of toxicity (hypoxia, acidosis)*
		IVPB							
		Continuous infusion	√		√				
Norepinephrine (Levophed)	Vasopressor	IV Push							Usual initial rate: 1 mcg/min (max 30 mcg/min). Central line administration preferred. *Monitor blood pressure and heart rate.*
		IVPB							
		Continuous infusion	√		√				
Octreotide (Sandostatin®)	Synthetic somatostatin analog	IV Push	√	√	√	√		3 min	**Usual IV Push** dose: 50 – 500 mcg, dose dependent on indication (e.g.50 mcg for variceal bleeding). Maximum daily dose is 1500 mcg. e May be administered by IV push over 3 minutes. In emergency situations (e.g., carcinoid crisis) it may be given by rapid
		IVPB	√	√	√	√			
		Continuous infusion	√	√	√	√			

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									bolus[5]. **Continuous infusion:** 25-100 mcg IV bolus, then 25-50 mcg/hr
Ondansetron (Zofran®)	Antiemetic	IV Push	√	√	√	√	16 mg	2 min	**Usual dose: Postoperative nausea and vomiting (PONV):** 4 mg IV push over 2 – 5 minutes as a single dose beginning 30 minutes before the end of anesthesia, or as treatment if vomiting occurs after surgery[5].
		IVPB	√	√	√	√			
		Continuous infusion							
Pancuronium (Pavulon®)	Neuromuscular Blocker	IV Push	√	Only for Intubation	Only for Intubation	Only for Intubation		1 min	**Usual dose:** 0.06 – 0.1 mg per kg IV push rapidly over 1 minute, **followed by** 0.8 – 1.7 mcg/kg/min once initial recovery from bolus observed or 0.1 – 0.2 mg per kg every 1 – 3 hours[5]. **Ventilation required prior to and during administration. Pancuronium does not relieve pain or produce sedation. Patient must receive analgesia and/or sedation prior to receiving paralytic agent.**
		IVPB							
		Continuous infusion							
Pantoprazole (Protonix®)	Proton Pump Inhibitor	IV Push	√	√	√	√	40 mg	2 min	Usual dose for IV push: 40 mg IV once a day. The pantoprazole 40 mg vial is reconstituted with 10 mL of 0.9% sodium chloride to be infused over 2 minutes[5]. **Special Considerations and Precautions-For active GI bleeding, 80 mg dose can be mixed with 20 mL of normal saline and given as IV push over 2 minutes.** **Continuous infusion:** Loading dose 80 mg, then 8 mg/h
		IVPB	√	√	√	√			
		Continuous infusion	√	√	√	√			
PENTObarbital (Nembutal®)	Barbiturate	IV Push	√				100 mg	50 mg/min	Usual dose: 100 mg IV push slowly, may repeat every 1 – 3 minutes up to 200 – 500 mg total dose. IV push should be administered no faster than 50 mg per minute[5]. Parenteral solutions are highly alkaline; avoid extravasation; avoid intra-arterial injection. *Hypotension is not uncommon; ventilation may be required.* **Continuous infusion:** 0.5-5 mg/kg/h
		IVPB							
		Continuous infusion	√						

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PHENObarbital	Barbiturate	IV Push	√					60 mg/min	**Sedation:** usual dose 30-120 mg to max 400mg/day. **Status epilepticus:** usual dose 10 – 20 mg/kg in a single or divided dose[5]. Avoid rapid IV administration greater than 60 mg per min; avoid intra-arterial injection. *Ventilation may be required.*
		IVPB	√						
		Continuous infusion							
Phenylephrine (Neosynephrine)	Vasopressor	IV Push							Usual initial rate: 100 mcg/min (max 200 mcg/min). Central line administration preferred. *Monitor blood pressure and heart rate.*
		IVPB							
		Continuous infusion	√		√				
Phenytoin (Dilantin)	Anticonvulsant	IV Push							**Status epilepticus:** loading dose 20 mg/kg then 100 mg IV q6-8 hours. **Max infusion rate 50 mg/min**. Slower administration (e.g 20 mg/min) reduces incidence of cardiovascular events. *Continuous cardiac monitoring during administration recommended.*
		IVPB	√		√				
		Continuous infusion							
Potassium Chloride	Electrolyte	IV Push							**Peripheral line concentration:** 20meq/250ml (or 0.08meq/ml). Max infusion rate for peripheral line is 10meq/hr. **Central line concentration:** 20meq/50ml (or 0.4meq/ml). *ECG monitoring **required** for max rate 20meq/hr.*
		IVPB	√	√	√	√			
		Continuous infusion							
Procainamide (Pronestyl)	Antiarrhythemic	IV Push	√		√			50 mg/min	**Ventricular arrhythmias: loading dose** 10-17 mg/kg **then** 1-4 mg/min continuous infusion. Dilute loading dose to max concentration 20 mg/ml prior to administration. *Monitor ECG, blood pressure and heart rate*.
		IVPB							
		Continuous infusion	√		√				
Prochlorperazine (Compazine®)	Antiemetic	IV Push	√	√	√	√	10 mg	5 mg/min	Usual dose: 5 – 10 mg. Standard 5mg per ml solution may be given undiluted; slow IV push **NOT** to exceed 5 mg per minute. Maximum single IV push dose is 10 mg. *To reduce the risk of hypotension, patients must remain lying down and be observed for **at least** 30 minutes following administration[5].*
		IVPB							
		Continuous infusion							
Propofol (Diprivan®)	Anesthetic	IV Push							**Usual initial rate**: 5 mcg/kg/min (typical max 50 mcg/kg/min). **Titrate to goal RASS.** Mechanical ventilation **required** with continuous infusion, except for deep sedation . *Monitor blood pressure and oxygen saturation.*
		IVPB							
		Continuous infusion	√		√				

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Propranolol (Inderal®)	Beta-Adrenergic Blocker	IV Push	√	√	√		3 mg	1 mg/min	**Usual IV push dose:** 1-3 mg **may repeat** every 2-5 minutes up to a total of 5 mg.[5] Maximum rate of administration should **NOT** exceed 1 mg per min. *Blood pressure and heart rate **must** be monitored* **every** 5 minutes for 15 minutes following each dose. May cause bronchospasm in asthmatic patients. Used for tachyarrhythmias and thyrotoxicosis. **Continuous infusion:** 2-10 mg/h
		IVPB							
		Continuous infusion	√						
Protamine Sulfate	Antidote	IV Push	√	√	√	√	50 mg	5 mg/min	**Usual dose:** 1 mg of protamine per 100 units of heparin for up to 30 minutes **post** heparin administration. **If 30 minutes have elapsed,** 0.5 mg of protamine per 100 units of heparin. **If greater than 2 hours have elapsed,** 0.25 mg of protamine per 100 units of heparin) *Rapid IV infusion may cause hypotension. Monitor for hypersensitivity reactions.*
		IVPB	√	√	√	√			
		Continuous infusion							
Prothrombin complex concentrate (Kcentra)	Antidote	IV Push	√	√	√	√		8.4 ml/min	**INR 2- <4:** 25 units/kg (max 2500 units) **INR 4-6:** 35 units/kg (max 3500 units) **INR >6:** 50 units/hr (max 5000 units) Prior authorization required. **Contraindicated in HIT and DIC.**
		IVPB	√	√	√	√			
		Continuous infusion							
Regadenoson (Lexiscan)	A2A adenosine receptor agonist, Coronary vasodilator	IV Push	√		√				Recommended IV dose i: 0.4 mg as a single dose. Administer rapidly IV over approximately 10 seconds. **Administer** a 5 ml saline flush **immediately after** **Administer** the radionuclide myocardial perfusion imaging agent **10-20 seconds after** the saline flush. The radionuclide may be injected directly into the same catheter
		IVPB							

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		Continuous infusion							as Lexiscan. **Do not administer Lexiscan to patients with second or third degree AV block or sinus node** dysfunction unless these patients have a functioning artificial pacemaker
Rh_0(D) Immune Globulin	Blood product derivative	IV Push/IM	√	√	√	√	*See comments	*See comments	**RhD suppression:** Antepartum - Rhophylac 300 mcg IV/IM or WinRho 300 mcg IV/IM Postpartum – Rhophylac 300 mcg IM/IVP or WinRho 120 **mcg** IV/IM **Immune thrombocytopenia (ITP):** Rhophylac: 50 mcg/kg IV, infuse at 2 ml per 15-60 seconds WinRho: 25-60 mcg/kg IV, infuse over 3-5 minutes
		IVPB	√	√	√	√			
		Continuous infusion							
Rocuronium (Zemuron®)	Neuromuscular Blocker	IV Push	√	Only for Intubation	Only for Intubation	Only for Intubation		1 min	Usual dose: 0.6-1.2 mg/kg. Use **ideal body weight** for obese patients. Administer IV only; may be administered as a bolus injection[5]. **Ventilation required prior to and during administration. Rocuronium does not relieve pain or produce sedation. Patient must receive analgesia and/or sedation prior to receiving paralytic agent**.
		IVPB							
		Continuous infusion	√						
Scopolamine	Anticholinergic	IV Push	√	√	√	√		2 min	Usual IV dose: 0.3 to 0.6 mg. Administer scopolamine as a **slow IV push** injection over approximately 2-3 minutes[5]. ***Contraindicated*** *in patients with narrow-angle glaucoma.*
		IVPB							
		Continuous infusion							
Sodium Bicarbonate 8.4% (1.0 mEq/mL)	Alkalinizing Agent	IV Push	√	√	√	Only in Cardiac Arrest		50 mEq/5 min (ACLS)	**Cardiac arrest:** Routine use of $NaHCO_3$ is not recommended and should be given only **after** adequate alveolar ventilation has been established and **effective** cardiac compressions are provided. **Initial dose:** 1 meq/kg/dose; repeat doses should be guided by arterial blood gases[5]. **Continuous infusion:** concentrations >150meq/L are restricted to ICU/ED
		IVPB							
		Continuous infusion	√	√(see comments)	√	√(see comments)			

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Sodium Chloride 3%	Electrolyte supplement	IV Push							Administration through a central line is recommended.
		IVPB	√						
		Continuous infusion	√		√				
Succinylcholine (Anectine®)	Neuromuscular Blocker	IV Push	√	Only for Intubation	Only for Intubation	Only for Intubation		30 sec	Dose: 0.6-1.5 mg/kg IV push over 30 seconds[5]. **Ventilation required prior to and during administration. Succinylcholine does not relieve pain or produce sedation. Patient must receive analgesia and/or sedation prior to receiving paralytic agent.**
		IVPB							
		Continuous infusion							
Terbutaline	Beta agonist	IV Push							**Approved for use in L&D: **Premature labor:** usual dose 2.5-5 mcg/min (max 25 mcg/min). Limited to max duration 72 hours.
		IVPB	√						
		Continuous infusion			√(L&D)**				
Tranexamic acid	Antifibrinolytic	IV Push							**Trauma-associated hemorrhage: Loading dose** 1 g over 10 mins, **then** 1 g infused over 8 hrs.
		IVPB	√	√	√	√			
		Continuous infusion	√		√				
Treprostinil (Remodulin)	Prostacyclin	IV Push							Usual initial dose: 2 ng/kg/min. Restricted to cardiology and pulmonology. Therapy initiation requires DHS prior authorization. Dedicated central line only (peripheral line may be used temporarily). **Must not be suddenly discontinued.**
		IVPB							
		Continuous infusion	√						
Valproic acid	Anticonvulsant	IV Push						20 mg/min	Status epilepticus: Usual loading dose 20-40 mg/kg (to max 3g). Usual maintenance dose 10-15 mg/kg/day divided q6h.
		IVPB	√	√	√	√			
		Continuous infusion							
Vasopressin (Pitressin)	Antidiuretic hormone analog; vasopressor	IV Push							**Sepsis**: 0.03-0.04 units/min **GIB:** Usual initial rate 0.2-0.4 units/min (max 0.8 units/min) **One Legacy:** max 4 units/hr **DI:** Usual dosage range 0.6-6 units/hr (max 7 units/hr) Note: No titration needed when used in sepsis. Central line administration recommended.
		IVPB							
		Continuous infusion	√		√				

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Medication	Classification	Route	ICU/ ED **	PCU*	PACU	Acute Care Units	IVP Max single dose	IVP Max rate	Comments-Special Considerations and Precautions
Vecuronium (Norcuron®)	Neuromuscular Blocker	IV Push	√	Only for Intubation	Only for Intubation	Only for Intubation		1 min	**Initial dose:** 0.08 – 0.1 mg/kg slow IV push[5]. **Intermittent dosing:** 0.1-0.2 mg/kg/dose, may be repeated when neuromuscular function returns. **Infusion**: 0.8 mcg/kg/min (max 1.2 mcg/kg/min). *Monitor train of four (TOF).* **Ventilation required prior to and during administration. Vecuronium does not relieve pain or produce sedation. Patient must receive analgesia and/or sedation prior to receiving paralytic agent.**
		IVPB							
		Continuous infusion	√						

*Infusion Center, Rand Schrader Clinic: Refer to Unit Structure Standards

References:

1. Davis's Drug Guide for Nurses www.drugguide.com/monograph_library/psychotropic_drugs/benztropine.htm
2. Trissel's Handbook on Injectable Drugs 11th Edition
3. Moore C, Woollard M. Dextrose 10% or 50% in the treatment of hypoglycaemia out of hospital? A randomised controlled trial. *Emerg Med J*. 2005;22(7):512-515.
4. Micromedex, Accessed Feb 2018
5. Drug Information powered by Lexicomp, Inc. Accessed via UptoDate Jan 2018
6. Drug Manufactures' Package Insert, Accessed via DailyMed Feb 2018

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Note: √ means "may be administered"
* Progressive Care Unit
** Administration areas may include OR, Procedure Suites and Treatment Rooms—Consult with nurse manager, supervisor, or pharmacy for assistance
***Table is not a comprehensive list of medications that may be given intravenously – Consult with nurse manager, supervisor, or pharmacy for assistance

Attachment 911-A

Doses listed are "usual" doses and may be exceeded if clinically required.

Note: √ means "may be administered"
* Progressive Care Unit
** Administration areas may include OR, Procedure Suites and Treatment Rooms—Consult with nurse manager, supervisor, or pharmacy for assistance
***Table is not a comprehensive list of medications that may be given intravenously – Consult with nurse manager, supervisor, or pharmacy for assistance