MISCELANEOUS—diuretic

FUROSEMIDE			DO NOT TITRATE
Concentration			**Starting Dose**
25 mg	50 mL D5W	0.5 mg/mL	Load: 0.1 mg/kg/dose over 5 mins Continuous Infusion: 0.05 mg/kg/hour
50 mg	50 mL D5W	1 mg/mL	
100 mg	50 mL D5W	2 mg/mL	**Usual/Maximum [adult]**
250 mg	50 mL D5W	5 mg/mL	Usual: 0.05-0.4 mg/kg/hour
500 mg	50 mL undiluted	10 mg/mL	Maximum: 1 mg/kg/hour [40 mg/hour]

FUROSEMIDE 0.5 MG/ML

25 mg/50 mL	Dose rate in mg/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.50**
0.50	0.1	0.1	0.2	0.2	0.3	0.5
1.50	0.2	0.3	0.5	0.6	0.8	1.5
3.00	0.3	0.6	0.9	1.2	1.5	3.0
6.00	0.6	1.2	1.8	2.4	3.0	6.0
20.00	2.0	4.0	6.0	8.0	10.0	20.0
40.00	4.0	8.0	12.0	16.0	20.0	40.0

Pump flow rate (mL/hr)

FUROSEMIDE 1 MG/ML

50 mg/50 mL	Dose rate in mg/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.50**
0.50	0.0	0.1	0.1	0.1	0.1	0.3
1.50	0.1	0.2	0.2	0.3	0.4	0.8
3.00	0.2	0.3	0.5	0.6	0.8	1.5
6.00	0.3	0.6	0.9	1.2	1.5	3.0
20.00	1.0	2.0	3.0	4.0	5.0	10.0
40.00	2.0	4.0	6.0	8.0	10.0	20.0

Pump flow rate (mL/hr)

FUROSEMIDE 2 MG/ML

100 mg/50 mL	Dose rate in mg/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.50**
0.50	0.0	0.0	0.0	0.1	0.1	0.1
1.50	0.0	0.1	0.1	0.2	0.2	0.4
3.00	0.1	0.2	0.2	0.3	0.4	0.8
6.00	0.2	0.3	0.5	0.6	0.8	1.5
20.00	0.5	1.0	1.5	2.0	2.5	5.0
40.00	1.0	2.0	3.0	4.0	5.0	10.0

Pump flow rate (mL/hr)

FUROSEMIDE 5 MG/ML

250 mg/50 mL	Dose rate in mg/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.50**
0.50	0.0	0.0	0.0	0.0	0.0	0.1
1.50	0.0	0.0	0.0	0.1	0.1	0.2
3.00	0.0	0.1	0.1	0.1	0.2	0.3
6.00	0.1	0.1	0.2	0.2	0.3	0.6
20.00	0.2	0.4	0.6	0.8	1.0	2.0
40.00	0.4	0.8	1.2	1.6	2.0	4.0

Pump flow rate (mL/hr)

FUROSEMIDE 10 MG/ML

500 mg/50 ml	Dose rate in mg/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.50**
0.50	0.0	0.0	0.0	0.0	0.0	0.0
1.50	0.0	0.0	0.0	0.0	0.0	0.1
3.00	0.0	0.0	0.0	0.1	0.1	0.2
6.00	0.0	0.1	0.1	0.1	0.2	0.3
20.00	0.1	0.2	0.3	0.4	0.5	1.0
40.00	0.2	0.4	0.6	0.8	1.0	2.0

Pump flow rate (mL/hr)

MISCELANEOUS—

HEPARIN			*MUST SPECIFY TITRATION PARAMETERS**
Concentration			**Starting Dose**
5000 unit	50 mL D5W	100 unit/mL	Load: 75 unit/kg/dose over 10 mins Continuous Infusion: 28 unit/kg/hour < 1 yr 20 unit/kg/hour (> 1 year)
25000 unit	250 mL PREMIX	100 unit/mL	**Usual/Maximum [adult]** Usual: 10-25 unit/kg/hour Titrate: per protocol Maximum: titrate to goal [initial 1800 unit/hour]

HEPARIN 100 UNIT/ML

5000 unit/50mL	Dose rate in unit/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**5.00**	**10.00**	**20.00**	**25.00**	**30.00**	**35.00**
0.50	0.03	0.05	0.10	0.13	0.15	0.18
1.50	0.08	0.15	0.30	0.38	0.45	0.53
3.00	0.15	0.30	0.60	0.75	0.90	1.05
6.00	0.30	0.60	1.20	1.50	1.80	2.10
20.00	1.00	2.00	4.00	5.00	6.00	7.00
40.00	2.00	4.00	8.00	10.00	12.00	14.00

Pump flow rate (mL/hr)

SEDATION—analgesia

HYDROMORPHONE			DO NOT TITRATE
Concentration			**Starting Dose**
25 mg	50 mL D5W	0.5 mg/mL	Continuous Infusion: 5 mcg/kg/hour
50 mg	50 mL D5W	1 mg/mL	
			Usual/Maximum [adult]
			Usual: 5-10 mcg/kg/hour Maximum: 25 mcg/kg/hour [5 mg/hour]

HYDROMORPHONE 0.5 MG/ML

25 mg/50 mL	Dose rate in mcg/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**2.00**	**5.00**	**10.00**	**15.00**	**20.00**	**25.00**
0.50	0.00	0.01	0.01	0.02	0.02	0.03
1.50	0.01	0.02	0.03	0.05	0.06	0.08
3.00	0.01	0.03	0.06	0.09	0.12	0.15
6.00	0.02	0.06	0.12	0.18	0.24	0.30
20.00	0.08	0.20	0.40	0.60	0.80	1.00
40.00	0.16	0.40	0.80	1.20	1.60	2.00

Pump flow rate (mL/hr)

HYDROMORPHONE 1 MG/ML

50 mg/50 mL	Dose rate in mcg/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**2.00**	**5.00**	**10.00**	**15.00**	**20.00**	**25.00**
0.50	0.00	0.00	0.01	0.01	0.01	0.01
1.50	0.00	0.01	0.02	0.02	0.03	0.04
3.00	0.01	0.02	0.03	0.05	0.06	0.08
6.00	0.01	0.03	0.06	0.09	0.12	0.15
20.00	0.04	0.10	0.20	0.30	0.40	0.50
40.00	0.08	0.20	0.40	0.60	0.80	1.00

Pump flow rate (mL/hr)

MISCELANEOUS—glycemic control DKA

INSULIN, REGULAR			*DO NOT TITRATE**
Concentration			**Starting Dose**
50 unit	50 mL NS	1 unit/mL	Initial: 0.1 unit/kg/hour
100 unit	100 mL NS	1 unit/mL	**Usual/Maximum [adult]**
			Usual: 0.05-0.1 unit/kg/hour
			Maximum: BG < 150 or [caution: > 5 unit/hour]

INSULIN, REGULAR 1 unit/mL

50 unit/50 mL	Dose rate in unit/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**0.01**	**0.02**	**0.05**	**0.10**	**0.15**	**0.20**
0.50	0.01	0.01	0.03	0.05	0.08	0.10
1.50	0.02	0.03	0.08	0.15	0.23	0.30
3.00	0.03	0.06	0.15	0.30	0.45	0.60
6.00	0.06	0.12	0.30	0.60	0.90	1.20
20.00	0.20	0.40	1.00	2.00	3.00	4.00
40.00	0.40	0.80	2.00	4.00	6.00	8.00

Pump flow rate (mL/hr)

SEDATION

KETAMINE			DO NOT TITRATE
Concentration			**Starting Dose**
125 mg	50 mL NS	2.5 mg/mL	Load: 1-2 mg/kg/dose over 5 mins
500 mg	50 mL NS	10 mg/mL	Continuous Infusion: 1 mg/kg/hour
1000 mg	50 mL NS	20 mg/mL	**Usual/Maximum [adult]**
			Usual: 1-2 mg/kg/hour
			Maximum: 3 mg/kg/hour (soft) [5.4 mg/kg/hour]

KETAMINE 2.5 MG/ML

125 mg/50 mL	Dose rate in mg/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**0.50**	**1.00**	**2.00**	**3.00**	**4.00**	**5.00**
0.50	0.10	0.20	0.40	0.60	0.80	1.00
1.50	0.30	0.60	1.20	1.80	2.40	3.00
3.00	0.60	1.20	2.40	3.60	4.80	6.00
6.00	1.20	2.40	4.80	7.20	9.60	12.00
20.00	4.00	8.00	16.00	24.00	32.00	40.00
40.00	8.00	16.00	32.00	48.00	64.00	80.00

Pump flow rate (mL/hr)

KETAMINE 10 MG/ML

500 mg/50 mL	Dose rate in mg/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**0.50**	**1.00**	**2.00**	**3.00**	**4.00**	**5.00**
0.50	0.03	0.05	0.10	0.15	0.20	0.25
1.50	0.08	0.15	0.30	0.45	0.60	0.75
3.00	0.15	0.30	0.60	0.90	1.20	1.50
6.00	0.30	0.60	1.20	1.80	2.40	3.00
20.00	1.00	2.00	4.00	6.00	8.00	10.00
40.00	2.00	4.00	8.00	12.00	16.00	20.00

Pump flow rate (mL/hr)

KETAMINE 20 MG/ML

1000 mg/50 mL	Dose rate in mg/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**0.50**	**1.00**	**2.00**	**3.00**	**4.00**	**5.00**
0.50	0.01	0.03	0.05	0.08	0.10	0.13
1.50	0.04	0.08	0.15	0.23	0.30	0.38
3.00	0.08	0.15	0.30	0.45	0.60	0.75
6.00	0.15	0.30	0.60	0.90	1.20	1.50
20.00	0.50	1.00	2.00	3.00	4.00	5.00
40.00	1.00	2.00	4.00	6.00	8.00	10.00

Pump flow rate (mL/hr)

CARDIAC HEMODYNAMIC SUPPORT--antihypertensive

LABETOLOL			*MUST SPECIFY TITRATION PARAMETERS**
Concentration			**Starting Dose**
50 mg	50 mL D5W	1 mg/mL	Load: 0.2-1 mg/kg [20 mg] over 10 min Continuous Infusion: 0.25 mg/kg/hour
100 mg	50 mL D5W	2 mg/mL	
250 mg	50 mL D5W	5 mg/mL	**Usual/Maximum [adult]**
			Usual: 0.25-3 mg/kg/hour Titrate: 0.25 mg/kg/hr Q15 min (range MAP or SBP)* Maximum: 3 mg/kg/hour [4 mg/min] Wean: 0.25 mg/kg/hour Q30 min until off

LABETOLOL 1 MG/ML

50 mg/50 mL	Dose rate in mg/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**0.25**	**0.50**	**1.00**	**1.50**	**2.00**	**3.00**
0.50	0.13	0.25	0.50	0.75	1.00	1.50
1.50	0.38	0.75	1.50	2.25	3.00	4.50
3.00	0.75	1.50	3.00	4.50	6.00	9.00
6.00	1.50	3.00	6.00	9.00	12.00	18.00
20.00	5.00	10.00	20.00	30.00	40.00	60.00
40.00	10.00	20.00	40.00	60.00	80.00	120.00

Pump flow rate (mL/hr)

LABETOLOL 2 MG/ML

100 mg/50 mL	Dose rate in mg/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**0.25**	**0.50**	**1.00**	**1.50**	**2.00**	**3.00**
0.50	0.06	0.13	0.25	0.38	0.50	0.75
1.50	0.19	0.38	0.75	1.13	1.50	2.25
3.00	0.38	0.75	1.50	2.25	3.00	4.50
6.00	0.75	1.50	3.00	4.50	6.00	9.00
20.00	2.50	5.00	10.00	15.00	20.00	30.00
40.00	5.00	10.00	20.00	30.00	40.00	60.00

Pump flow rate (mL/hr)

LABETOLOL 5 MG/ML

250 mg/50 mL	Dose rate in mg/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**0.25**	**0.50**	**1.00**	**1.50**	**2.00**	**3.00**
0.50	0.03	0.05	0.10	0.15	0.20	0.30
1.50	0.08	0.15	0.30	0.45	0.60	0.90
3.00	0.15	0.30	0.60	0.90	1.20	1.80
6.00	0.30	0.60	1.20	1.80	2.40	3.60
20.00	1.00	2.00	4.00	6.00	8.00	12.00
40.00	2.00	4.00	8.00	12.00	16.00	24.00

Pump flow rate (mL/hr)

SEDATION

MIDAZOLAM			*DO NOT TITRATE**
Concentration			**Starting Dose**
5 mg	50 mL D5W	0.1 mg/mL	Continuous Infusion: 0.05 mg/kg/hour
10 mg	50 mL D5W	0.2 mg/mL	**Usual/Maximum [adult]**
50 mg	50 mL D5W	1 mg/mL	Usual: 0.05-0.1 mg/kg/hour
100 mg	50 mL D5W	2 mg/mL	Maximum: 0.4 mg/kg/hour [10 mg/hour]
250 mg	50 mL D5W	5 mg/mL	

MIDAZOLAM 0.1 MG/ML

5 mg/50 mL	Dose rate in mg/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**0.05**	**0.10**	**0.15**	**0.20**	**0.30**	**0.40**
0.50	0.25	0.50	0.75	1.00	1.50	2.00
1.50	0.75	1.50	2.25	3.00	4.50	6.00
3.00	1.50	3.00	4.50	6.00	9.00	12.00
6.00	3.00	6.00	9.00	12.00	18.00	24.00
20.00	10.00	20.00	30.00	40.00	60.00	80.00
40.00	20.00	40.00	60.00	80.00 ⊗	120.00 ⊗	160.00

Pump flow rate (mL/hr)

MIDAZOLAM 0.2 MG/ML

10 mg/50 mL	Dose rate in mg/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**0.05**	**0.10**	**0.15**	**0.20**	**0.30**	**0.40**
0.50	0.13	0.25	0.38	0.50	0.75	1.00
1.50	0.38	0.75	1.13	1.50	2.25	3.00
3.00	0.75	1.50	2.25	3.00	4.50	6.00
6.00	1.50	3.00	4.50	6.00	9.00	12.00
20.00	5.00	10.00	15.00	20.00	30.00	40.00
40.00	10.00	20.00	30.00	40.00 ⊗	60.00 ⊗	80.00

Pump flow rate (mL/hr)

MIDAZOLAM 1 MG/ML

50 mg/50 mL	Dose rate in mg/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**0.05**	**0.10**	**0.15**	**0.20**	**0.30**	**0.40**
0.50	0.03	0.05	0.08	0.10	0.15	0.20
1.50	0.08	0.15	0.23	0.30	0.45	0.60
3.00	0.15	0.30	0.45	0.60	0.90	1.20
6.00	0.30	0.60	0.90	1.20	1.80	2.40
20.00	1.00	2.00	3.00	4.00	6.00	8.00
40.00	2.00	4.00	6.00	8.00 ⊗	12.00 ⊗	16.00

Pump flow rate (mL/hr)

MIDAZOLAM 2 MG/ML

100 mg/50 mL	Dose rate in mg/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**0.05**	**0.10**	**0.15**	**0.20**	**0.30**	**0.40**
0.50	0.01	0.03	0.04	0.05	0.08	0.10
1.50	0.04	0.08	0.11	0.15	0.23	0.30
3.00	0.08	0.15	0.23	0.30	0.45	0.60
6.00	0.15	0.30	0.45	0.60	0.90	1.20
20.00	0.50	1.00	1.50	2.00	3.00	4.00
40.00	1.00	2.00	3.00	4.00	6.00	8.00

Pump flow rate (mL/hr)

MIDAZOLAM 5 MG/ML

250 mg/50 mL	Dose rate in mg/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**0.05**	**0.10**	**0.15**	**0.20**	**0.30**	**0.40**
0.50	0.01	0.01	0.02	0.02	0.03	0.04
1.50	0.02	0.03	0.05	0.06	0.09	0.12
3.00	0.03	0.06	0.09	0.12	0.18	0.24
6.00	0.06	0.12	0.18	0.24	0.36	0.48
20.00	0.20	0.40	0.60	0.80	1.20	1.60
40.00	0.40	0.80	1.20	1.60	2.40	3.20

Pump flow rate (mL/hr)

CARDIAC HEMODYNAMIC SUPPORT--Heart failure (Phosphodiesterase Inhibitor)

MILRINONE			*DO NOT TITRATE*
Concentration			**Starting Dose**
5 mg	50 mL D5W	0.1 mg/mL	Load: 50 mcg/kg over 15 mins
10 mg	50 mL D5W	0.2 mg/mL	Continuous Infusion: 0.5 mcg/kg/min
25 mg	50 mL D5W	0.5 mg/mL	**Usual/Maximum [adult]**
50 mg	50 mL Straight	1 mg/mL	Usual: 0.25-0.75 mcg/kg/min Maximum: 1.2 mcg/kg/min [1.13 mg/kg/day]

MILRINONE 0.1 MG/ML

5 mg/50 mL	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**0.25**	**0.30**	**0.40**	**0.50**	**0.75**	**1.00**
0.50	0.08	0.09	0.12	0.15	0.23	0.30
1.50	0.23	0.27	0.36	0.45	0.68	0.90
3.00	0.45	0.54	0.72	0.90	1.35	1.80
6.00	0.90	1.08	1.44	1.80	2.70	3.60
20.00	3.00	3.60	4.80	6.00	9.00	12.00
40.00	6.00	7.20	9.60	12.00	18.00	24.00

Pump flow rate (mL/hr)

MILRINONE 0.2 MG/ML

10 mg/50 mL	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**0.25**	**0.30**	**0.40**	**0.50**	**0.75**	**1.00**
0.50	0.04	0.05	0.06	0.08	0.11	0.15
1.50	0.11	0.14	0.18	0.23	0.34	0.45
3.00	0.23	0.27	0.36	0.45	0.68	0.90
6.00	0.45	0.54	0.72	0.90	1.35	1.80
20.00	1.50	1.80	2.40	3.00	4.50	6.00
40.00	3.00	3.60	4.80	6.00	9.00	12.00

Pump flow rate (mL/hr)

MILRINONE 0.5 MG/ML

25 mg/50 mL	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**0.25**	**0.30**	**0.40**	**0.50**	**0.75**	**1.00**
0.50	0.02	0.02	0.02	0.03	0.05	0.06
1.50	0.05	0.05	0.07	0.09	0.14	0.18
3.00	0.09	0.11	0.14	0.18	0.27	0.36
6.00	0.18	0.22	0.29	0.36	0.54	0.72
20.00	0.60	0.72	0.96	1.20	1.80	2.40
40.00	1.20	1.44	1.92	2.40	3.60	4.80

Pump flow rate (mL/hr)

MILRINONE 1 MG/ML

50 mg/50 mL	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**0.25**	**0.30**	**0.40**	**0.50**	**0.75**	**1.00**
0.50	0.01	0.01	0.01	0.02	0.02	0.03
1.50	0.02	0.03	0.04	0.05	0.07	0.09
3.00	0.05	0.05	0.07	0.09	0.14	0.18
6.00	0.09	0.11	0.14	0.18	0.27	0.36
20.00	0.30	0.36	0.48	0.60	0.90	1.20
40.00	0.60	0.72	0.96	1.20	1.80	2.40

Pump flow rate (mL/hr)

SEDATION

MORPHINE			*DO NOT TITRATE**
Concentration			**Starting Dose**
25 mg	50 mL D5W	0.5 mg/mL	Continuous Infusion: 0.05 mg/kg/hour
50 mg	50 mL D5W	1 mg/mL	**Usual/Maximum [adult]**
100 mg	50 mL D5W	2 mg/mL	
250 mg	50 mL D5W	5 mg/mL	Usual: 0.05-0.1 mg/kg/hour Maximum: 0.4 mg/kg/hour [10 mg/hour]

MORPHINE 0.5 MG/ML

25 mg/50 mL	Dose rate in mg/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**0.01**	**0.02**	**0.05**	**0.10**	**0.20**	**0.40**
0.50	0.01	0.02	0.05	0.10	0.20	0.40
1.50	0.03	0.06	0.15	0.30	0.60	1.20
3.00	0.06	0.12	0.30	0.60	1.20	2.40
6.00	0.12	0.24	0.60	1.20	2.40	4.80
20.00	0.40	0.80	2.00	4.00	8.00	16.00
40.00	0.80	1.60	4.00	8.00	16.00	32.00

Pump flow rate (mL/hr)

MORPHINE 1 MG/ML

50 mg/50 mL	Dose rate in mg/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**0.01**	**0.02**	**0.05**	**0.10**	**0.20**	**0.40**
0.50	0.01	0.01	0.03	0.05	0.10	0.20
1.50	0.02	0.03	0.08	0.15	0.30	0.60
3.00	0.03	0.06	0.15	0.30	0.60	1.20
6.00	0.06	0.12	0.30	0.60	1.20	2.40
20.00	0.20	0.40	1.00	2.00	4.00	8.00
40.00	0.40	0.80	2.00	4.00	8.00	16.00

Pump flow rate (mL/hr)

MORPHINE 2 MG/ML

100 mg/50 mL	Dose rate in mg/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**0.01**	**0.02**	**0.05**	**0.10**	**0.20**	**0.40**
0.50	0.00	0.01	0.01	0.03	0.05	0.10
1.50	0.01	0.02	0.04	0.08	0.15	0.30
3.00	0.02	0.03	0.08	0.15	0.30	0.60
6.00	0.03	0.06	0.15	0.30	0.60	1.20
20.00	0.10	0.20	0.50	1.00	2.00	4.00
40.00	0.20	0.40	1.00	2.00	4.00	8.00

Pump flow rate (mL/hr)

MORPHINE 5 MG/ML

250 mg/50 mL	Dose rate in mg/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**0.01**	**0.02**	**0.05**	**0.10**	**0.20**	**0.40**
0.50	0.00	0.00	0.01	0.01	0.02	0.04
1.50	0.00	0.01	0.02	0.03	0.06	0.12
3.00	0.01	0.01	0.03	0.06	0.12	0.24
6.00	0.01	0.02	0.06	0.12	0.24	0.48
20.00	0.04	0.08	0.20	0.40	0.80	1.60
40.00	0.08	0.16	0.40	0.80	1.60	3.20

Pump flow rate (mL/hr)

CARDIAC HEMODYNAMIC SUPPORT--Pressor

NICARDIPINE — MUST SPECIFY TITRATION PARAMETERS*

Concentration		
5 mg	50 mL D5W	0.1 mg/mL
12.5 mg	50 mL D5W	0.25 mg/mL
25 mg	50 mL D5W	0.5 mg/mL
50 mg	50 mL D5W	1 mg/mL

Starting Dose

Continuous Infusion: 0.5-1 mcg/kg/min

Usual/Maximum [adult]

Usual: 0.5-3 mcg/kg/min
Titrate: 0.5 mcg/kg/min Q5 min (range MAP or SBP)*
Maximum: 5 mcg/kg/min [15 mg/hour]

NICARDIPINE 0.1 mg/mL

5 mg/50 mL	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**0.10**	**0.20**	**0.50**	**1.00**	**3.00**	**5.00**
0.50	0.03	0.06	0.15	0.30	0.90	1.50
1.50	0.09	0.18	0.45	0.90	2.70	4.50
3.00	0.18	0.36	0.90	1.80	5.40	9.00
6.00	0.36	0.72	1.80	3.60	10.80	18.00
20.00	1.20	2.40	6.00	12.00	36.00	60.00
40.00	2.40	4.80	12.00	24.00	72.00	120.00

Pump flow rate (mL/hr)

NICARDIPINE 0.25 MG/ML

12.5 mg/50 mL	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**0.10**	**0.20**	**0.50**	**1.00**	**3.00**	**5.00**
0.50	0.01	0.02	0.06	0.12	0.36	0.60
1.50	0.04	0.07	0.18	0.36	1.08	1.80
3.00	0.07	0.14	0.36	0.72	2.16	3.60
6.00	0.14	0.29	0.72	1.44	4.32	7.20
20.00	0.48	0.96	2.40	4.80	14.40	24.00
40.00	0.96	1.92	4.80	9.60	28.80	48.00

Pump flow rate (mL/hr)

NICARDIPINE 0.5 MG/ML

25 mg/50 mL	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**0.10**	**0.20**	**0.50**	**1.00**	**3.00**	**5.00**
0.50	0.01	0.01	0.03	0.06	0.18	0.30
1.50	0.02	0.04	0.09	0.18	0.54	0.90
3.00	0.04	0.07	0.18	0.36	1.08	1.80
6.00	0.07	0.14	0.36	0.72	2.16	3.60
20.00	0.24	0.48	1.20	2.40	7.20	12.00
40.00	0.48	0.96	2.40	4.80	14.40	24.00

Pump flow rate (mL/hr)

NICARDIPINE 1 MG/ML

50 mg/50 mL	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**0.10**	**0.20**	**0.50**	**1.00**	**3.00**	**5.00**
0.50	0.00	0.01	0.02	0.03	0.09	0.15
1.50	0.01	0.02	0.05	0.09	0.27	0.45
3.00	0.02	0.04	0.09	0.18	0.54	0.90
6.00	0.04	0.07	0.18	0.36	1.08	1.80
20.00	0.12	0.24	0.60	1.20	3.60	6.00
40.00	0.24	0.48	1.20	2.40	7.20	12.00

Pump flow rate (mL/hr)

CARDIAC HEMODYNAMIC SUPPORT--Pressor

NITROGLYCERIN			MUST SPECIFY TITRATION PARAMETERS*
Concentration			**Starting Dose**
5 mg	50 mL D5W	0.1 mg/mL	Continuous Infusion: 0.25-0.5 mcg/kg/min
10 mg	50 mL D5W	0.2 mg/mL	**Usual/Maximum [adult]**
20 mg	50 mL D5W	0.4 mg/mL	Usual: 0.5-3 mcg/kg/min
50 mg	50 mL D5W	1 mg/mL	Titrate: 0.5 mcg/kg/min Q5 min (range MAP or SBP)*
			Maximum: 5 mcg/kg/min [200 mcg/min]

NITROGLYCERIN 0.1 mg/mL

5 mg/50 mL	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**0.10**	**0.20**	**0.50**	**1.00**	**3.00**	**5.00**
0.50	0.03	0.06	0.15	0.30	0.90	1,50
1.50	0.09	0.18	0.45	0.90	2.70	4.50
3.00	0.18	0.36	0.90	1.80	5.40	9.00
6.00	0.36	0.72	1.80	3.60	10.80	18.00
20.00	1.20	2.40	6.00	12.00	36.00	60.00
40.00	2.40	4.80	12.00	24.00	72.00	120.00

Pump flow rate (mL/hr)

NITROGLYCERIN 0.2 MG/ML

10 mg/50 mL	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**0.10**	**0.20**	**0.50**	**1.00**	**3.00**	**5.00**
0.50	0.02	0.03	0.08	0.15	0.45	0.75
1.50	0.05	0.09	0.23	0.45	1.35	2.25
3.00	0.09	0.18	0.45	0.90	2.70	4.50
6.00	0.18	0.36	0.90	1.80	5.40	9.00
20.00	0.60	1.20	3.00	6.00	18.00	30.00
40.00	1.20	2.40	6.00	12.00	36.00	60.00

Pump flow rate (mL/hr)

NITROGLYCERIN 0.4 MG/ML

20 mg/50 mL	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**0.10**	**0.20**	**0.50**	**1.00**	**3.00**	**5.00**
0.50	0.01	0.02	0.04	0.08	0.23	0.38
1.50	0.02	0.05	0.11	0.23	0.68	1.13
3.00	0.05	0.09	0.23	0.45	1.35	2.25
6.00	0.09	0.18	0.45	0.90	2.70	4.50
20.00	0.30	0.60	1.50	3.00	9.00	15.00
40.00	0.60	1.20	3.00	6.00	18.00	30.00

Pump flow rate (mL/hr)

NITROGLYCERIN 1 MG/ML

50 mg/50 mL	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**0.10**	**0.20**	**0.50**	**1.00**	**3.00**	**5.00**
0.50	0.00	0.01	0.02	0.03	0.09	0.15
1.50	0.01	0.02	0.05	0.09	0.27	0.45
3.00	0.02	0.04	0.09	0.18	0.54	0.90
6.00	0.04	0.07	0.18	0.36	1.08	1.80
20.00	0.12	0.24	0.60	1.20	3.60	6.00
40.00	0.24	0.48	1.20	2.40	7.20	12.00

Pump flow rate (mL/hr)

CARDIAC HEMODYNAMIC SUPPORT--Pressor

NITROPRUSSIDE			MUST SPECIFY TITRATION PARAMETERS*
Concentration			**Starting Dose**
5 mg	50 mL D5W	0.1 mg/mL	Continuous Infusion: 0.5 mcg/kg/min
10 mg	50 mL D5W	0.2 mg/mL	**Usual/Maximum [adult]**
20 mg	50 mL D5W	0.4 mg/mL	Usual: 0.5-3 mcg/kg/min
50 mg	50 mL D5W	1 mg/mL	Titrate: 0.5 mcg/kg/min Q5 min (range MAP or SBP)*
			Maximum: 4 mcg/kg/min [10 mcg/kg/min x10 mins]

NITROPRUSSIDE 0.1 mg/mL

5 mg/50 mL	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**0.10**	**0.20**	**0.50**	**1.00**	**3.00**	**5.00**
0.50	0.03	0.06	0.15	0.30	0.90	1.50
1.50	0.09	0.18	0.45	0.90	2.70	4.50
3.00	0.18	0.36	0.90	1.80	5.40	9.00
6.00	0.36	0.72	1.80	3.60	10.80	18.00
20.00	1.20	2.40	6.00	12.00	36.00	60.00
40.00	2.40	4.80	12.00	24.00	72.00	120.00

Pump flow rate (mL/hr)

NITROPRUSSIDE 0.2 MG/ML

10 mg/50 mL	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**0.10**	**0.20**	**0.50**	**1.00**	**3.00**	**5.00**
0.50	0.02	0.03	0.08	0.15	0.45	0.75
1.50	0.05	0.09	0.23	0.45	1.35	2.25
3.00	0.09	0.18	0.45	0.90	2.70	4.50
6.00	0.18	0.36	0.90	1.80	5.40	9.00
20.00	0.60	1.20	3.00	6.00	18.00	30.00
40.00	1.20	2.40	6.00	12.00	36.00	60.00

Pump flow rate (mL/hr)

NITROPRUSSIDE 0.4 MG/ML

20 mg/50 mL	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**0.10**	**0.20**	**0.50**	**1.00**	**3.00**	**5.00**
0.50	0.01	0.02	0.04	0.08	0.23	0.38
1.50	0.02	0.05	0.11	0.23	0.68	1.13
3.00	0.05	0.09	0.23	0.45	1.35	2.25
6.00	0.09	0.18	0.45	0.90	2.70	4.50
20.00	0.30	0.60	1.50	3.00	9.00	15.00
40.00	0.60	1.20	3.00	6.00	18.00	30.00

Pump flow rate (mL/hr)

NITROPRUSSIDE 1 MG/ML

50 mg/50 mL	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**0.10**	**0.20**	**0.50**	**1.00**	**3.00**	**5.00**
0.50	0.00	0.01	0.02	0.03	0.09	0.15
1.50	0.01	0.02	0.05	0.09	0.27	0.45
3.00	0.02	0.04	0.09	0.18	0.54	0.90
6.00	0.04	0.07	0.18	0.36	1.08	1.80
20.00	0.12	0.24	0.60	1.20	3.60	6.00
40.00	0.24	0.48	1.20	2.40	7.20	12.00

Pump flow rate (mL/hr)

CARDIAC HEMODYNAMIC SUPPORT--Pressor

NOREPINEPHRINE			MUST SPECIFY TITRATION PARAMETERS*
Concentration			**Starting Dose**
1.6 mg	50 mL D5W	32 mcg/mL	Continuous Infusion: 0.1 mcg/kg/min
10 mg	50 mL D5W	200 mcg/mL	**Usual/Maximum [adult]**
30 mg	50 mL D5W	600 mcg/mL	Usual: 0.02-0.5 mcg/kg/min Titrate: 0.05 mcg/kg/min Q5 min (range MAP or SBP)* Maximum: 1 mcg/kg/min [50 mcg/min] Wean: 0.05 mcg/kg/min Q30 min as tolerated until off

NOREPINEPHRINE 32 MCG/ML

1.6 mg/50 mL	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**0.05**	**0.10**	**0.50**	**1.00**	**1.50**	**2.00**
0.50	0.05	0.09	0.47	0.94	1.41	1.88
1.50	0.14	0.28	1.41	2.81	4.22	5.63
3.00	0.28	0.56	2.81	5.63	8.44	11.25
6.00	0.56	1.13	5.63	11.25	16.88	22.50
20.00	1.88	3.75	18.75	37.50	56.25	75.00
40.00	3.75	7.50	37.50	75.00	⊗ 112.50	⊗ 150.00

Pump flow rate (mL/hr)

NOREPINEPHRINE 200 MCG/ML

10 mg/50 mL	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**0.05**	**0.10**	**0.50**	**1.00**	**1.50**	**2.00**
0.50	0.01	0.02	0.08	0.15	0.23	0.30
1.50	0.02	0.05	0.23	0.45	0.68	0.90
3.00	0.05	0.09	0.45	0.90	1.35	1.80
6.00	0.09	0.18	0.90	1.80	2.70	3.60
20.00	0.30	0.60	3.00	6.00	9.00	12.00
40.00	0.60	1.20	6.00	12.00	⊗ 18.00	⊗ 24.00

Pump flow rate (mL/hr)

NOREPINEPHRINE 600 MCG/ML

30 mg/50 mL	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**0.05**	**0.10**	**0.50**	**1.00**	**1.50**	**2.00**
0.50	0.00	0.01	0.03	0.05	0.08	0.10
1.50	0.01	0.02	0.08	0.15	0.23	0.30
3.00	0.02	0.03	0.15	0.30	0.45	0.60
6.00	0.03	0.06	0.30	0.60	0.90	1.20
20.00	0.10	0.20	1.00	2.00	3.00	4.00
40.00	0.20	0.40	2.00	4.00	⊗ 6.00	⊗ 8.00

Pump flow rate (mL/hr)

CARDIAC HEMODYNAMIC SUPPORT--Pressor

PHENYLEPHRINE

MUST SPECIFY TITRATION PARAMETERS*

Concentration		
2 mg	50 mL D5W	40 mcg/mL
8 mg	50 mL D5W	160 mcg/mL
20 mg	50 mL D5W	400 mcg/mL

Starting Dose

Continuous Infusion: 0.1 mcg/kg/min

Usual/Maximum [adult]

Usual: 0.02-0.1 mcg/kg/min
Titrate: 0.05 mcg/kg/min Q5 min (range MAP or SBP)*
Maximum: 1 mcg/kg/min [300 mcg/min]
Wean: 0.05 mcg/kg/min Q30 min as tolerated until off

PHENYLEPHRINE 40 MCG/ML

2 mg/50 mL

	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**0.05**	**0.10**	**0.15**	**0.50**	**0.75**	**1.00**
0.50	0.04	0.08	0.11	0.38	0.56	0.75
1.50	0.11	0.23	0.34	1.13	1.69	2.25
3.00	0.23	0.45	0.68	2.25	3.38	4.50
6.00	0.45	0.90	1.35	4.50	6.75	9.00
20.00	1.50	3.00	4.50	15.00	22.50	30.00
40.00	3.00	6.00	9.00	30.00	45.00	60.00

Pump flow rate (mL/hr)

PHENYLEPHRINE 160 MCG/ML

8 mg/50 mL

	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**0.05**	**0.10**	**0.15**	**0.50**	**0.75**	**1.00**
0.50	0.01	0.02	0.03	0.09	0.14	0.19
1.50	0.03	0.06	0.08	0.28	0.42	0.56
3.00	0.06	0.11	0.17	0.56	0.84	1.13
6.00	0.11	0.23	0.34	1.13	1.69	2.25
20.00	0.38	0.75	1.13	3.75	5.63	7.50
40.00	0.75	1.50	2.25	7.50	11.25	15.00

Pump flow rate (mL/hr)

PHENYLEPHRINE 400 MCG/ML

20 mg/50 mL

	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**0.05**	**0.10**	**0.15**	**0.50**	**0.75**	**1.00**
0.50	0.00	0.01	0.01	0.04	0.06	0.08
1.50	0.01	0.02	0.03	0.11	0.17	0.23
3.00	0.02	0.05	0.07	0.23	0.34	0.45
6.00	0.05	0.09	0.14	0.45	0.68	0.90
20.00	0.15	0.30	0.45	1.50	2.25	3.00
40.00	0.30	0.60	0.90	3.00	4.50	6.00

Pump flow rate (mL/hr)

SEDATION

PROPOFOL			*TITRATE to RASS goal*
Concentration			**Starting Dose**
500 mg	50 mL Fat 10%	10 mg/mL	Load: 1-2 mg/kg/dose over 30 seconds Continuous Infusion: 5 mcg/kg/min
			Usual/Maximum [adult]
			Usual: 0-50 mcg/kg/min Titrate: 5 mcg/kg/min Q5 min to RASS goal Maximum: 50 mcg/kg/min; 24 hours (PRIS)

PROPOFOL 10 MG/ML

	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**5.00**	**10.00**	**15.00**	**25.00**	**30.00**	**50.00**
0.50	0.02	0.03	0.05	0.08	0.09	0.15
1.50	0.05	0.09	0.14	0.23	0.27	0.45
3.00	0.09	0.18	0.27	0.45	0.54	0.90
6.00	0.18	0.36	0.54	0.90	1.08	1.80
20.00	0.60	1.20	1.80	3.00	3.60	6.00
40.00	1.20	2.40	3.60	6.00	7.20	12.00

Pump flow rate (mL/hr)

MISCELANEOUS—Bronchodilator (β-2 agonist)

TERBUTALINE			DO NOT TITRATE
Concentration			**Starting Dose**
5 mg	50 mL NS	0.1 mg/mL	Load: 5-10 mcg/kg/dose over 10 mins
12.5 mg	50 mL NS	0.25 mg/mL	Continuous Infusion: 0.4 mcg/kg/min
25 mg	50 mL NS	0.5 mg/mL	**Usual/Maximum [adult]**
50 mg	50 mL undiluted	1 mg/mL	Usual: 0.5-4 mcg/kg/min Maximum: 10 mcg/kg/min

TERUTALINE 0.1 MG/ML

5 mg/50 mL	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**0.20**	**0.40**	**0.60**	**1.00**	**6.00**	**10.00**
0.50	0.06	0.12	0.18	0.30	1.80	3.00
1.50	0.18	0.36	0.54	0.90	5.40	9.00
3.00	0.36	0.72	1.08	1.80	10.80	18.00
6.00	0.72	1.44	2.16	3.60	21.60	36.00
20.00	2.40	4.80	7.20	12.00	72.00	120.00
40.00	4.80	9.60	14.40	24.00	144.00	240.00

Pump flow rate (mL/hr)

TERUTALINE 0.25 MG/ML

12.5 mg/50 mL	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**0.20**	**0.40**	**0.60**	**1.00**	**6.00**	**10.00**
0.50	0.02	0.05	0.07	0.12	0.72	1.20
1.50	0.07	0.14	0.22	0.36	2.16	3.60
3.00	0.14	0.29	0.43	0.72	4.32	7.20
6.00	0.29	0.58	0.86	1.44	8.64	14.40
20.00	0.96	1.92	2.88	4.80	28.80	48.00
40.00	1.92	3.84	5.76	9.60	57.60	96.00

Pump flow rate (mL/hr)

TERUTALINE 0.5 MG/ML

25 mg/50 mL	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**0.20**	**0.40**	**0.60**	**1.00**	**6.00**	**10.00**
0.50	0.01	0.02	0.04	0.06	0.36	0.60
1.50	0.04	0.07	0.11	0.18	1.08	1.80
3.00	0.07	0.14	0.22	0.36	2.16	3.60
6.00	0.14	0.29	0.43	0.72	4.32	7.20
20.00	0.48	0.96	1.44	2.40	14.40	24.00
40.00	0.96	1.92	2.88	4.80	28.80	48.00

Pump flow rate (mL/hr)

TERUTALINE 1 MG/ML

50 mg/50 mL	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**0.20**	**0.40**	**0.60**	**1.00**	**6.00**	**10.00**
0.50	0.01	0.01	0.02	0.03	0.18	0.30
1.50	0.02	0.04	0.05	0.09	0.54	0.90
3.00	0.04	0.07	0.11	0.18	1.08	1.80
6.00	0.07	0.14	0.22	0.36	2.16	3.60
20.00	0.24	0.48	0.72	1.20	7.20	12.00
40.00	0.48	0.96	1.44	2.40	14.40	24.00

Pump flow rate (mL/hr)

*MISCELANEOUS—DIABETES INSIPIDUS*** Weight-Based*

VASOPRESSIN			*MUST SPECIFY TITRATION PARAMETERS**
Concentration			**Starting Dose**
0.5 unit	50 mL NS	0.01 unit/mL	Initial: 1 milliunit/kg/hour
10 unit	50 mL NS	0.2 unit/mL	**Usual/Maximum [adult]**
20 unit	50 mL NS	0.4 unit/mL	Usual: 1 milliunit/kg/hour
50 unit	50 mL NS	1 unit/mL	Titrate: double or half rate Q60 min for {goal}
			Maximum: 10 milliunit/kg/hour

VASOPRESSIN 0.01 UNIT/ML

0.5 unit/50 mL	Dose rate in milliunit/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**0.50**	**1.00**	**2.00**	**4.00**	**8.00**	**10.00**
0.50	0.03	0.05	0.10	0.20	0.40	0.50
1.50	0.08	0.15	0.30	0.60	1.20	1.50
3.00	0.15	0.30	0.60	1.20	2.40	3.00
6.00	0.30	0.60	1.20	2.40	4.80	6.00
20.00	1.00	2.00	4.00	8.00	16.00	20.00
40.00	2.00	4.00	8.00	16.00	32.00	40.00

Pump flow rate (mL/hr)

VASOPRESSIN 0.2 UNIT/ML

10 unit/50 mL	Dose rate in milliunit/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**0.50**	**1.00**	**2.00**	**4.00**	**8.00**	**10.00**
0.50	0.00	0.00	0.01	0.01	0.02	0.03
1.50	0.00	0.01	0.02	0.03	0.06	0.08
3.00	0.01	0.02	0.03	0.06	0.12	0.15
6.00	0.02	0.03	0.06	0.12	0.24	0.30
20.00	0.05	0.10	0.20	0.40	0.80	1.00
40.00	0.10	0.20	0.40	0.80	1.60	2.00

Pump flow rate (mL/hr)

VASOPRESSIN 0.4 UNIT/ML

20 unit/50 mL	Dose rate in milliunit/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**0.50**	**1.00**	**2.00**	**4.00**	**8.00**	**10.00**
0.50	0.00	0.00	0.00	0.01	0.01	0.01
1.50	0.00	0.00	0.01	0.02	0.03	0.04
3.00	0.00	0.01	0.02	0.03	0.06	0.08
6.00	0.01	0.02	0.03	0.06	0.12	0.15
20.00	0.03	0.05	0.10	0.20	0.40	0.50
40.00	0.05	0.10	0.20	0.40	0.80	1.00

Pump flow rate (mL/hr)

VASOPRESSIN 1 UNIT/ML

50 unit/50 mL	Dose rate in milliunit/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**0.50**	**1.00**	**2.00**	**4.00**	**8.00**	**10.00**
0.50	0.00	0.00	0.00	0.00	0.00	0.01
1.50	0.00	0.00	0.00	0.01	0.01	0.02
3.00	0.00	0.00	0.01	0.01	0.02	0.03
6.00	0.00	0.01	0.01	0.02	0.05	0.06
20.00	0.01	0.02	0.04	0.08	0.16	0.20
40.00	0.02	0.04	0.08	0.16	0.32	0.40

Pump flow rate (mL/hr)

*MISCELANEOUS—DIABETES INSIPIDUS** Non Weight-Based*

VASOPRESSIN			*MUST SPECIFY TITRATION PARAMETERS**
Concentration			**Starting Dose**
50 unit	50 mL NS	1 unit/mL	Initial: 2.5 unit/hour
			Usual/Maximum [adult]
			Usual: 2.5-4 unit/hour Titrate: double or half rate Q60 min for {goal} Maximum: convert usual daily requirement to hourly rate

≥ 40 kg VASOPRESSIN 1 UNIT/ML

50 unit/50 mL	Dose rate in unit/hour					
	Soft Min					Soft Max
Weight (kg)	**2.50**	**4.00**	**5.00**	**6.00**	**7.00**	**10.00**
40.00	2.50	4.00	5.00	6.00	7.00	10.00

Pump flow rate (mL/hr)

CARDIAC HEMODYNAMIC SUPPORT--vasodialotory support

VASOPRESSIN **SHOCK** < 25 kg — *DO NOT TITRATE*

Concentration			Starting Dose
10 unit	50 mL NS	0.2 unit/mL	Continuous Infusion: 0.2 milliunit/kg/min
20 unit	50 mL D5W	0.4 unit/mL	**Usual/Maximum [adult]**
50 unit	50 mL D5W	1 unit/mL	Usual: 0.5-2 milliunit/kg/min Maximum: 2 milliunit/kg/min [0.04 unit/min]

VASOPRESSIN 0.2 UNIT/ML

10 unit/50 mL	Dose rate in milliunit/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**0.10**	**0.15**	**0.25**	**0.50**	**1.00**	**2.00**
0.50	0.02	0.02	0.04	0.08	0.15	0.30
1.50	0.05	0.07	0.11	0.23	0.45	0.90
3.00	0.09	0.14	0.23	0.45	0.90	1.80
6.00	0.18	0.27	0.45	0.90	1.80	3.60
20.00	0.60	0.90	1.50	3.00	6.00	12.00
25.00	0.75	1.13	1.88	3.75	7.50	15.00

Pump flow rate (mL/hr)

VASOPRESSIN 0.4 UNIT/ML

20 unit/50 mL	Dose rate in milliunit/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**0.10**	**0.15**	**0.25**	**0.50**	**1.00**	**2.00**
0.50	0.01	0.01	0.02	0.04	0.08	0.15
1.50	0.02	0.03	0.06	0.11	0.23	0.45
3.00	0.05	0.07	0.11	0.23	0.45	0.90
6.00	0.09	0.14	0.23	0.45	0.90	1.80
20.00	0.30	0.45	0.75	1.50	3.00	6.00
25.00	0.38	0.56	0.94	1.88	3.75	7.50

Pump flow rate (mL/hr)

VASOPRESSIN 1 UNIT/ML

50 unit/50 mL	Dose rate in milliunit/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**0.10**	**0.15**	**0.25**	**0.50**	**1.00**	**2.00**
0.50	0.00	0.00	0.01	0.02	0.03	0.06
1.50	0.01	0.01	0.02	0.05	0.09	0.18
3.00	0.02	0.03	0.05	0.09	0.18	0.36
6.00	0.04	0.05	0.09	0.18	0.36	0.72
20.00	0.12	0.18	0.30	0.60	1.20	2.40
25.00	0.15	0.23	0.38	0.75	1.50	3.00

Pump flow rate (mL/hr)

CARDIAC HEMODYNAMIC SUPPORT--vasodialotory support

VASOPRESSIN **SHOCK** ≥ 25 kg			*DO NOT TITRATE*
Concentration			**Starting Dose**
10 unit	50 mL NS	0.2 unit/mL	Continuous Infusion: 0.2 milliunit/kg/min
20 unit	50 mL D5W	0.4 unit/mL	**Usual/Maximum [adult]**
50 unit	50 mL D5W	1 unit/mL	Usual: 0.5-2 milliunit/kg/min Maximum: 2 milliunit/kg/min [0.04 unit/min]

VASOPRESSIN 0.2 UNIT/ML

10 unit/50 mL	Dose rate in unit/minute			
	Soft Min			
Weight (kg)	**0.01**	**0.02**	**0.03**	**0.04**
25.00	3.00	6.00	9.00	12.00

Pump flow rate (mL/hr)

VASOPRESSIN 0.4 UNIT/ML

20 unit/50 mL	Dose rate in unit/minute			
	Soft Min			
Weight (kg)	**0.01**	**0.02**	**0.03**	**0.04**
25.00	1.50	3.00	4.50	6.00

Pump flow rate (mL/hr)

VASOPRESSIN 1 UNIT/ML

50 unit/50 mL	Dose rate in unit/minute			
	Soft Min			
Weight (kg)	**0.01**	**0.02**	**0.03**	**0.04**
25.00	0.60	1.20	1.80	2.40

Pump flow rate (mL/hr)

PARALYTIC--neuromuscular blockade

VECURONIUM			DO NOT TITRATE
Concentration			**Starting Dose**
25 mg	50 mL D5W	0.5 mg/mL	Continuous Infusion: 0.1 mg/kg/hour
50 mg	50 mL D5W	1 mg/mL	**Usual/Maximum [adult]**
100 mg	50 mL D5W	2 mg/mL	Bolus: 0.1 mg/kg rapidly over seconds Usual: 0.05-0.1 mg/kg/hour Maximum: 0.2 mg/kg/hour [1.7 mcg/kg/min]

VECURONIUM 0.5 MG/ML

25 mg/50 mL	Dose rate in mg/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**0.05**	**0.10**	**0.15**	**0.17**	**0.18**	**0.20**
0.50	0.07	0.08	0.11	0.13	0.20	0.27
1.50	0.20	0.24	0.32	0.40	0.60	0.80
3.00	0.40	0.48	0.64	0.80	1.20	1.60
6.00	0.80	0.96	1.28	1.60	2.40	3.20
20.00	2.67	3.20	4.27	5.33	8.00	10.67
40.00	5.33	6.40	8.53	10.67	16.00	21.33

Pump flow rate (mL/hr)

VECURONIUM 1 MG/ML

50 mg/50 mL	Dose rate in mg/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**0.05**	**0.10**	**0.15**	**0.17**	**0.18**	**0.20**
0.50	0.02	0.02	0.03	0.03	0.05	0.07
1.50	0.05	0.06	0.08	0.10	0.15	0.20
3.00	0.10	0.12	0.16	0.20	0.30	0.40
6.00	0.20	0.24	0.32	0.40	0.60	0.80
20.00	0.67	0.80	1.07	1.33	2.00	2.67
40.00	1.33	1.60	2.13	2.67	4.00	5.33

Pump flow rate (mL/hr)

VECURONIUM 2 MG/ML

100 mg/50 mL	Dose rate in mg/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**0.05**	**0.10**	**0.15**	**0.17**	**0.18**	**0.20**
0.50	0.01	0.03	0.04	0.04	0.04	0.05
1.00	0.03	0.05	0.08	0.09	0.09	0.10
1.50	0.04	0.08	0.11	0.13	0.13	0.15
3.00	0.08	0.15	0.23	0.26	0.26	0.30
5.00	0.13	0.25	0.38	0.43	0.44	0.50
6.00	0.15	0.30	0.45	0.51	0.53	0.60

Pump flow rate (mL/hr)

PEDIATRIC PROTOCOL FOR SYSTEMIC HEPARIN ADJUSTMENT

To be used after initial loading dose and maintenance I.V. infusion dose to maintain APTT of 60-80 seconds (assuming this reflects antifactor Xa level of 0.3-0.7)

Usual starting dose:

- < 1 year old: 28 unit/kg/hour
- ≥ 1 year old: 20 unit/kg/hour

Obtain blood for APTT 4 hours after heparin loading dose and 4 hours after every infusion rate change

Obtain daily CBC and APTT after APTT is therapeutic

APTT (seconds)	Dosage Adjustment	Time to repeat APTT
< 50	Give 50 unit/kg bolus and increase infusion rate by 10%	4 hours after rate change
50-59	Increase infusion rate by 10%	4 hours after rate change
60-80	Keep same rate	Next day
81-95	Decrease infusion rate by 10%	4 hours after rate change
96-120	Hold infusion for 30 minutes and decrease infusion rate by 10%	4 hours after rate change
> 120	Hold infusion for 60 minutes and decrease infusion rate by 15%	4 hours after rate change

Modified from Monagle P, Michelson AD, Bovill E, et al, "Antithrombotic Therapy in Children," Chest, 2001, 119:344S-70S

Neonatal ICU STANDARD DRIPS and Titration Protocol

MEDICATION	CONCENTRATION	AMOUNT	FLUID	RATE	SUGGESTED DOSING [Maximum]	Titration and Weaning*
Alprostadil	5 mcg/mL	125 mcg/25 mL	D5W	ⓘ	Usual: 0.05-0.1 mcg/kg/min	DO NOT TITRATE
	10 mcg/mL	250 mcg/25 mL		ⓘ	Max: 0.4 mcg/kg/min	
Amiodarone	1 mg/mL	25 mg/25 mL	NS or D5W	ⓘ	Usual: 5-10 mcg/kg/min	DO NOT TITRATE
	1.8 mg/mL	45 mg/25 mL		ⓘ	Max: 15 mcg/kg/min	
DOBUTamine	600 mcg/mL	15 mg/25 mL	D5W	ⓘ	Usual: 5 mcg/kg/min Max: 20 mcg/kg/min	Parameter: MAP -Range- Titrate: 2 mcgkg/min Q15 min Wean: 1 mcg/kg/min Q60 min
	800 mcg/mL	20 mg/25 mL		ⓘ		
	1600 mcg/mL	40 mg/25 mL		ⓘ		
DOPamine	600 mcg/mL	15 mg/25 mL	D5W	ⓘ	Usual: 3-5 mcg/kg/min Max: 20 mcg/kg/min	Paramater: MAP -Range- Titrate: 2 mcgkg/min Q15 min Wean: 1 mcg/kg/min Q60 min
	800 mcg/mL	20 mg/25 mL		ⓘ		
	1600 mcg/mL	40 mg/25 mL		ⓘ		
EPINEPHrine	10 mcg/mL	0.25 mcg/25 mL	D5W	ⓘ	Usual: 0.05-0.3 mcg/kg/min Max: 1 mcg/kg/min	Parameter: MAP -Range- Titrate: 0.1 mcg/kg/min Q15 min Wean: 0.05 mcg/kg/min Q60 min
	25 mcg/mL	0.625 mg/25 mL		ⓘ		
	50 mcg/mL	1.25 mg/25 mL		ⓘ		
esmolol	10 mg/mL	250 mg/25 mL	PREMIX NS	ⓘ	Usual: HTN: 50-250 mcg/kg/minute SVT: 200 mcg/kg/min Maximum: HTN: 500 mcg/kg/minute, SVT: 1,000 mcg/kg/min	Paramater: HR or MAP -Range- Titrate: 25-50 mcgkg/min Q15 min Wean: 50 mcg/kg/min Q60 min
	20 mg/mL	500 mg/25 mL	NS	ⓘ		
fentaNYL	2 mcg/mL	50 mcg/25 mL	D5W or NS	ⓘ	Usual: 2-5 mcg/kg/hr Max: 7 mcg/kg/hr (to effect)	DO NOT TITRATE
	5 mcg/mL	125 mcg/25 mL		ⓘ		
	10 mcg/mL	250 mcg/25 mL		ⓘ		
	25 mcg/mL	625 mcg/25 mL		ⓘ		
	40 mcg/mL	1000 mcg/25 mL		ⓘ		
Insulin Regular	0.05 unit/mL	1.25 unit/25 mL	D5W	ⓘ	Usual: 0.02-0.1 unit/kg/hr Max: 0.2 unit/kg/hr or BS ≤ 180 mg/dL	DO NOT TITRATE Nofify prescriber BS ≤ 250; stop if BS ≤ 180
midazolam	0.05 mg/mL	1.25 mg/25 mL	D5W or NS	ⓘ	Usual: 0.01-0.05 mg/kg/hr	DO NOT TITRATE
	0.1 mg/mL	2.5 mg/25 mL		ⓘ		
	0.2 mg/mL	5 mg/25 mL		ⓘ		
milrinone	50 mcg/mL	1.25 mg/25 mL	D5W or NS	ⓘ	Load: 50 mcg/kg over 15 min Usual: 0.25-0.75 mcg/kg/min Max: 1.2 mcg/kg/min	DO NOT TITRATE
	100 mcg/mL	2.5 mg/25 mL		ⓘ		
	200 mcg/mL	5 mg/25 mL		ⓘ		
	500 mcg/mL	12.5 mg/25 mL		ⓘ		
morphine	50 mcg/mL	1.25 mg/25 mL	D5W	ⓘ	Bolus: 50 mcg/kg/dose Usual: 5-20 mcg/kg/hour Max: 30 mcg/kg/hr [soft]	DO NOT TITRATE
	100 mcg/mL	2.5 mg/25 mL				
	250 mcg/mL	6.25 mg/25 mL				
vecuronium	0.5 mg/mL	12.5 mg/25 mL	D5W	ⓘ	Bolus: 0.01 mg/kg Usual: 0.01-0.07 mg/kg/hr Max: 0.18 mg/kg/hr	DO NOT TITRATE
	1 mg/mL	25 mg/25 mL		ⓘ		

All drips are prepared final volume 25 mL in 30 mL syringe

* Titration orders require complete dosing parameters: criteria/goal, initial dose, titration dose, titration frequency, and maximum dose

NEONATAL DRIP CONCENTRATION FLOW RATES

The purpose of the following tables is to provide the clinician with practical information to aid in the selection of the optimal standard concentration for continuous IV administration. Information includes:

1. IV flow rates for specific concentrations, weight and dose
2. Loading or bolus dose when applicable
3. Initial dose
4. Continuous dose
5. Usual maximum dose

KEY:

The colored tables are provided as a visual tool to aid in the selection of the most suitable concentration, over the usual dosage range, for an effective flow rate without exceeding the maxium dose.

Yellow	Less than 0.2 mL/hr but greater than the minimum pump rate
Red	Indicates flow rate less than 0.1 mL/hr or > 3 mL/hr
Green	Indicates flow rate 0.3-3 mL/hr

MISCELANEOUS--prostaglandin

ALPROSTADIL			DO NOT TITRATE
Concentration			**Starting Dose**
125 mcg	25 mL D5W	5 mcg/mL	Load: n/a
250 mcg	25 mL D5W	10 mcg/mL	Continuous Infusion: 0.1 mcg/kg/minute
			Usual/Maximum
			Usual: 0.05-0.1 mcg/kg/min
			Maximum: 0.4 mcg/kg/minute

ALPROSTADIL 5 MCG/ML (less than 1 kg)

125 mcg/25 mL	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**0.01**	**0.05**	**0.10**	**0.15**	**0.20**	**0.40**
0.50	0.1	0.3	0.6	0.9	1.2	2.4
1.00	0.1	0.6	1.2	1.8	2.4	4.8
1.50	0.2	0.9	1.8	2.7	3.6	7.2
3.00	0.4	1.8	3.6	5.4	7.2	14.4
5.00	0.6	3.0	6.0	9.0	12.0	24.0
6.00	0.7	3.6	7.2	10.8	14.4	28.8

Pump flow rate (mL/hr)

ALPROSTADIL 10 MCG/ML (≥ 1 kg)

250 mcg/25 mL	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**0.01**	**0.05**	**0.10**	**0.15**	**0.20**	**0.40**
0.50	0.0	0.2	0.3	0.5	0.6	1.2
1.00	0.1	0.3	0.6	0.9	1.2	2.4
1.50	0.1	0.5	0.9	1.4	1.8	3.6
3.00	0.2	0.9	1.8	2.7	3.6	7.2
5.00	0.3	1.5	3.0	4.5	6.0	12.0
6.00	0.4	1.8	3.6	5.4	7.2	14.4

Pump flow rate (mL/hr)

CARDIAC HEMODYNAMIC SUPPORT--Antiarrhythmic

AMIODARONE			*DO NOT TITRATE*
Concentration			**Starting Dose**
25 mg	25 mL D5W	1000 mcg/mL	Continuous Infusion: 5 mcg/kg/minute
45 mg	25 mL D5W	1800 mcg/mL	**Usual/Maximum**
			Usual: 10 mcg/kg/minute Maximum: 15 mcg/kg/min

AMIODARONE 1 MG/ML

25 mg/25 mL	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**2.50**	**5.00**	**7.50**	**10.00**	**12.50**	**15.00**
0.50	0.1	0.2	0.2	0.3	0.4	0.5
1.00	0.2	0.3	0.5	0.6	0.8	0.9
1.50	0.2	0.5	0.7	0.9	1.1	1.4
3.00	0.5	0.9	1.4	1.8	2.3	2.7
5.00	0.8	1.5	2.3	3.0	3.8	4.5
6.00	0.9	1.8	2.7	3.6	4.5	5.4

Pump flow rate (mL/hr)

AMIODARONE 1.8 MG/ML

45 mg/25 mL	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**2.50**	**5.00**	**7.50**	**10.00**	**12.50**	**15.00**
0.50	0.0	0.1	0.1	0.2	0.2	0.3
1.00	0.1	0.2	0.3	0.3	0.4	0.5
1.50	0.1	0.3	0.4	0.5	0.6	0.8
3.00	0.3	0.5	0.8	1.0	1.3	1.5
5.00	0.4	0.8	1.3	1.7	2.1	2.5
6.00	0.5	1.0	1.5	2.0	2.5	3.0

Pump flow rate (mL/hr)

CARDIAC HEMODYNAMIC SUPPORT--Pressor

DOBUTAMINE — ***MUST SPECIFY TITRATION PARAMETERS****

Concentration			Starting Dose
15 mg	25 mL D5W	600 mcg/mL	Continuous Infusion: 5 mcg/kg/minute
20 mg	25 mL D5W	800 mcg/mL	**Usual/Maximum**
40 mg	25 mL D5W	1600 mcg/mL	Usual: 2-20 mcg/kg/minute Titrate: 2 mcg/kg/minute Q15 min (specify range MAP)* Maximum: 20 mcg/kg/minute Wean: 1 mcg/kg/min Q60min as tolerated until off

DOBUTAMINE 600 MCG/ML (less than 1 kg)

15 mg/25 mL	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**2.00**	**5.00**	**7.50**	**10.00**	**15.00**	**20.00**
0.50	0.1	0.3	0.4	0.5	0.8	1.0
1.00	0.2	0.5	0.8	1.0	1.5	2.0
1.50	0.3	0.8	1.1	1.5	2.3	3.0
3.00	0.6	1.5	2.3	3.0	4.5	6.0
5.00	1.0	2.5	3.8	5.0	7.5	10.0
6.00	1.2	3.0	4.5	6.0	9.0	12.0

Pump flow rate (mL/hr)

DOBUTAMINE 800 MCG/ML (1-2.4 kg)

20 mg/25 mL	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**2.00**	**5.00**	**7.50**	**10.00**	**15.00**	**20.00**
0.50	0.1	0.2	0.3	0.4	0.6	0.8
1.00	0.2	0.4	0.6	0.8	1.1	1.5
1.50	0.2	0.6	0.8	1.1	1.7	2.3
3.00	0.5	1.1	1.7	2.3	3.4	4.5
5.00	0.8	1.9	2.8	3.8	5.6	7.5
6.00	0.9	2.3	3.4	4.5	6.8	9.0

Pump flow rate (mL/hr)

DOBUTAMINE 1600 MCG/ML (2.5-5.9 kg)

40 mg/25 mL	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**2.00**	**5.00**	**7.50**	**10.00**	**15.00**	**20.00**
0.50	0.0	0.1	0.1	0.2	0.3	0.4
1.00	0.1	0.2	0.3	0.4	0.6	0.8
1.50	0.1	0.3	0.4	0.6	0.8	1.1
3.00	0.2	0.6	0.8	1.1	1.7	2.3
5.00	0.4	0.9	1.4	1.9	2.8	3.8
6.00	0.5	1.1	1.7	2.3	3.4	4.5

Pump flow rate (mL/hr)

CARDIAC HEMODYNAMIC SUPPORT--Pressor

DOPAMINE — MUST SPECIFY TITRATION PARAMETERS*

Concentration		
15 mg	25 mL D5W	600 mcg/mL
20 mg	25 mL D5W	800 mcg/mL
40 mg	25 mL D5W	1600 mcg/mL

Starting Dose

Continuous Infusion:
Low: 1-5 mcg/kg/minute (renal)
Moderate: 5-15 mcg/kg/minute
High: > 15 mcg/kg/minute (alpha effects predominate)

Usual/Maximum

Usual: 3-5 mcg/kg/minute
Titrate: 2 mcg/kg/minute Q15 min (specify range MAP or SBP)*
Maximum: 20 mcg/kg/minute
Wean: 1 mcg/kg/min Q60 minute

DOPAMINE 600 MCG/ML (less than 1 kg)

15 mg/25 mL	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**2.00**	**5.00**	**7.50**	**10.00**	**15.00**	**20.00**
0.50	0.1	0.3	0.4	0.5	0.8	1.0
1.00	0.2	0.5	0.8	1.0	1.5	2.0
1.50	0.3	0.8	1.1	1.5	2.3	3.0
3.00	0.6	1.5	2.3	3.0	4.5	6.0
5.00	1.0	2.5	3.8	5.0	7.5	10.0
6.00	1.2	3.0	4.5	6.0	9.0	12.0

Pump flow rate (mL/hr)

DOPAMINE 800 MCG/ML (1-2.4 kg)

20 mg/25 mL	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**2.00**	**5.00**	**7.50**	**10.00**	**15.00**	**20.00**
0.50	0.1	0.2	0.3	0.4	0.6	0.8
1.00	0.2	0.4	0.6	0.8	1.1	1.5
1.50	0.2	0.6	0.8	1.1	1.7	2.3
3.00	0.5	1.1	1.7	2.3	3.4	4.5
5.00	0.8	1.9	2.8	3.8	5.6	7.5
6.00	0.9	2.3	3.4	4.5	6.8	9.0

Pump flow rate (mL/hr)

DOPAMINE 1600 MCG/ML (2.5-5.9 kg)

40 mg/25 mL	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**2.00**	**5.00**	**7.50**	**10.00**	**15.00**	**20.00**
0.50	0.0	0.1	0.1	0.2	0.3	0.4
1.00	0.1	0.2	0.3	0.4	0.6	0.8
1.50	0.1	0.3	0.4	0.6	0.8	1.1
3.00	0.2	0.6	0.8	1.1	1.7	2.3
5.00	0.4	0.9	1.4	1.9	2.8	3.8
6.00	0.5	1.1	1.7	2.3	3.4	4.5

Pump flow rate (mL/hr)

CARDIAC HEMODYNAMIC SUPPORT--Pressor

EPINEPHRINE			MUST SPECIFY TITRATION PARAMETERS*
Concentration			**Starting Dose**
0.25 mg	25 mL D5W	10 mcg/mL	Continuous Infusion: 0.1 mcg/kg/minute
0.625 mg	25 mL D5W	25 mcg/mL	**Usual/Maximum**
1.25 mg	25 mL D5W	50 mcg/mL	Usual: 0.05-0.3 mcg/kg/minute Titrate: 0.1 mcg/kg/min Q15 min (specify range MAP or SBP)* Maximum: 1 mcg/kg/minute

EPINEPHRINE 10 MCG/ML (less than 1 kg)

0.25 mg/25 mL	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**0.02**	**0.05**	**0.10**	**0.20**	**0.50**	**1.00**
0.50	0.1	0.2	0.3	0.6	1.5	3.0
1.00	0.1	0.3	0.6	1.2	3.0	6.0
1.50	0.2	0.5	0.9	1.8	4.5	9.0
3.00	0.4	0.9	1.8	3.6	9.0	18.0
5.00	0.6	1.5	3.0	6.0	15.0	30.0
6.00	0.7	1.8	3.6	7.2	18.0	36.0

Pump flow rate (mL/hr)

EPINEPHRINE 25MCG/ML (1-2.4 kg)

0.625 mg/25 mL	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**0.02**	**0.05**	**0.10**	**0.20**	**0.50**	**1.00**
0.50	0.0	0.1	0.1	0.2	0.6	1.2
1.00	0.0	0.1	0.2	0.5	1.2	2.4
1.50	0.1	0.2	0.4	0.7	1.8	3.6
3.00	0.1	0.4	0.7	1.4	3.6	7.2
5.00	0.2	0.6	1.2	2.4	6.0	12.0
6.00	0.3	0.7	1.4	2.9	7.2	14.4

Pump flow rate (mL/hr)

EPINEPHRINE 50 MCG/ML (≥ 2.5 kg)

1.25 mg/25 mL	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**0.02**	**0.05**	**0.10**	**0.20**	**0.50**	**1.00**
0.50	0.0	0.0	0.1	0.1	0.3	0.6
1.00	0.0	0.1	0.1	0.2	0.6	1.2
1.50	0.0	0.1	0.2	0.4	0.9	1.8
3.00	0.1	0.2	0.4	0.7	1.8	3.6
5.00	0.1	0.3	0.6	1.2	3.0	6.0
6.00	0.1	0.4	0.7	1.4	3.6	7.2

Pump flow rate (mL/hr)

CARDIAC HEMODYNAMIC SUPPORT--Antiarrhythmic/Antihypertensive

ESMOLOL			*MUST SPECIFY TITRATION PARAMETERS**
Concentration			**Starting Dose**
250 mg	25 mL	10 mg/mL	Load: 500 mcg/kg Max: 1000 mcg/kg
500 mg	25 mL	20 mg/mL	Continuous Infusion: 50 mcg/kg/minute
			Usual/Maximum
			Usual: 50-250 mcg/kg/minute Titrate: 25-50 mcg/kg/min Q15 min (specify range HR or MAP or SBP)* Maximum: 1000 mcg/kg/minute

ESMOLOL 10 MG/ML

250 mg/25 mL	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**25.00**	**50.00**	**100.00**	**250.00**	**500.00**	**1000.00**
0.50	0.1	0.2	0.3	0.8	1.5	3.0
1.00	0.2	0.3	0.6	1.5	3.0	6.0
1.50	0.2	0.5	0.9	2.3	4.5	9.0
3.00	0.5	0.9	1.8	4.5	9.0	18.0
5.00	0.8	1.5	3.0	7.5	15.0	30.0
6.00	0.9	1.8	3.6	9.0	18.0	36.0

Pump flow rate (mL/hr)

ESMOLOL (20 MG/ML)

500 mg/25 mL	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**25.00**	**50.00**	**100.00**	**250.00**	**500.00**	**1000.00**
0.50	0.0	0.1	0.2	0.4	0.8	1.5
1.00	0.1	0.2	0.3	0.8	1.5	3.0
1.50	0.1	0.2	0.5	1.1	2.3	4.5
3.00	0.2	0.5	0.9	2.3	4.5	9.0
5.00	0.4	0.8	1.5	3.8	7.5	15.0
6.00	0.5	0.9	1.8	4.5	9.0	18.0

Pump flow rate (mL/hr)

SEDATION--ANALGESIA

FENTANYL			*DO NOT TITRATE**
Concentration			**Starting Dose**
50 mcg	25 mL D5W	2 mcg/mL	Bolus: 1-2 mcg/kg/dose over 10 minutes
125 mcg	25 mL D5W	5 mcg/mL	Continuous Infusion: 1 mcg/kg/hour
250 mcg	25 mL D5W	10 mcg/mL	**Usual/Maximum**
625 mcg	25 mL D5W	25 mcg/mL	Usual: 2-5 mcg/kg/hour
1000 mcg	25 mL D5W	40 mcg/mL	Wean: 0.5 mcg/kg/hour Q30 min* (minimum infusion rate 0.1 mL/hr)
			Maximum: 7 mcg/kg/hour (to desired effect)

FENTANYL 2 MCG/ML (less than 1 kg)

50 mcg/25 mL	Dose rate in mcg/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**0.50**	**1.00**	**2.00**	**3.00**	**4.00**	**5.00**
0.50	0.1	0.3	0.5	0.8	1.0	1.3
1.00	0.3	0.5	1.0	1.5	2.0	2.5
1.50	0.4	0.8	1.5	2.3	3.0	3.8
3.00	0.8	1.5	3.0	4.5	6.0	7.5
5.00	1.3	2.5	5.0	7.5	10.0	12.5
6.00	1.5	3.0	6.0	9.0	12.0	15.0

Pump flow rate (mL/hr)

FENTANYL 5 MCG/ML (1-2.4 kg)

125 mcg/25 mL	Dose rate in mcg/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**0.50**	**1.00**	**2.00**	**3.00**	**4.00**	**5.00**
0.50	0.1	0.1	0.2	0.3	0.4	0.5
1.00	0.1	0.2	0.4	0.6	0.8	1.0
1.50	0.2	0.3	0.6	0.9	1.2	1.5
3.00	0.3	0.6	1.2	1.8	2.4	3.0
5.00	0.5	1.0	2.0	3.0	4.0	5.0
6.00	0.6	1.2	2.4	3.6	4.8	6.0

Pump flow rate (mL/hr)

FENTANYL 10 MCG/ML (≥ 2.5 kg)

250 mcg/25 mL	Dose rate in mcg/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**0.50**	**1.00**	**2.00**	**3.00**	**4.00**	**5.00**
0.50	0.0	0.1	0.1	0.2	0.2	0.3
1.00	0.1	0.1	0.2	0.3	0.4	0.5
1.50	0.1	0.2	0.3	0.5	0.6	0.8
3.00	0.2	0.3	0.6	0.9	1.2	1.5
5.00	0.3	0.5	1.0	1.5	2.0	2.5
6.00	0.3	0.6	1.2	1.8	2.4	3.0

Pump flow rate (mL/hr)

FENTANYL 25 MCG/ML

625 mcg/25 mL	Dose rate in mcg/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**0.50**	**1.00**	**2.00**	**3.00**	**4.00**	**5.00**
0.50	0.0	0.0	0.0	0.1	0.1	0.1
1.00	0.0	0.0	0.1	0.1	0.2	0.2
1.50	0.0	0.1	0.1	0.2	0.2	0.3
3.00	0.1	0.1	0.2	0.4	0.5	0.6
5.00	0.1	0.2	0.4	0.6	0.8	1.0
6.00	0.1	0.2	0.5	0.7	1.0	1.2

Pump flow rate (mL/hr)

FENTANYL 40 MCG/ML

1000 mcg/25mL	Dose rate in mcg/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**0.50**	**1.00**	**2.00**	**3.00**	**4.00**	**5.00**
0.50	0.0	0.0	0.0	0.0	0.1	0.1
1.00	0.0	0.0	0.1	0.1	0.1	0.1
1.50	0.0	0.0	0.1	0.1	0.2	0.2
3.00	0.0	0.1	0.2	0.2	0.3	0.4
5.00	0.1	0.1	0.3	0.4	0.5	0.6
6.00	0.1	0.2	0.3	0.5	0.6	0.8

Pump flow rate (mL/hr)

MISCELANEOUS—glycemic control

INSULIN, REGULAR			*DO NOT TITRATE**
Concentration			**Starting Dose**
1.25 unit	25 mL D5W	0.05 unit/mL	Continuous Infusion: 0.02 unit/kg/hour
			Usual/Maximum
			Usual: 0.02-0.1 unit/kg/hour Maximum: 0.2 unit/kg/hr; Notify if BS ≤ 250; STOP if BS ≤ 180 mg/dL

INSULIN, REGULAR 0.05 unit/mL

1.25 unit/25 mL	Dose rate in unit/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**0.01**	**0.02**	**0.03**	**0.04**	**0.05**	**0.10**
0.50	0.1	0.2	0.3	0.4	0.5	1.0
1.00	0.2	0.4	0.6	0.8	1.0	2.0
1.50	0.3	0.6	0.9	1.2	1.5	3.0
3.00	0.6	1.2	1.8	2.4	3.0	6.0
5.00	1.0	2.0	3.0	4.0	5.0	10.0
6.00	1.2	2.4	3.6	4.8	6.0	12.0

Pump flow rate (mL/hr)

SEDATION

MIDAZOLAM			DO NOT TITRATE*
Concentration			**Starting Dose**
1.25 mg	25 mL D5W	0.05 mg/mL	Bolus: 0.1-0.2 mg/kg over 2-5 min
2.5 mg	25 mL D5W	0.1 mg/mL	Continuous Infusion: 0.03 mg/kg/hour
5 mg	25 mL D5W	0.2 mg/mL	**Usual/Maximum**
			Usual: 0.01-0.4 mg/kg/hour Wean: 10% Q30 min* (minimum infusion rate 0.1 mL/hr) Maximum: 3 mg/kg/hour (to desired effect)

MIDAZOLAM 0.05 MG/ML (less than 1 kg)

1.25 mg/25 mL	Dose rate in mg/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**0.01**	**0.02**	**0.03**	**0.04**	**0.05**	**0.10**
0.50	0.1	0.2	0.3	0.4	0.5	1.0
1.00	0.2	0.4	0.6	0.8	1.0	2.0
1.50	0.3	0.6	0.9	1.2	1.5	3.0
3.00	0.6	1.2	1.8	2.4	3.0	6.0
5.00	1.0	2.0	3.0	4.0	5.0	10.0
6.00	1.2	2.4	3.6	4.8	6.0	12.0

Pump flow rate (mL/hr)

MIDAZOLAM 0.1 MG/ML (1-2.4 Kg)

2.5 mg/25 mL	Dose rate in mg/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**0.01**	**0.02**	**0.03**	**0.04**	**0.05**	**0.10**
0.50	0.1	0.1	0.2	0.2	0.3	0.5
1.00	0.1	0.2	0.3	0.4	0.5	1.0
1.50	0.2	0.3	0.5	0.6	0.8	1.5
3.00	0.3	0.6	0.9	1.2	1.5	3.0
5.00	0.5	1.0	1.5	2.0	2.5	5.0
6.00	0.6	1.2	1.8	2.4	3.0	6.0

Pump flow rate (mL/hr)

MIDAZOLAM 0.2 MG/ML (2.5-5.9)

5 mg/25 mL	Dose rate in mg/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**0.01**	**0.02**	**0.03**	**0.04**	**0.05**	**0.10**
0.50	0.0	0.1	0.1	0.1	0.1	0.3
1.00	0.1	0.1	0.2	0.2	0.3	0.5
1.50	0.1	0.2	0.2	0.3	0.4	0.8
3.00	0.2	0.3	0.5	0.6	0.8	1.5
5.00	0.3	0.5	0.8	1.0	1.3	2.5
6.00	0.3	0.6	0.9	1.2	1.5	3.0

Pump flow rate (mL/hr)

CARDIAC HEMODYNAMIC SUPPORT--Heart failure (Phosphodiesterase Inhibitor)

MILRINONE			*DO NOT TITRATE*
Concentration			**Starting Dose**
1.25 mg	25 mL D5W	50 mcg/mL	Load: 50 mcg/kg over 15 minutes
2.5 mg	25 mL D5W	100 mcg/mL	Continuous Infusion: 0.5 mcg/kg/minute
5 mg	25 mL D5W	200 mcg/mL	**Usual/Maximum**
12.5 mg	25 mL D5W	500 mcg/mL	Usual: 0.25-0.75 mcg/kg/min Maximum: 1.2 mcg/kg/minute

MILRINONE 50 MCG/ML (less than 1 kg)

1.25 mg/25 mL	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**0.20**	**0.25**	**0.40**	**0.50**	**0.60**	**0.75**
0.50	0.1	0.2	0.2	0.3	0.4	0.5
1.00	0.2	0.3	0.5	0.6	0.7	0.9
1.50	0.4	0.5	0.7	0.9	1.1	1.4
3.00	0.7	0.9	1.4	1.8	2.2	2.7
5.00	1.2	1.5	2.4	3.0	3.6	4.5
6.00	1.4	1.8	2.9	3.6	4.3	5.4

Pump flow rate (mL/hr)

MILRINONE 100 MCG/ML (≥ 1 kg)

2.5 mg/25 mL	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**0.20**	**0.25**	**0.40**	**0.50**	**0.60**	**0.75**
0.50	0.1	0.1	0.1	0.2	0.2	0.2
1.00	0.1	0.2	0.2	0.3	0.4	0.5
1.50	0.2	0.2	0.4	0.5	0.5	0.7
3.00	0.4	0.5	0.7	0.9	1.1	1.4
5.00	0.6	0.8	1.2	1.5	1.8	2.3
6.00	0.7	0.9	1.4	1.8	2.2	2.7

Pump flow rate (mL/hr)

MILRINONE 200 MCG/ML (PREMIX)

5 mg/25 mL	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**0.20**	**0.25**	**0.40**	**0.50**	**0.60**	**0.75**
0.50	0.0	0.0	0.1	0.1	0.1	0.1
1.00	0.1	0.1	0.1	0.2	0.2	0.2
1.50	0.1	0.1	0.2	0.2	0.3	0.3
3.00	0.2	0.2	0.4	0.5	0.5	0.7
5.00	0.3	0.4	0.6	0.8	0.9	1.1
6.00	0.4	0.5	0.7	0.9	1.1	1.4

Pump flow rate (mL/hr)

MILRINONE 500 MCG/ML

12.5 mg/25 mL	Dose rate in mcg/kg/minute					
	Soft Min					Soft Max
Weight (kg)	**0.20**	**0.25**	**0.40**	**0.50**	**0.60**	**0.75**
0.50	0.0	0.0	0.0	0.0	0.0	0.0
1.00	0.0	0.0	0.0	0.1	0.1	0.1
1.50	0.0	0.0	0.1	0.1	0.1	0.1
3.00	0.1	0.1	0.1	0.2	0.2	0.3
5.00	0.1	0.2	0.2	0.3	0.4	0.5
6.00	0.1	0.2	0.3	0.4	0.4	0.5

Pump flow rate (mL/hr)

SEDATION

MORPHINE			*DO NOT TITRATE**
Concentration			**Starting Dose**
1.25 mg	25 mL D5W	50 mcg/mL	Continuous Infusion: 10 mcg/kg/hour
2.5 mg	25 mL D5W	100 mcg/mL	**Usual/Maximum**
6.25 mg	25 mL D5W	250 mcg/mL	Usual: 5-20 mcg/kg/hour Wean: 5 mcg/kg/hour Q30 min* (minimum infusion rate 0.1 mL/hr) Maximum (soft): 30 mcg/kg/hour (some infants may require higher doses if tolerance develops)

MORPHINE 50 MCG/ML (less than 1 kg)

1.25 mg/25 mL	Dose rate in mcg/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**10.00**	**15.00**	**20.00**	**30.00**	**40.00**	**50.00**
0.50	0.1	0.2	0.2	0.3	0.4	0.5
1.00	0.2	0.3	0.4	0.6	0.8	1.0
1.50	0.3	0.5	0.6	0.9	1.2	1.5
3.00	0.6	0.9	1.2	1.8	2.4	3.0
5.00	1.0	1.5	2.0	3.0	4.0	5.0
6.00	1.2	1.8	2.4	3.6	4.8	6.0

Pump flow rate (mL/hr)

MORPHINE 100 MCG/ML (1-2.4 Kg)

2.5 mg/25 mL	Dose rate in mcg/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**10.00**	**15.00**	**20.00**	**30.00**	**40.00**	**50.00**
0.50	0.1	0.1	0.1	0.2	0.2	0.3
1.00	0.1	0.2	0.2	0.3	0.4	0.5
1.50	0.2	0.2	0.3	0.5	0.6	0.8
3.00	0.3	0.5	0.6	0.9	1.2	1.5
5.00	0.5	0.8	1.0	1.5	2.0	2.5
6.00	0.6	0.9	1.2	1.8	2.4	3.0

Pump flow rate (mL/hr)

MORPHINE 250 MCG/ML (2.5-5.9)

6.25 mg/25 mL	Dose rate in mcg/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**10.00**	**15.00**	**20.00**	**30.00**	**40.00**	**50.00**
0.50	0.0	0.0	0.0	0.1	0.1	0.1
1.00	0.0	0.1	0.1	0.1	0.2	0.2
1.50	0.1	0.1	0.1	0.2	0.2	0.3
3.00	0.1	0.2	0.2	0.4	0.5	0.6
5.00	0.2	0.3	0.4	0.6	0.8	1.0
6.00	0.2	0.4	0.5	0.7	1.0	1.2

Pump flow rate (mL/hr)

PARALYTIC--neuromuscular blockade

VECURONIUM			*DO NOT TITRATE**
Concentration			**Starting Dose**
12.5 mg	25 mL D5W	0.5 mg/mL	Continuous Infusion: 0.1 mg/kg/hour
25 mg	25 mL D5W	1 mg/mL	**Usual/Maximum**
			Bolus: 0.1 mg/kg rapid Usual: 0.01-0.07 mg/kg/hour Wean: 0.05 mg/kg/hour Q30 min* (minimum infusion rate 0.1 mL/hr) Maximum: 0.18 mg/kg/hour

VECURONIUM 0.5 MG/ML (less than 1 kg)

12.5 mg/25 mL	Dose rate in mg/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**0.05**	**0.10**	**0.15**	**0.17**	**0.18**	**0.20**
0.50	0.1	0.1	0.2	0.2	0.2	0.2
1.00	0.1	0.2	0.3	0.3	0.4	0.4
1.50	0.2	0.3	0.5	0.5	0.5	0.6
3.00	0.3	0.6	0.9	1.0	1.1	1.2
5.00	0.5	1.0	1.5	1.7	1.8	2.0
6.00	0.6	1.2	1.8	2.0	2.2	2.4

Pump flow rate (mL/hr)

VECURONIUM 1 MG/ML (≥ 1 kg)

25 mg/25 mL	Dose rate in mg/kg/hour					
	Soft Min					Soft Max
Weight (kg)	**0.05**	**0.10**	**0.15**	**0.17**	**0.18**	**0.20**
0.50	0.0	0.1	0.1	0.1	0.1	0.1
1.00	0.1	0.1	0.2	0.2	0.2	0.2
1.50	0.1	0.2	0.2	0.3	0.3	0.3
3.00	0.2	0.3	0.5	0.5	0.5	0.6
5.00	0.3	0.5	0.8	0.9	0.9	1.0
6.00	0.3	0.6	0.9	1.0	1.1	1.2

Pump flow rate (mL/hr)

RIVERSIDE UNIVERSITY HEALTH SYSTEM – MEDICAL CENTER
Housewide

	Document No: 820	Page 1 of 5
Title: Managing Patients with a Penicillin Allergy and Penicillin Desensitization Protocol	**Effective Date:** 5/6/2019	☐ RUHS – Behavioral Health ☐ RUHS – Care Clinics ☒ RUHS – Medical Center ☐ RUHS – Public Health ☐ RUHS – Hospital Clinics ☐ Departmental
Approved By: Jennifer Cruikshank CEO/ Hospital Director		☐ Policy ☐ Procedure ☒ Guideline

1. SCOPE

1.1 Penicillin desensitization will be limited to the adult patient population and upon formal recommendations from the ID consult service.

a. Penicillin allergy skin testing should be considered prior to proceeding with penicillin desensitization.

1.2 Penicillin desensitization should only be considered when benefits outweigh the risks, for example in patients with neurosyphilis with severe penicillin allergy who are not candidates for penicillin allergy skin testing, or conditions where no other alternative treatments are available (ex: syphilis during pregnancy).

2. BACKGROUND

2.1 The reported rate of penicillin allergy is approximately 10%. Although, 80-90% of patients who report a penicillin allergy will have negative skin tests and are not at a risk of an IgE-mediated allergic reaction. The rate of cross-reactivity (IgE-mediated reactions) to cephalosporins in penicillin allergic patients is 5% or less. Rates of carbapenem cross reactivity are ~40% although clinical hypersensitivity reactions are approximately 10%. Patients labeled with a Penicillin allergy end up requiring alternatives that are broader spectrum with more adverse effects and may require more monitoring (ex: Vancomycin and aminoglycosides).

2.2 Monobactams (Aztreonam) does not have cross-reactivity to penicillin although it is less efficacious and more expensive than beta-lactams.

3. GUIDELINE

3.1 Types of drug hypersensitivity reactions (Gell and Coomb's classification)

a. Type 1: IgE-mediated, Immediate
- Occurs minutes to within an hour of administration
- Urticaria, angioedema, pruritus, flushing, anaphylaxis, laryngeal edema, cardiac arrhythmias
- Associated with beta-lactam antibiotics

b. Type 2: Cytotoxic (IgG or IgM mediated)
- Hemolysis, thrombocytopenia, neutropenia, interstitial nephritis

c. Type 3: Immune complexes
- Serum sickness, rash, urticarial, arthralgias, fevers

d. Type 4: Delayed hypersensitivity reaction
   - Dermatitis
e. Unknown Mechanism
   - Stevens-Johnson syndrome, toxic epidermal necrolysis (TEN), autoimmune diseases, drug fever
     i. Penicillin skin test will not detect these
     ii. Desensitization should NEVER be performed for this type of reaction due to increased risk of severe hypersensitivity reaction.

3.2 Evaluating a patient with a penicillin allergy
a. Interview patient to assess allergic reaction versus adverse drug reaction (nausea, GI distress).
b. What was the type of reaction that occurred?
c. If rash occurred, what type of rash was it, severity?
d. Timing of reaction in relation to dose administration (within minutes, hour to days after administration).
e. Had the patient received and tolerated penicillin prior to the reaction?
f. Has the patient tolerated other penicillins or cephalosporins since the reaction? (ask about generic/trade names – Augmentin, Keflex, Amoxicillin, Cephalexin)

4. PENICILLIN ALLERGY SKIN TESTING AND GRADED CHALLENGE

4.1 Penicillin allergy skin testing (refer to HW875 Penicillin Allergy Skin Testing Procedure (Pre-Pen®) for Inpatients)
a. In patients with an unclear allergy history, or a history of mild to moderate IgE mediated allergic reaction (i.e. pruritic rash, hives), penicillin allergy skin testing is recommended.
b. If this service is unavailable, or patient does not consent to the test, beta-lactam antibiotics may be administered through a graded challenge.

4.2 Graded challenge

a. Graded challenge should be performed in a critical care unit or progressive care unit (2500) where patient can be monitored closely.
b. Give 80mg Amoxicillin PO x 1 and observe for 30 minutes. If no reaction is observed, proceed to Amoxicillin 500mg PO x 1 observe for 60 minutes. If no reaction is observed, proceed with treatment dose.
c. Have rescue medications at bedside for graded challenge - Epinephrine 0.3mg/3mL autoinjection (Epi-Pen®), Diphenhydramine 50 mg/mL and Methylprednisolone 40 mg/mL.

PROCEDURE FOR PENICILLIN G POTASSIUM DESENSITIZATION PROTOCOL PATIENTS WITH SEVERE, IGE-MEDIATED REACTIONS)

5. PROTOCOL INITIATION REQUIREMENTS

5.1 Infectious diseases physician or Infectious diseases pharmacist must be consulted to initiate the penicillin desensitization protocol.

5.2 An informed written consent must be obtained either in person or by calling the next available kin in the event the patient is unable to make decisions.

5.3 Penicillin Desensitization order set must be completed by a physician. No telephone or verbal orders will be accepted.

5.4 Patient must be a full-code for the desensitization procedure and for the course of treatment.

5.5 Admit the patient to the ICU (under no circumstances should the procedure be performed outside the ICU).

5.6 Beta blockers must be held 24 hours before the protocol is initiated.

5.7 A member of the primary team or ordering team must be present at the time of initiation of the protocol.

5.8 Nurse to patient ratio 1:1 must be maintained during protocol administration. Primary team must arrange this with the house supervisor and ICU nurse managers.

5.9 Rescue Medications for penicillin desensitization
a. Epinephrine 1mg/ml (0.3mg in 0.3ml) IM q 5 minutes as needed for hypersensitivity reaction.
b. Methylprednisolone 125mg IV x 1 dose prn systemic reaction
c. Diphenhydramine 50mg IV x 1 prn systemic reaction
d. Nebulized albuterol 2.5mg inhaled prn bronchospasms
e. Famotidine 20mg IV x 1 prn systemic reaction

6. MONITORING REQUIRMENTS

6.1 Monitor and chart vital signs and oxygen saturation prior to the first dose and before each dose escalation.

6.2 Assess breath sounds prior to first dose, prior to each dose escalation and upon complaints of respiratory symptoms including dyspnea or chest tightness.

6.3 Notify ICU fellow/attending and hold subsequent doses if any of the following symptoms of hypersensitivity reaction
a. Oral: edema of lips, tongue, pruritus of lips
b. Skin: localized or general itching, flushing, hives, angioedema, morbilliform rash
c. GI: abdominal cramps, nausea, vomiting, loss of bowel control,
d. Respiratory: tightness of throat or chest, wheezing, difficulty swallowing, respiratory distress, change in oxygen saturation.
e. Cardiovascular: Tachycardia (increase by > 15bpm), mild or severe hypotension, bradycardia, dysrhythmia.

7. DRUG DESENSITIZATION PROCEDURE (REFER TO TABLE 1)

7.1 Give each dose by diluting the drug in approximately 30 mLs of water and administer orally. Allow a 15 minute monitoring period for signs/symptoms of allergic reaction before the next dose.

7.2 Document each dose as "given"

7.3 Monitor for 30 minutes after the final dose. If no reaction occurs, start the scheduled penicillin dose 4 hours after the desensitization dose as ordered by the treating physician.

7.4 If penicillin is held for more than 24 hours the patient may become resensitized and will need to repeat desensitization if additional doses are needed. Consult infectious diseases service for guidance.

Table 1: Drug Desensitization Protocol – Oral

Penicillin V suspension dose	Amount (units/mL)	Units	Cumulative dose (units)
1	1000	100	100
2	1000	200	300
3	1000	400	700
4	1000	800	1,500
5	1000	1,600	3,100
6	1000	3,200	6,300
7	1000	6,400	12,700
8	10,000	12,000	24,700
9	10,000	24,000	48,700
10	10,000	48,000	96,700
11	80,000	80,000	176,000
12	80,000	160,000	336,700
13	80,000	320,000	656,700
14	80,000	640,000	1,296,700

8. REFERENCES

8.1 2015 Sexually transmitted diseases guidelines. Centers for Disease Control and Prevention (CDC). Management of patient with a penicillin allergy section. Accessed 11/1/2018 at https://www.cdc.gov/std/tg2015/pen-allergy.htm

8.2 Solensky R, Earl H, Gruchalla RS. Clinical approach to penicillin-allergic patients: a survey. Ann Allergy Asthma Immunol 2000;84:329-33.

8.3 Solensky R. Drug desensitization. Immunol Allergy Clin N Am 2004;24:425-43.

8.4 Salkind AR, Cuddy PG, Foxworth JW. Is this patient allergic to penicillin? An evidence-based analysis of the likelihood of penicillin allergy. JAMA 2001;285:2498-505.

8.5 University of Miami Hospital Drug Desensitization Protocols. http://ugotabug.med.miami.edu/umh-antimicrobial-stewardship-program/antibiotic-desensitization-protocols-umh. Accessed 6/2016.

8.6 Wendel GO, Jr, Stark BJ, Jamison RB, Melina RD, Sullivan TJ. Penicillin allergy and desensitization in serious infections during pregnancy. N Engl J Med 1985;312:1229–32.

Document History:

Release Dates: NEW		**Retire Date:** N/A	
Sponsored by: Pharmacy		**Replaces Policy:** N/A	
Date Reviewed	**Reviewed By:**	**Revisions Made?**	**Revision Description**
11/13/18	PRC	Yes	Update CEO Match Table 1: Drug Desensitization Protocol – Oral to EPIC's table Add how to dilute and administer Penicillin V from CDC protocol.
12/3/18	P&T	Yes	Added location for graded challenge. Other minor changes
2/5/19	PAC	Yes	Scope added.
4/11/19	MEC	No	

RIVERSIDE UNIVERSITY HEALTH SYSTEM - MEDICAL CENTER
Housewide

	Document No: 822	Page 1 of 5
Title: Downtime Procedures – Inpatient/Infusion Center Pharmacy	Effective Date: 5/6/2019	☐ RUHS – Behavioral Health ☐ RUHS – Care Clinics ☒ RUHS – Medical Center ☐ RUHS – Public Health ☐ Departmental
Approved By:  Jennifer Cruikshank CEO/Hospital Director		☐ Policy ☒ Procedure ☐ Guideline

1. SCOPE

1.1 This policy to describe a procedure for scheduled downtime.

2. DEFINITIONS

2.1 **Scheduled Downtime**: Any planned situation where software, hardware or other upgrade requiring a temporary shutdown of pharmacy applications from normal operations.

2.2 **BCA** (Business Continuity Access): Web-based data that is available from the last Shadow Server refresh. This is available to end-users if the WAN/LAN is available.

2.3 **Epic SRO** (Shadow Server Read Only): Server that runs parallel to the production server, and refreshes/saves a snapshot of data from the production server. When the production server is the only server experiencing downtime, end-users will be able to access data from the Shadow Server.

3. PROCEDURES

2.1 Information Services (IS) will:

a. Communicate with Pharmacy, through the Information Technology (IT) pharmacist when possible, the following:
   i. Downtime: date, time and duration
   ii. Systems affected:
      - Epic
      - BD Carefusion products (CII Safe, Pyxis Logistics, Pyxis Medstation)
      - Vigilanz
      - Interface Engine
      - Other
   iii. Person who is managing the downtime.
   iv. The purpose of the downtime, current status, next steps and proposed resolutions.

b. Pharmacy department and IS will discuss the impact of downtime on patient care and financial consequences.

3.2 Pharmacy Department will:

a. Review current staffing schedule.
b. Discuss with Pharmacy personnel involved.
c. Schedule extra personnel as required.

3.3 Information Services (IS) will notify the pertinent departments to communicate downtimes via e-mail including but not limited to:
- a. Pharmacy
- b. Nursing
- c. Respiratory
- d. Dietary
- e. Laboratory
- f. Radiology

3.4 Information Services (IS) will notify all vendors if applicable:
- a. Epic
- b. BD Carefusion
- c. Vigilanz
- d. Openlink - Interface
- e. Others

3.5 Pharmacy Director, IT pharmacist or a designee will communicate with necessary support staff:
- a. Pharmacy staff will, when appropriate:
  (Downtime checklist attached as a tool to help document)
  - i. Check for a sufficient supply of pre-printed IV labels.
  - ii. Review with staff downtime work flow.
  - iii. Ensure Pyxis Connect scanner is operational.
  - iv. Ensure fax machine is ready with paper and toner.
  - v. Ensure tube system is ready; call Plant Operations for support.
  - vi. Notify Transportation service, as needed.
  - vii. Schedule extra Pharmacists and/or Pharmacy Technicians, especially upon recovery to backload downtime orders.
  - viii. Enable critical override on Pyxis if downtime is over 15 minutes.
  - ix. Disable critical override when system is back up and pharmacy workload is caught up to normal operations.

3.6 During system down
- a. Medication Adminstration Record (MAR)
  - i. Paper MARs printed by nursing from BCA web, if hospital network is down then the BCA downtime PC must be used (before downtime starts if downtime is scheduled).
  - ii. If MARs cannot be printed, nursing staff will write next day's MARs.
- b. Patient profile
  - i. View using Epic SRO which is a snapshot of Epic prior to downtime and can be used to reproduce previously generated labels.
- c. Pharmacy staff shall enable Pyxis critical override mode.
- d. Ensure all critical equipment and medication refrigerators are on emergency power, contact Plant Operations for any additional support that may be required.
- e. Pyxis Connect
  - i. Collect all faxed orders.
  - ii. Pharmacy will annotate nursing unit on the faxed order.
  - iii. Pharmacy will scan orders into Pyxis Connect for archiving purposes.

f. Order Processing
   i. Inpatient/Infusion Center orders
      - Send all orders that are not loaded in Pyxis and note on order amount dispensed.
      - After processing the order, file the order in downtime folder corresponding to nursing units.
      - Forward any IV order to IV room.
      - Link the annotated order in the Pyxis Connect review queue to the appropriate patient and MRN by manually typing.
   ii. IV orders
      - Process IV orders.
      - Dispense and write the amount dispensed on copy of the order.
      - Forward any IP order to IP pharmacists.
      - Keep processed orders in Downtime Protocol folder.

3.7 Computer system returned
   i. Backload process.
      - Pharmacists will enter all downtime orders.
      - Nurses will back document all downtime medication administrations which will trigger a patient charge.
   ii. Disable Critical Override mode after orders back load completed.

Release Dates: 4/2015, 6/18		**Retire Date:** N/A	
Sponsor: Pharmacy		**Replaces Policy:** Policy # 237, 221, B220,	
Date Reviewed	**Reviewed By:**	**Revisions Made?**	**Revision Description**
12/11/2018	PRC	Yes	Removal of TPN software (no longer used) Minor format change Included Downtime procedure workflow diagram
2/4/19	P&T	No	Does not go to MEC, not patient care
3/5/19	PAC	Yes	Deleted unscheduled downtime definition Added Scope 3.6a Medication Administration Record (MAR)

Pharmacy/IS Down Time Checklist

- Downtime: Between Date _____ Time _____ and
  Date _____ Time _____
- System Down: (Check appropriate system)

  ____EPIC ____Pyxis ____Vigilanz Pyxis Logistics ____Interface ____Other
- I/S Contact for Upgrading the System:
  - _____
  - _____
- Pharmacy Personnel Notified: (Who/When/How)

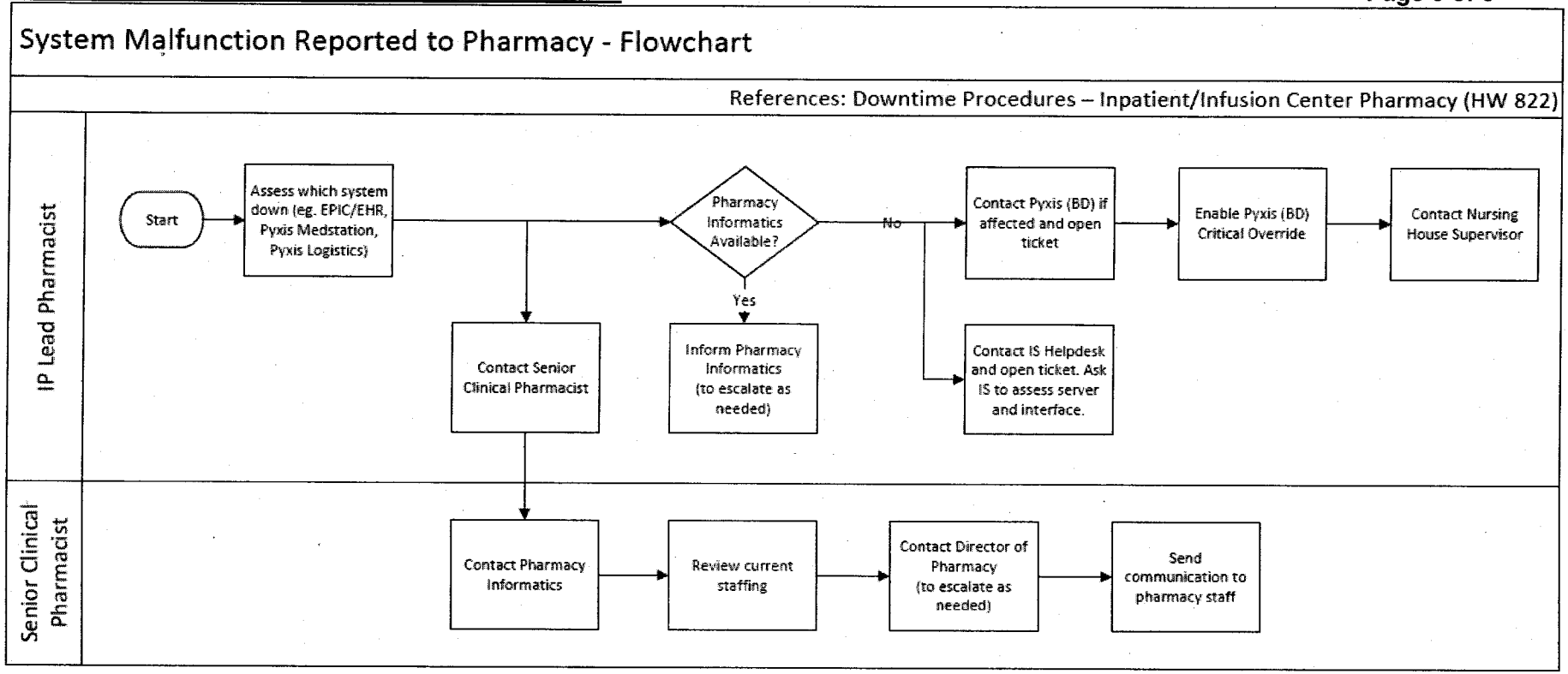
  _____
  _____
- Nursing Personnel Notified: (Who/When/How)

  _____
  _____
- Transportation Services Notified (Who/When/How)

  _____
  _____
- Vendor Notification: (Who/When/How)

  _____
  _____

Appendix 1: Downtime Procedure Workflow Diagram



RIVERSIDE UNIVERSITY HEALTH SYSTEM – MEDICAL CENTER
HOUSE WIDE

	Document No: 828	Page 1 of 5
Title: Smart Infusion Pump System	**Effective Date:** 3/4/2019	☐ RUHS – Behavioral Health ☐ RUHS – Care Clinics ☒ RUHS – Medical Center ☐ RUHS – Public Health ☐ Departmental
Approved By:  Jennifer Cruikshank CEO/ Hospital Director		☐ Policy ☐ Procedure ☒ Guideline

1. SCOPE

1.1 To provide guidance for use of the Smart Infusion Pump Systems used at RUHS Medical Center and Infusion Center for the administration of medications.

2. DEFINITIONS

2.1 Drug Library: a drug data set to define a list of drugs and concentrations appropriate for each profile. Programming via the drug data set automates programming steps, including the drug name, drug amount and diluent volume, and represents established best practice.

2.2 Epidural Anesthesia: a type of anesthesia block in which a local anesthetic is injected into the epidural space surrounding the spinal cord.

2.3 Guardrails: Drug Error Reducing Software for the ALARIS® Infusion System.

2.4 PCA Module: The ALARIS® module that is attached to the programming module for the delivery of patient controlled analgesic (PCA) medications. This module is placed to the immediate right (when facing the pump) of the programming module ("Point of Care Unit") to ensure security of the drug and device.

2.5 Profile: Represents a specific patient population within the ALARIS® Infusion System. Each profile contains drugs and instrument configurations that are appropriate for that patient population (Critical Care, Medical/Surgical, Oncology, Pediatrics, and Nursery).

2.6 Programming (Point-of-Care) Module: The module of the ALARIS® Infusion System that contains the drug library and pump configurations. This module controls all of the solutions and medications delivered through the pumping modules. The programming module cannot deliver any medication without a pumping module. Each programming module has the ability to control four pumping modules.

2.7 Pumping Module: The ALARIS® module that is attached to the programming module for the delivery of intravenous fluids or medications.

2.8 Syringe Module: The ALARIS® module that is attached to the programming module for the delivery of intermittent medications via syringe. This attachment to the ALARIS® Point of Care unit delivers exceptional delivery of concentrated drugs through advance pressure monitoring and rate flow accuracy.

2.9 Hard Limit: Does not allow the operator of the infusion system to adjust the rate of drug delivery outside of the parameters currently set within the dataset.

2.10 Soft Limit: Allows the operator of the infusion system to adjust the rate of drug delivery above the maximum dose or below the minimum dose. When a soft limit is reached, the operator will be asked to review and approve the infusion rate to assure that an error has not been made before overriding and Guardrails limit. A visual and auditory prompt will occur indicating that the infusion is being delivered above or below the Guardrails limit when a soft limit is overridden. The visual alert will stay visible during the infusion.

2.11 Smart Infusion Pump: Infusion pump with software that can alert users to potential errors; contain a library of medications that provides medications dosing guidelines by establishing concentrations, dose limits, and clinical advisories.

2.12 Manual flow regulator a.k.a Dial-a-flow®: is a device that regulates the infusion rate.

3. GUIDELINE

3.1 Intravenous medications, solutions, and blood products for infusion shall be administered via a smart infusion pump. Exception: perioperative area may utilize manual flow regulator for maintenance fluid only.

3.2 All staff that use the smart infusion system shall complete an education program and a hands-on demonstration prior to utilization of the pump. The Chief Nursing Officer is responsible for training of nursing users, the Director of Pharmacy is responsible for training of pharmacy users, and other respective managers are responsible for training their staff.

3.3 Drug Library

a. The library will be routinely maintained and updated by pharmacy in collaboration with other disciplines, at least annually, or more often as necessary.

b. The Chair of Pharmacy & Therapeutics (P&T) Committee, a pharmacy director, or a pharmacy director's designee will review and approve each infusion pump drug library update. Once approved, the new infusion pump drug library will be uploaded to the server and activated. In addition, the infusion pump drug library will be reported at the subsequent P&T Committee meeting.

3.4 When a patient transfers from one unit to another, the receiving unit is responsible to check and/or change the profile to meet the level of care provided on that unit.

3.5 All pumps and modules are returned to Central Processing Department after their use for proper cleaning and disinfection.

3.6 DO NOT USE Smart Infusion System pumps near magnetic resonance imaging (MRI) room. The exception to this is the MRidium® MRI-Safe smart infusion pump.

3.7 Infusion pumps used for enteral feeding shall NOT be used to administer medications.

4. ALARIS® INFUSION SYSTEM

4.1 Assemble all needed equipment, open tubing and solution packages, prime tubing, invert all y-ports to purge air. When priming is complete use roller clamp to stop flow.

4.2 Ensure that secondary tubing is unclamped before infusion.

4.3 Medications and solutions delivered by the ALARIS® Infusion System shall be administered using the appropriate clinical profile entry from the GUARDRAILS DRUGS or GUARDRAILS IV FLUIDS library.

4.4 BASIC INFUSION and DRUG CALCULATION modes shall only be used when there is no option for the medication or concentration in the drug library. In these instances, the user will notify the pharmacist so that the medication can be added to the drug library in the future.

4.5 When initiating intravenous therapy, select YES when the programming module asks "Is this a new patient?" This will definitively clear the settings from the prior patient.

4.6 Select the appropriate profile for the area in which the infusion will run.

4.7 Verify medication administration information that appears on the Alaris pump screen matches providers' orders, e.g. dose, rate, and volume.

4.8 Any alerts must be reviewed and addressed prior to starting medication infusion.

4.9 Refer to the ALARIS® Quick Reference Guide for further instructions.

5. PERFUSOR® SPACE INFUSION PUMP

5.1 During neonatal transport, a smart infusion pump (PERFUSOR® SPACE INFUSION PUMP) will be used if medication administration is required.

a. Prior to overriding the dose in Space Infusion Pump, the nurse shall:

- Complete a two practitioners, RN, and RN designee, verification of the Dose Mode entry screen with the original physician order. The RN designee must be a licensed individual competent in medication administration to the neonatal patient.
- If an original order is outside the pre-programmed limits, the nurse will notify the physician to verify the infusion order.
- Document the verification in the progress notes and nursing flow sheet.

6. EPIDURAL INFUSION

6.1 Infusion delivered via the epidural route will be administered by a dedicated smart infusion pump. A pump being used for epidural administration shall not be used for other medications for routes other than epidural.

a. A smart infusion pump being used for epidural infusion will be labeled as "EPIDURAL" when used.

- Epidural Infusion Specific-Alaris Pumps are labeled and dedicated for EPIDURAL Infusion. These pumps are maintained by L&D Department.

b. A patient may have an additional pump and modules for the administration of other medications for routes other than epidural.

c. A patient will have intravenous (IV) access at all times when epidural infusions are being administered.

6.2 Pumping module will be mounted on the LEFT side of the programming module; the programming module & pumping module will be placed to one side of the patient, opposite side of any primary infusion pump.

6.3 Epidural infusions shall use yellow-lined tubing without injection ports.

6.4 Epidural anesthesia is initiated and programmed by an Anesthesia Care Provider

6.5 Orders for medications infused via the epidural routes are written only by an Anesthesia Care Provider.

6.6 Anesthesia Care Providers will label the epidural tubing at both ends of the tubing.

6.7 Only a pharmacist, a pharmacy technician under a pharmacist's supervision or an Anesthesia Care Provider may prepare epidural infusion. If not using a premix product, then medication will be compounded in a sterile laminar flow hood using aseptic technique in an IV room, located in the inpatient pharmacy.

6.8 A resuscitation bag and mask must be ready available in the patient care area where epidural medication is administered.

7. MRidium® MRI IV Infusion System

7.1 MRidium® MRI IV Infusion System is the only MRI-Safe smart infusion system that can be used in MRI Room.

a. Transition of continuous medications to the MRidium® Infusion System will occur in the MRI holding area prior to MRI procedure.

7.2 This system is not intended for long term patient care outside of an MRI environment.

8. Safety and Malfunction Concerns

8.1 In case of suspecting the smart infusion pump to be malfunctioning:

a. 2nd qualified staff member to verify the provider's order and smart infusion pump programming to see if the error/malfunction still happens despite correct programming

b. If the smart infusion pump is found to be malfunctioning:

- Remove the smart infusion pump from patient care area, and quarantine including disposables (i.e. tubing) and medications involved in the incident.
- Notify nurse manager/director, or chain of command.
- Follow institution policy for reporting broken or malfunctioning equipment.

9. REFERENCES

9.1 ALARIS™ Infusion System, version 9.33, September 2017.

9.2 ALARIS™ Infusion System User Manual Addendum, January 2018

9.3 Centers for Medicare & Medicaid Services Conditions of Participation §482.23(c)(4)

9.4 IRadimed Corporation 3860+ MRidium Infusion System Operator's Manual September 2018.

9.5 ISMP. Proceedings from the ISMP Summit on the Use of Smart Infusion Pumps: GUIDELINES FOR SAFE IMPLEMENTATION AND USE. 2009

9.6 ISMP. Acute Care ISMP Medication Safety Alert. Epidural – IV Route Mix-ups: Reducing the Risk of Deadly Errors. July 3, 2008.

9.7 HW Policy 555: Reporting Broken and Malfunctioning Equipment

Document History:

Prior Release Dates: 6/15/2018	**Retire Date:** N/A
Document Owner: Pharmacy Department	**Replaces Policy:** Pharmacy Dept PnP C315 ALARIS® Infusion Pump Nursing Dept PnP 718 Infusion Pump: ALARIS® Infusion System Pharmacy Dept PnP377 Neonatal Transport: SPACE Infusion Pump System HW 845 Smart Infusion Pumps for Epidural Infusion

Date Reviewed	Reviewed By:	Revisions Made Y/N	Revision Description
9/11/2018 11/13/2018	Pharmacy Review Committee	YES	9/2018:Combining Policy 377 and HW 845 into HW828 11/2018:Post GACH-RLS review. Add section 4.7/4.8 – verify that the pump setting matches order; add section 8 regarding possible malfunctioning equipment
11/29/2018	Nursing Policy & Procedure Committee - evote	Yes	Added subsections in 8.1.b
12/3/2018	P&T Committee	Yes	Updated References 9.1 and 9.2.
1/22/2019	PAC	Yes	Minor clarification in 6.2
2/13/19	Audrey/Janis	Yes	Added 2.12, definition of Manual IV regulator, and 3.1 exception. The use of IV manual regulator in periop for maintenance fluid,
2/14/2019	MEC	No	
2/19/2019	Nursing P&P	No	

RIVERSIDE UNIVERSITY HEALTH SYSTEM – MEDICAL CENTER
Housewide

	Document No: 830	Page 1 of 3
Title: Adult Guidelines for the Administration of Parenteral Medications	**Effective Date:** 5/6/2019	☐ RUHS – Behavioral Health ☐ RUHS – Community Health Centers ☐ RUHS – Hospital Based Clinics ☒ RUHS – Medical Center ☐ RUHS – Public Health ☐ Departmental
Approved By: Jennifer Cruikshank CEO/ Hospital Director		☐ Policy ☐ Procedure ☒ Guideline

1. DEFINITIONS

1.1 Parenteral medications: medications administered by some route other than through the digestive tract, such as by subcutaneous, intramuscular, or intravenous injection.

1.2 Titration: Increasing or decreasing a vasoactive drug or other medication including start rate, titration parameters (including rate and frequency), patient specified goal(s), and reassessment for desired effect.

2. GUIDELINES

2.1 All parenteral medications ordered in the hospital will be administered according to evidence-based practices and standard guidelines.

2.2 If an order written by an authorized prescriber does not specifically state how the intravenous medication is to be diluted or infused, it will be processed and completed with the standard concentration and rate of administration according to the Guidelines for the Administration of Parenteral Medications (see Appendices).

a. Appendix 1: Route, standard concentrations, and rate of administration are listed for adults.

b. Appendix 2: Titration of Critical Medications—ADULT.

2.3 Responsibilities for titratable medications are as follows:

a. Prescribers

i. Provide complete order for infusion, including start rate, titration parameters, and patient- specific goal(s).

ii. EXCEPTION: See "For unstable patients" or "Life-threatening situations," below.

b. Pharmacists

i. Verify order for completeness, including start rate, titration parameters (including rate and frequency), patient-specified goal(s), and max rate.

ii. Contact prescriber for clarification if any questions about the order.

iii. After the infusion has been off for 6 hours, the pharmacist or nurse should discontinue the order.

c. Nurses

i. Implement titration as ordered according to written parameters.

ii. Start drip rate at ordered/guideline rate. Nurse to contact prescriber and/or pharmacist to clarify start rate should any confusion exist.

iii. Titrate as specified, according to frequency and rate parameters to reach specified goal, including restarting as specified if needed after dose reaches "0" (zero).

- If the medication is titrated to zero and the patient remains in the desired target parameter range for six hours or more then the titratable drip may be "discontinued" and a new order is needed by the prescriber.

- If the patient does not remain in the desired target parameter range within the first six hours after the medication has been titrated to zero, the nurse has the authority to restart the medication at the last documented rate prior to zero and titrate per original order.

- It is recognized that some circumstances may inhibit immediate titration. In the absence of severe deviation from the targeted therapeutic goal, it is acceptable for a nurse to respond within 15 minutes of a value above or below the specific parameter range.

iv. The corresponding parameters for titration (e.g., blood pressure, heart rate, RASS, CPOT) must be documented in the patient record as per prescriber.

v. Do NOT exceed maximum dosing rate without a new order. The administration instructions must also reflect the new max rate.

vi. Contact prescriber if at maximum dosage or when titration guidelines do not seem appropriate for the individual patient. (e.g., if different rate or frequency needed to support care).

vii. Document notification of prescriber and obtain order for new titration instructions if needed.

viii. Clarify with prescriber for any questions about the order, including necessity for weaning of the infusion when prescriber orders to discontinue infusion.

2.4 Titrate to lowest dose

a. It is recognized that patients may remain within a hemodynamic, sedative or analgesic goal, but may also be able to tolerate a lower dose of a titratable infusion. If a patient remains within desired parameters for at least two hours, it is acceptable for the nurse to titrate down using prescribed guideline and reassess within prescribed time frame if patient has tolerated this decrease. Titration may continue as long as patient remains within the ordered parameter.

2.5 For unstable patients

a. During an acute episode, the prescriber(s) present at the bedside may direct the rapid titration of the continuous infusion. A new order is not needed unless it exceeds the max dosing rate of the original order.

b. The nurse must document the titration rate changes as directed by the prescriber into the electronic medical record.

c. The nurse must document the prescriber is at bedside directing the rapid titration.

d. Upon patient stabilization of the acute episode, the titration will continue per new or existing order.

2.6 Life-threatening situations

a. While obtaining concurrent prescriber communication, when the patient is rapidly deteriorating and is not responding to standard titration order:

i. The RN (Registered Nurse) is authorized to increase or decrease a titratable drip more rapidly than prescribed, up to a maximum prescribed dose, or "off", as needed to support patient hemodynamic and sedation goals.

ii. The RN is to document the rapid titration changes performed by the RN and the emergent patient condition in the comment section of the electronic medication administration record (MAR).

2.7 The Infusion Guideline Appendices will be accessible in an electronic format. A hard copy of the document will be available in the Pharmacy in the event of an electronic communication failure.

Document History:

Release Dates: 6/29/15, 11/12/15, 3/20/18, 7/12/18, 12/26/18		**Retire Date:** N/A	
Sponsor: Pharmacy		**Replaces Policy:** Previously 395, C319 04/2012, 12/2012, 10/2014	
Date Reviewed	**Reviewed By:**	**Revisions Y/N**	**Revision Description**
01/08/19	Pharmacy Review Committee	Yes	Approved to forward to P&T
02/04/19	P&T	No	
3/5/19	PAC	Yes	Recommended changes reviewed without further changes necessary. Maximum dose remains the same per original order if restarting within 6 hours of weaning to zero
4/11/19	MEC	No	

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Drug Name	ACCU ED PACU	L&D	POST-PARTUM	2500 UNIT	MED/ SURG	COMMENTS	IVPB/Drip STANDARD CONCENTRATIONS / RATE OF ADMINISTRATION	IV Push/IM STANDARD CONCENTRATIONS / RATE OF ADMINISTRATION
Abatacept	IVPB	---	---	IVPB	IVPB	Adminster thru 0.2-1.2 micron filter Restricted to Infusion Center	Mix in 100 mL NS over 30 min	
Acetaminophen	IVPB	IVPB	IVPB	IVPB	IVPB	Restricted for use during the perioperative (pre-emptive and post-operative) period		
AcetaZOLAMIDE	Push	Push	Push	Push	Push	No more than 1 gm/ 24 hrs	500 mg/50 mL NS or D5W over 30 min	Dilute 5 mL sterile H2O per vial to 100 mg/mL – Rate: 500 mg over 3 min
	IVPB	IVPB	IVPB	IVPB	IVPB			
Acetylcysteine	Drip	Drip	---	Drip‡	Drip‡	Monitor vitals for analphylaxis every 15 minutes during 1st hour of infusion (loading dose); Loading dose to be given in ED/ACCU	Dose 1 (load): 150 mg/kg in 250 mL D5W infuse over 1 hr; Dose 2: 50 mg/kg in 500 mL D5W infuse over 4 hrs; Dose 3: 100 mg/kg in 1000 mL D5W infuse over 16 hrs; Note: Alternate dosing available for non-acetaminophen acute liver failure	--------
Acyclovir	IVPB	IVPB	IVPB	IVPB	IVPB		500-700 mg/100 mL D5W or NS; 800-1000 mg/250 mL D5W or NS infuse over 1 hr	------
Adenosine	Push	Push†	Push	Push†	Push†	Administer peripherally preferably. If administered centrally, recommend ½ the dose.		6 mg/2 mL (undiluted); Rate: rapid over 1-2 seconds – follow w/ saline flush; may repeat w/ 12 mg after 1-2 min if indicated x 2.
Ado-Trastuzumab Emtansine	IVPB	---	---	IVPB	IVPB	Non-Formulary for Inpatient area	100 mg or 160 mg/250 mL NS (do not shake) infuse over 90 min (1st infusion) or over 30 min (if prior dose well tolerated) through a 0.22 micron inline nonprotein adsorptive polyethersulfone filter	Do NOT administer IV push or bolus
Albumin	IVPB	IVPB	IVPB	IVPB	IVPB		Rate: 50 mL/hr for 25% albumin; 125 mL/hr for 5% albumin.	
	Drip	Drip	Drip	Drip	Drip			
Alteplase	Push*	Push*	Push*	Push*	Push*	*Appropriate in all patient units for central line clearance	STEMI - >67 kg - 15 mg bolus over 1-2 min; 50 mg over 30 min; remaining 35 mg over next hr; </= 67 kg: 15 mg bolus over 1-2 min; 0.75 mg/kg over 30 min (not to exceed 50 mg); 0.5 mg/kg over 60 min (not to exceed 35 mg)	2 mg/mL – retain 30 mins in catheter for CVC/PICC clearance
	IVPB	---	---	---	---		Ischemic Stroke: load 0.09 mg/kg (max 9 mg) over 1 min, then 0.81 mg/kg (max 81 mg) over 60 min PE: 100 mg over 2 hrs	
Amikacin	IVPB	IVPB	IVPB	IVPB	IVPB	Non-Formulary	Mix in 50 mL or 250 mL D5W over 1 hr.	--------

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Aminophylline	IVPB	IVPB	IVPB	IVPB	IVPB		250 mg/250 mL NS or D5W Load over 30 min – rate < 21 mg/hr.	IV push over 30 - 60 seconds for adenosine-, dipyridamole-, regadenoson reversal during nuclear cardiac stress test
Amiodarone *See Appendix 2 for titration protocol	Push† IVPB Drip	Push†	Push†	Push† IVPB Drip	Push†	Slow infusion if hypotension develops; physician clinical judgement for patient stability; Monitor BP q15 minutes x 4 after initiation of infusion and then per unit admission/discharge criteria	450 mg/250 mL D5W; PREMIX 150 mg/100 mL; Load 150 mg over 10 min (PREMIX preferred), follow with an infusion of 1 mg/minute for 6 hours, then 0.5 mg/minute for 18 hours No nursing titration in 2500 unit	Undiluted IV Push only during ACLS – otherwise load from IVPB
Amphotericin B (conventional)	Irrigation	Irrigation	Irrigation	Irrigation	Irrigation	Non-formulary Restricted to use in irrigation only. Use	Bladder irrigation – 50 mg/1000 mL sterile water irrigate over 24 hrs (Not compatible with NS)	-------
Amphotericin B – Liposomal	IVPB	IVPB	IVPB	IVPB	IVPB	Prime and flush the line with D5W ONLY Infuse NS bolus pre and post Amphotericin infusion for renal protection	Dilute to a final concentration of 1-2 mg/mL infuse dose over 2 hrs	-------
Ampicillin	IVPB	IVPB	IVPB	IVPB	IVPB		1 gm/50 mL NS; 2 gm/100 mL NS over 30 min	-------
Ampicillin/Sulbactam	IVPB	IVPB	IVPB	IVPB	IVPB		1.5 gm/50 mL NS; 3 gm/100 mL NS over 30 min	-------
Argatroban *See Appendix 2 for titration protocol*	Drip	Drip	Drip	Drip	Drip		250 mg/250 mL NS – titrate per protocol	-------
ARIPiprazole	IM	IM	IM	IM	IM	7.5 mg/mL: Restricted to Psychiatry		IM Injection ONLY
ARIPiprazole Lauroxil	IM	IM	IM	IM	IM	Restricted to Psychiatry Restricted to adult patients Restricted to paitient with established oral Aripaprazole		IM Injection ONLY
Atropine	Push	Push†	Push†	Push	Push†	2500 Unit: Max cumulative dose 3mg (for bradycardia only)	Administer undiluted by rapid IV; slow injection may result in paradoxical bradycardia	1 mg/10 mL; Rapid IV push over 2-10 seconds.
Azithromycin	IVPB	IVPB	IVPB	IVPB	IVPB		Dilute in 250 mL D5W – over 1 hr	-------
Aztreonam	IVPB	IVPB	IVPB	IVPB	IVPB		1 gm/50 mL D5W; 2 gm/100 mL D5W over 30 min	-------

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Betamethasone	IM	IM	IM	IM	IM			IM Injection ONLY
Bevacizumab	IVPB	---	---	IVPB	IVPB	Restricted to Oncology Attendings	Mix with 100 mL NS – 1st dose over 90 min; 2nd dose over 60 min; subsequent doses over 30 min	-------
Bleomycin	IVPB	---	---	IVPB	IVPB		Mix with 50-100 mL NS over 10 min	-------
Bumetanide *See Appendix 2 for titration protocol*	Push	Push	Push	Push	Push	2500 Unit: No RN titration (drip), rate changes must be ordered by physicians	10 mg/100 mL NS or D5W No nursing titration in 2500 unit	0.25 mg/mLL (undiluted); Rate: 1-2 minutes
	Drip	Drip	Drip	Drip	---			
Benztropine Mesylate	Push	Push	Push	Push	Push	IM Preferred	-------	Over 2 min
Bupivacaine HCl	Epidural	Epidural	Epidural	---	---	Not recommended for IV use	-------	-------
Bupivacaine/ Epinephrine	Epidural	Epidural	Epidural	---	---	Not recommended for IV use	-------	-------
Butorphanol	Push	Push	Push	Push	Push		-------	2 mg/mL (undiluted); Rate: 2 mg over 3-5 min
Calcitrol	Push	Push	Push	Push	Push			Undiluted; rapid - over 2 min
Calcium Chloride	Push†	Push†	Push†	Push†	Push†	Push for ACLS/ hyperkalemia only	1 gm/100 mL D5W; 2 gm/100 mL D5W over 1 hr	Undiluted; rapid – over 2 min
	IVPB	IVPB	IVPB	IVPB	IVPB			
Calcium Gluconate	Push†	Push†	Push†	Push†	Push†	Push for ACLS or for symptomatic hyperkalemia, hypermagnesemia or hypocalcemia	1 gm/100 mL D5W or NS; 2 gm/100 mL D5W or NS over 1 hr	Undiluted; rapid – over 2 min
	IVPB	IVPB	IVPB	IVPB	IVPB			
CARBOplatin	IVPB	---	---	IVPB	IVPB		Mix in 250-500 mL NS (max conc 2 mg/mL) over 30-60 min	-------
carboprost Tromethamine	IM	IM	IM	IM	IM	DO NOT inject IV		Administer Deep IM
ceFAZolin	IVPB	IVPB	IVPB	IVPB	IVPB		1 gm/50 mL D5W; 2 gm/100 mL D5W over 30 min	-------
Cefepime	IVPB	IVPB	IVPB	IVPB	IVPB		1 gm/50 mL D5W; 2 gm/100 mL D5W over 30 min	-------
Cefotaxime	IVPB	IVPB	IVPB	IVPB	IVPB		1 gm/50 mL D5W; 2 gm/100 mL D5W over 30 min	-------
cefOXitin	IVPB	IVPB	IVPB	IVPB	IVPB		1 gm/50 mL D5W; 2 gm/100 mL D5W over 30 min	-------
cefTAZidime	IVPB	IVPB	IVPB	IVPB	IVPB		1 gm/50 mL D5W; 2 gm/100 mL D5W over 30 min	-------
cefTRIAXone	Push	Push	Push	Push	Push	DO NOT administer simultaneously with calcium-containing products including lactated ringer's (LR) solution due to risk of precipitation.	-------	1 gm/10 mL sterile water over 3 - 5 minutes
	IVPB	IVPB	IVPB	IVPB	IVPB		1 gm/50 mL D5W; 2 gm/100 mL D5W over 30 min	-------

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Cefuroxime	IVPB	IVPB	IVPB	IVPB	IVPB		750 mg/50 mL D5W; 1.5 gm/100 mL D5W over 30 min	--------
Cetuximab	---	---	---	---	---	Infusion Center only	2 mg/mL (do not reconst); load over 2 hr; maintenance over 1 hr	DO NOT IV PUSH
chlorproMAZINE	Push	Push	Push	Push	Push	Patients receiving IV must remain lying down during and for 30 min. after the injection to reduce risk of hypotension	Dilute 1 mg/ mL NS – Rate 1 mg/min	IV Push Rate 1 mg/min
	IVPB	IVPB	IVPB	IVPB	IVPB			
ciprofloxacin	IVPB	IVPB	IVPB	IVPB	IVPB		200 mg/100 mL Infuse over 60 min 400 mg/200 mL Infuse over 60 min	
Cisatracurium **See Appendix 2 for titration protocol*	IVPB	IVPB	IVPB	IVPB	IVPB		100 mg/100 mL NS; titrate to TOF	--------
CISplatin	IVPB	---	---	IVPB	IVPB		Mix in 500 mL NS; IV administration varied from 15-120 min infusion; usually 1 mg/min; up to 24 hr	--------
Clindamycin	IVPB	IVPB	IVPB	IVPB	IVPB		600 mg/50 mL D5W over 30 min 900 mg/50 mL D5W over 1 hr	--------
Colistimethate	IVPB	IVPB	IVPB	IVPB	IVPB		150 mg/100 mL NS over 30 min	--------
Cosyntropin	Push	Push	Push	Push	Push		--------	Undiluted over 2 min
Crotalidae polyvalent immune FAB	IVPB	IVPB	IVPB	IVPB	IVPB	Monitor for Hypersenstivity reaction	Dilute in 250 mL NS; Rate: first dose - 25 mL/hr x 10 min, then 250 mL/hr for remainder of infusion; subsequent doses over 1 hr	--------
Cyanide Antidote Kit (Sodium Nitrite, Sodium Thiosulfate)	Push (Sodium Nitrite)	---	---	---	---	Administer sodium nitrite first, followed immediately by the administration of sodium thiosulfate. Decrease rate of infusion in the event of significant hypotension	Sodium Thiosulfate 1 vial 12.5 gm/50 mL sodium thiosulfate (50 mL); Rate: IV infusion over 10-30 min	Sodium Nitrite 1 vial 300 mg/10 mL sodium nitrite (10 mL); Max dose: 10 mL Rate: slow IV injection 2.5-5 mL/min
	IVPB (Sodium Thiosulfate)							
cyanocobalamin	IM/SubQ	IM/SubQ	IM/SubQ	IM/SubQ	IM/SubQ	No IVP		
Cyclophosphamide	IVPB	---	---	IVPB	IVPB		Mix in 250 mL NS over 30 min	--------
cycloSPORINE	IVPB	IVPB	IVPB	IVPB	IVPB		1 mL/100 mL over 4 hr	--------
Cytarabine	IVPB	---	---	IVPB	IVPB		Mix in 250 mL NS over 3 hr	--------

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Dacarbazine	IVPB	---	---	IVPB	IVPB		Mix in 250 mL NS over 1 hr, can increase to 2 hr with IV pain	-------
Dactinomycin	IVPB	---	---	IVPB	IVPB	Push in Oncology Clinic	50 mL NS over 10-15 min	0.5 mg/mL over 2-3 min (clinic)
Dantrolene Sodium	Push IVPB Drip	Push IVPB Drip	---	---	---	Refer to malignant hyperthermia policy	Reconstitute each 250 mg vial w/ 5 mL sterile water without bacteriostatic agents. Post Crisis: 1 mg/kg q4h or 0.25 mg/kg/hr for at least 24 hr.	As rapidly as possible in treatment of malignant hyperthermia
DAUNOrubicin	Push	---	---	Push	Push		Dilute in D5W or NS over 15-30 min	5 mg/mL over 1-5 min
Decitabine	IVPB	---	---	IVPB	IVPB	Infusion Center only	Mix in 100 mL NS over 1-3 hours	-------
Deferoxamine Mesylate	IM IVPB	---	---	IM IVPB†	IM IVPB†	IM preferred – IV infusion only in cardiovascular collapse	500 mg/50 mL NS, 1000 mg/100 mL NS; Limit rate to 15 mg/kg/hr for the first 1000 mg. Subsequent doses not to exceed 125 mg/hr. (Pharmacy: reconstitute to 95 mg/mL with sterile water - then add to NS, D5W, ½ NS, or LR for further dilution.)	For IM Injection: Reconstitute with sterile water for injection (500 mg vial with 2 mL SWFI; 2000 mg vial with 8 mL SWFI) to a final concentration of 213 mg/mL
Dexamethasone	Push IVPB	Push IVPB	Push IVPB	Push IVPB	Push IVPB	20 mg or less dispensed IV Push	Dilute in 50 mL NS over 30 minutes	Undiluted over 2-3 min
Dexmedetomidine *See Appendix 2 for titration protocol*	Push Drip	---	---	---	---		400 mcg/100 mL NS	4 mcg/mL - Loading dose over 10 min
Dexrazoxane	Push	---	---	Push	Push		-------	Over 5-15 min
Desmopressin acetate	Push IVPB	---	---	Push IVPB	Push IVPB		Dilute in 50 mL NS over 15 -30 min	Over 2 min
Dextrose 50%	Push	Push	Push	Push	Push		-------	Rapid IVP 25gm/50 mL
Diazepam	Push	Push	Push	Push	Push	5 mg/mL undiluted	-------	Rate: 5 mg/min; Do not dilute
Digoxin	Push	Push	Push	Push	Push		-------	May be given undiluted or dilute with four-fold volume of sterile water, D5W, NS Inject slowly over ≥5 minutes
Digoxin Immune FAB	Push IVPB	---	---	---	---	Each vial (40 mg) binds 0.5 mg of Digoxin.	-------	If cardiac arrest is imminent, give IV Push
Dimercaprol	IM	IM	IM	IM	IM			DEEP IM Injection; Rotate injection sites

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Diltiazem (Cardizem) *See Appendix 2 for titration protocol*	Push Drip	Push†	Push†	Push Drip	Push†	Do NOT administer if previously administered IV beta-blockers within a few hours.	No nursing titration in 2500 unit	Injection-give bolus over 2 min, may repeat in 15 min
diphenhydrAMINE	Push IVPB	Push IVPB	Push IVPB	Push IVPB	Push IVPB		--------	50 mg/mL (undiluted); Rate: 25 mg/min
DOCEtaxel	IVPB	---	---	IVPB	IVPB		Mix in 250 mL over 60 minutes	--------
DOBUTamine *See Appendix 2 for titration protocol	Drip	---	---	Drip (fixed 5-10 mcg/kg/ min)	---	Monitor decrease in BP with initiation of drip q15 minutes X 2	500 mg/250 mL D5W – administer per protocol No nursing titration in 2500 unit	--------
DOPamine *See Appendix 2 for titration protocol*	Drip	---	---	Drip (5mcg/kg/min)	---	Monitor infusion site for phlebitis and symptoms of extravasation. Central line preferred. Peripheral line for short term use only with large bore needles (at least 20 gauge). Peripheral line should be placed in the upper arm or forearm contralateral to the blood pressure cuff. Hand/wrist lines should be avoided as well as any IV sites requiring more than 1 venipuncture.	No nursing titration in 2500 unit 400 mg/250 mL D5W (peripheral); 800 mg/250 mL D5W (central)	--------
DOXOrubicin	Push	---	---	Push	Push		--------	2 mg/mL over 20 min
DOXOrubicin (Liposomal)	IVPB	IVPB	---	---	IVPB		Mix in 250 mL D5W (<90 mg); 500 mL D5W (>90 mg) over 60 minutes (max rate 1 mg/min)	--------
Doxycycline	IVPB	IVPB	IVPB	IVPB	IVPB		100 mg/100 mL D5W over 2 hrs	--------
Enalaprilat	Push IVPB	---	---	Push IVPB	Push IVPB		Dilute in 25 mL D5W over 15 minutes	Undiluted over at least 5 min
Enoxaparin	SubQ	SubQ	SubQ	SubQ	SubQ		--------	--------
ePHEDrine Sulfate	Push	Push	Push				--------	Over 2 min
EPINEPHrine HCl	Push	Push†	Push†	Push	Push†	Monitor infusion site for phlebitis and	No nursing titration in 2500 unit	Rapid IV push

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*See Appendix 2 for titration protocol	Drip			Drip†		symptoms of extravasation. Central line preferred. Peripheral line for short term use only with large bore needles (at least 20 gauge). Peripheral line should be placed in the upper arm or forearm contralateral to the blood pressure cuff. Hand/wrist lines should be avoided as well as any IV sites requiring more than 1 venipuncture.	2 mg/250 mL D5W or NS (peripheral) 4 mg/250 mL D5W or NS (central)	
Eptifibatide	Push Drip	---	---	---	---		Undiluted – 1-2 mcg/kg/min (max 15 mg/hr) x 72 hr	180 mcg/kg (max 22.6 mg) over 1-2 min
Epoetin Alfa	Push	Push	Push	Push	Push			Undiluted over at least 1 minute
Epoprostenol	Drip	---	---			Restricted to Pulmonology attending. May continue patient's home pump on all units. Use 0.22 micron filter	0.25 mg/50 mL Flolan Diluent; 0.50 mg/100 mL Flolan Diluent Adjust by 2 ng/kg/min at ≥15 min interval	--------
Ertapenem	IVPB	IVPB	IVPB	IVPB	IVPB		1 gm/50 mL NS over 30 min	May be given IM
Esmolol *See Appendix 2 for titration protocol	Drip Push	---	---	---	---		2500 mg/250 mL NS No nursing titration in 2500 unit	Rate: 500 mcg/kg over 1 minute
Estradiol Cypionate	IM	IM	IM	IM	IM		--------	--------
Estradiol Valerate	IM	IM	IM	IM	IM		--------	--------
Estrogen, Conjugated	Push IVPB	Push IVPB	Push IVPB	Push IVPB	Push IVPB		Mix with 50 mL NS over 30 min	Reconstitute 25 mg w/ 5 mL H20; Rate: 5 mg/min
Ethacrynic Acid	Push IVPB	Push IVPB	Push IVPB	Push IVPB	Push IVPB		Mix in 50 mL NS over 30 min	Undiluted; Rate: 10 mg/min
Ethanolamine Oleate	Sclero-therapy	---	---	---	---	Only for sclerotherapy – not for direct IV administration max of 20 mL per treatment session	--------	--------
Etomidate	Push	---	---	---	---	Watch for hypotension, asthma, CV effects; OK for intubation and transfer	--------	Undiluted; Rate: over 30-60 seconds
Etoposide	IVPB	---	---	IVPB	IVPB	Must use 0.22 micron filter	Mix in 500 mL NS over 1 hour	--------

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Drug Name	ACCU ED PACU	L&D	POST-PARTUM	2500 UNIT	MED/ SURG	COMMENTS	IVPB/Drip STANDARD CONCENTRATIONS / RATE OF ADMINISTRATION	IV Push/IM STANDARD CONCENTRATIONS / RATE OF ADMINISTRATION
Factor VIIa (Recombinant)	Push	---	---	---	---	Reconstitute with provided diluent according to package instructions	--------	Rate: over 2-5 minutes – administer within 3 hours after reconstitution
Famotidine	Push IVPB	Push IVPB	Push IVPB	Push IVPB	Push IVPB		20 - 40 mg in 50 mL NS over 30 min	May dilute with 5-10 mL of NS or administer undiluted; Rate: over 2 minutes
Fat Emulsion, intravenous (IVFE)	IVPB Drip	IVPB Drip	IVPB Drip	IVPB Drip	IVPB Drip	Only stable for 20 hrs when out of admixture; See Intralipid rescue guidlines for local anesthetic toxicity posted in OR and L&D or visit the website: www.lipidrescue.org	Drip is 3-in-1 TPN	-------
fentaNYL **See Appendix 2 for titration protocol*	Push Drip	Push	---	Push Drip	---	2500 Unit: On mechanical vent or Comfort/Palliative/End of life Care; Only if patient cannot be managed by other opioid	1000 mcg/100 mL – titrate to goal pain score per pain/sedation protocol No nursing titration in 2500 unit	Dilute 100mcg/2mL vial with 8mL NS to a final concentration of 100mcg/10 mL [10mcg/mL]; Rate: 50 mcg over 1-2 min
Filgrastim G-CSF (Neupogen®)	SubQ IVPB	SubQ IVPB	SubQ IVPB	SubQ IVPB	SubQ IVPB	Do not shake vial; SubQ is preferred route; Not compatible w/ NS; Flush line before & after w/ D5W Do not administer earlier than 24 hours after or in the 24 hours prior to cytotoxis chemotherapy	Dilute in 50 mL D5W over 15-30 min	-------
Filgrastim (Zarxio®)	SubQ	SubQ	SubQ	SubQ	SubQ	Round to the closest prefilled syringe size- 300 mcg & 480 mcg	--------	--------
Fluconazole	IVPB	IVPB	IVPB	IVPB	IVPB		200 mg/100 mL NS over 1 hour; 400 mg/200 mL NS over 2 hours	--------
Fludarabine	IVPB	---	---	IVPB	IVPB		100 mL NS over 30 minutes (standard concentration 10-25 mg/mL)	--------
Flumazenil	Push	Push	Push	Push	Push		--------	Undiluted; Rate: Reversal of conscious sedation – 15 sec.; Benzodiazepine OD – 30 sec.
Fluorescein Sodium	---	---	---	---	---	Radiographic agent	--------	Undiluted – 1 mL/second
5-Fluorouracil	Push Drip	---	---	Push Drip	Push Drip		Mix in 1000 mL NS over 24 hrs	IV push over 10 minutes

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Fluphenazine Decanoate	IM	IM	IM	IM	IM		------	------
Fluphenazine HCl	IM	IM	IM	IM	IM		-------	-------
Fomepizole	IVPB	---	---	---	---		Mix in 100 mL NS over 30 min	-------
Fondaparinux	SubQ	SubQ	SubQ	SubQ	SubQ		-------	-------
Fosaprepitant	IVPB	---	---	IVPB	IVPB	Restricted to Oncologist or Chemotherapy order set.	150 mg/250 mL NS; infuse over 30min	------
Fosphenytoin	IVPB	---	---	IVPB	---	Telemetry trained nurses ONLY may give IV administration. Use double chemotherapy gloves and a protective gown during administration by the reproductive employee; at minimum, use single chemotherapy gloves during administration by the non-reproductive employee. Continuous monitoring of the electrocardiogram, blood pressure, and respiratory function is required during infusion and for 10 to 30 minutes after the end of infusion.	IV administration of 100 mg PE / 2 mL (50 mg PE / mL) in 100 mL NS or D5W using patient specific dosing (must be diluted to concentrations of 1 to 25 mg PE / mL; max concentration: 25 mg PE / mL). Adult infusion rate: 25-100 mg PE / min (Max Rate: 150 mg PE / min). Load: 10-20 mg PE / kg [Max: 1500 mg PE], Usual: 4 to 6 mg PE/kg/day in divided doses. Administer diluted solution as intermittent IV infusion; do not administer as a continuous infusion.	IM administration of undiluted fosphenytoin (50 mg PE/mL) at 4-20 mg PE / kg using 1-4 injection sites (Max: 2 mL at deltoid, 5 mL at buttock). Do not administer as IV push.
Fulvestrant	IM	---	---	IM	IM		-------	250 mg/5 mL x 2 prefilled
Furosemide *See Appendix 2 for titration protocol*	Push IVPB Drip	Push IVPB Drip	Push IVPB Drip	Push IVPB Drip	Push IVPB	2500 Unit: No RN titration (drip), rate changes must be ordered by physicians	Give doses greater than 240 mg in IVPB; 100 mg/100 mL NS; 500 mg/100 mL NS; 500 mg/50 mL (no dilution); titrate to urine output or as ordered No nursing titration in 2500 unit	Undiluted - 10 mg/mL; Rate: 20-40 mg/min
Ganciclovir	IVPB	IVPB	IVPB	IVPB	IVPB	Extravasation precautions; use latex gloves when handling; dispose of in chemotherapy waste; No Chemo RN needed	500 mg/250 mL D5W over 1 hour;	-------
Gemcitabine	IVPB	---	---	IVPB	IVPB		Mix in 250 mL NS over 30-60 min	
Gentamicin Sulfate	IVPB	IVPB	IVPB	IVPB	IVPB		100 mg/100 mL NS; 80 mg/100 mL NS; 5 mg/kg in 100 mL NS - over 30 min	------

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Glucagon	Push Drip	Push	Push	Push	Push		20 mg/100 mL NS	Mix 1 vial with 1 mL diluents or sterile water; Rate: over 1 min
Glycopyrrolate	Push	Push	Push	Push	Push		-------	Undiluted - 0.2 mg/mL; Rate: 2-3 min
Haloperidol	IM Only	IM Only	IM Only	IM Only	IM Only		-------	-------
Heparin Sodium *See Appendix 2 for titration protocol*	Push Drip	Push Drip	Push Drip	Push Drip	Push Drip		25,000 units/250 mL D5W – adjust per protocol	Undiluted - 5,000 units/mL ; Rate: Max 40 mg/min
Hepatitis B Immune Globulin (HBIG)	IM	IM	IM	IM	IM	IV for post liver transplant	-------	-------
Hetastarch	Drip	Drip	Drip	Drip	Drip	BBW: acute renal injury; avoid use in critically ill patients, including patients with sepsis	Not to exceed 20 mL/kg/hr, rates have been studied up to 1000 mL over 7-8 min in critical situations	-------
Hyaluronidase	SubQ	SubQ	SubQ	SubQ	SubQ		-------	-------
hydrALAZINE	Push	Push	Push	Push	Push		-------	Rate: 5 mg/min
Hydrocortisone	Push IVPB	Push IVPB	Push IVPB	Push IVPB	Push IVPB	Doses ≤250 mg given Push	Dilute in 50 mL NS over 30 minutes	Undiluted; Rate: 30 sec
HYDROmorphone *See Appendix 2 for titration protocol*	Push PCA Drip	Push PCA Drip	Push PCA Drip	Push PCA Drip*	Push PCA Drip*	Drip: mechanical vent required except for DNR/End of Life/Comfort/Palliative Care *NO Titration Drips on 2500 or MED/SURG units; set rate only.	Drip: 50 mg/100 mL NS; PCA 25 mg/50 mL NS	Undiluted; over 3 minutes
hydrOXYzine HCl	IM Only	IM Only	IM Only	IM Only	IM Only		-------	-------
Ibuprofen (Caldolor)	IVPB	IVPB	IVPB	IVPB	IVPB	Restricted for use from pre-surgery to 24 hour post-surgery. NOT interchangeable with ibuprofen lysine		Diluted to final concentration of ≤4mg/mL; over at least 30 minutes
Ifosfamide	IVPB Drip	---	---	IVPB Drip	IVPB Drip		Mix in 250 mL NS over 30 min; Mix in 1000 mL NS over 24 hrs (depending on regimen)	-------
Immune Globulin, Human	IVPB	IVPB	IVPB	IVPB	IVPB	Please refer to IVIG order set.	Octagam 5%: 0.5mg/kg/min (0.6mL/kg/hr); double infusion rate if tolerated every 30 minutes up to a max	-------

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	Drip	Drip	Drip	Drip	Drip		rate of 3.33mg/kg/min (4.2mL/kg/hour) Octagam 10%: 0.5mg/kg/min (0.6mL/kg/hr); double infusion rate if tolerated every 30 minutes up to a max rate of 12mg/kg/min (7.2mL/kg/hour)	
Indigotindisulfonate Na	Push	Push	Push	Push	Push	Diagnostic Agent	-------	-------
inFLIXimab	IVPB	---	---	IVPB	IVPB	Clinic Use Only	Mix in 250 mL NS, infuse over 2 hrs	-------
Insulin, Human Regluar	Push Drip	Push Drip	Push	Push	Push	Only Regular Insulin for IV use	100 units/100 mL NS – infuse per protocol	Undiluted: 100 units/mL; Rate: 2-4 seconds
Interferon alfa-2b	IVPB	---	---	IVPB	IVPB	Outpatient formulary only	Mix in 100 mL NS over 20 min	-------
INTRALIPD (see Fat Emulsion)								
Iohexol	---	---	---	---	---	Radiologic Contrast Agent – see specific procedures	-------	-------
Irinotecan	IVPB	---	---	IVPB	IVPB		Mix in 500 mL D5W over 90 min	-------
Iron Dextran	IVPB	IVPB	IVPB	IVPB	IVPB		100 mg/250 mL NS over 1-6 hours; Test Dose – 25 mg/50 mL NS over 30 min	-------
Isoproterenol	Drip	---	---	---	---	Not 1st line in ACLS No longer recommended in shock (hypovolemic/cardiogenic/septic)	1 mg/250 mL D5W; Rate: 0.3 - 10 mcg/min	-------
Isosulfan Blue	---	---	---	---	---	Radiologic Contrast Agent - SubQ	-------	-------
Ketamine HCl **See Appendix 2 for titration protocol*	Push Drip	---	---	---	---	Sedation/ Anesthesia Drip: Need mechanical vent . Analgesia Drip: Does not need mechanical vent. Intubation not required for Analgesia use/ DNR/End of Life/ Comfort/Palliative Care.	100 mg/100 mL NS - titrate per order; see pain/sedation protocol Sedation: 0.2-0.8 mg/kg bolus, followed by: 0.12-0.42 mg/kg/hr (higher doses may be needed) Analgesia: 0.1-0.5 mg/kg bolus over 1-3 minutes, followed by: 0.1-0.4 mg/kg/hour (maximum 0.4 mg/kg/hr)	Undiluted: 10 mg/mL; Rate: 0.5 mg/kg/min; 100 mg/mL concentration should not be administered IV unless properly diluted with an equal volume of SWFI, NS, or D5W. May administer bolus/induction doses over 1 minute or at a rate of 0.5 mg/kg/minute.
Ketorolac Tromethamine	Push	Push	Push	Push	Push		-------	Undiluted: 30 mg/mL; Rate: over 15 seconds
Labetalol **See Appendix 2 for titration protocol*	Push	Push	---	Push	Push	Max cumulative daily dose: 300 mg/day	300 mg/300 mL D5W	Undiltued: 5 mg/mL; Rate: 10 mg/min IV push requires telemetry monitoring

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	Drip							
Lacosamide	IVPB	IVPB	IVPB	IVPB	IVPB		Mix in 100 mL NS, D5W or LR; Infuse over 30 - 60 min	-------
Leucovorin Calcium	IVPB	---	---	IVPB	IVPB	Administration schedules differ by indication; refer to individual protocols	Mix in 100 mL NS over 30 min	-------
Leuprolide Acetate	IM Only	IM Only	IM Only	IM Only	IM Only	Restricted to Women's Health Clinic and Infusion Center	-------	3.75 mg to 30 mg prefilled
levETIRAcetam	IVPB	IVPB	IVPB	IVPB	IVPB		500, 750, or 1000 mg/100 mL NS over 30 min	-------
Levocarnitine	Push	Push	Push	Push	Push		Mix with 50 mL NS over 15 min	Over 2-3 min
	IVPB	IVPB	IVPB	IVPB	IVPB			
Levofloxacin	IVPB	IVPB	IVPB	IVPB	IVPB		250 mg/50 mL D5W over 60 min, 500 mg/100 mL D5W over 60 min, 750 mg/150 mL D5W over 90 min	-------
Levothyroxine	Push	Push	Push	Push	Push	Reconstitute w/ 5mL NS only; use immediately	-------	100 mcg/mL; Rate: 2 min
Lidocaine	Drip	---	---	---	---	Do not add to potassium containing solutions	2 gm/500 mL	-------
Lidocaine/ Epinephrine	Infiltration/Procedure					Not recommended for direct IV administration	-------	-------
Linezolid	IVPB	IVPB	IVPB	IVPB	IVPB	Restricted to Attending	600 mg/300 mL D5W over 30 min	-------
LORazepam *See Appendix 2 for titration protocol*	Push	Push	Push	Push	Push	Drip: mechanical vent required except for DNR/End of Life/Comfort/Palliative Care	120 mg/60 mL	IV: Rate: ≤ 2mg/min; dilute IVP dose prior to use with an equal volume of NS IM: Should be administered (undiluted)
	IM	IM	IM	IM	IM			
	Drip	---	---	---	---			
Magnesium Chloride	IVPB	IVPB	IVPB	IVPB	IVPB	Should NOT be used in compounding TPN	1 gm/50 mL D5W; 2 gm/100 mL D5W; 4 gm/200 mL D5W; Rate: 1 gm/hr	-------
Magnesium Sulfate	Push†	Push†	Push†	Push†	Push†	IV push only during Code Blue; rate is indication dependent	2 gm/50 mL PREMIX; 4 gm/100 mL PREMIX; 20 gm/500 mL PREMIX; 1 gm/50 mL D5W; 2 gm/100 mL D5W; 4 gm/100 mL D5W; General Rate: 1 gm/hr; If severely symptomatic preeclampsia/eclampsia more aggressive therapy (loading 4 g over 5 minutes) may be required	General Rate: < 150 mg/min; May IV push 1-2 gm over 1-2 minutes in persistent pulseless VT /VF with hypomagnesemia; For torsades de pointes give 1-2 gm over 15 minutes (IVPB PREMIX preferred); Max concentration 20% (2gm/10 mL) for IV push
	IVPB	IVPB	IVPB	IVPB	IVPB			

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	Drip	Drip	Drip	Drip	---			
Mannitol	Push IVPB	Push IVPB	Push IVPB	Push IVPB	Push IVPB	Use 5 micron filter and 18g needle.	Undiluted – Rate variable on diagnosis	Rate variable on diagnosis
meperidine	Push IM/SubQ	Push IM/SubQ	Push IM/SubQ	Push IM/SubQ	Push IM/SubQ	Restricted to the patients with rigor	------	Slow IV Push with dilution of 10 mg/mL (patient should be lying down) IM preferred
Mepivacaine HCl	Infiltration/Procedure					Not recommended for direct IV	------	------
Meropenem	IVPB	IVPB	IVPB	IVPB	IVPB	Use within 1 hour of reconstitution	500 mg/50 mL NS; 1gm/50 mL NS; infuse over 15 - 30 min	------
Mesna	IVPB	---	---	IVPB	IVPB		Dilute in 50 - 100 mL NS or D5W over 15 - 30 min	------
Methocarbamol	IVPB	IVPB	IVPB	IVPB	IVPB		250 mg – 1000 mg/100 mL NS over 15 min	------
Methohexital Sodium	Push	---	---	---	---	Procedural sedation/anesthesia	------	Dilute to a 1% (10 mg/mL) max concentration Rate 1 mL/5 seconds or ~2 mg/second
Methotrexate	IM Drip	---	---	IM Drip	IM Drip		Mix in 1000 mL NS to run over 24 hrs (high dose MTX)	IM injection for ectopic pregnancy and rheumatoid arthritis
Methylene Blue	Push IVPB	Push IVPB	Push IVPB	Push IVPB	Push IVPB	Vesicant; ensure proper needle / catheter placement prior to and during infusion; If a prolonged or continuous infusion is employed, administration via central line is recommended	Mix in 50 mL D5W infuse over 5 - 30 min	Undiluted over 5-10 min
Methylergonovine Maleate	Push IM	Push IM	Push IM	--- ---	--- ---	Prevention of hemorrhage; IM preferred route; IV administration should only be considered during life-threatening situations; monitor blood pressure	------	Dilute to 5 mL with NS Rate: over 1 min
Methylnaltrexone	Subcut	---	---	Subcut	Subcut		N/A	Administer by subcutaneous injection into the upper arm, abdomen, or thigh. Rotate injection sites at each dose.

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methylPREDNISolone (Depo-Medrol®) Acetate	IM	IM	IM	IM	IM	Avoid injection into the deltoid muscle due to a high incidence of subcutaneous atrophy. Avoid injection or leakage into the dermis. Do not inject into areas that have evidence of acute local infection.		
methylPREDNISolone sodium succinate (Solu-MEDROL®)	Push IVPB	Push IVPB	Push IVPB	Push IVPB	Push IVPB	Doses < 250 mg given IV Push	250 mg/50 mL D5W over 15 min 500 mg/50 mL D5W over 30 min 1 gm/50 mL D5W over 1 hr	Rate 40 mg/min
Metoclopramide	Push IVPB	Push IVPB	Push IVPB	Push IVPB	Push IVPB	Doses ≤ 10 mg given IV Push	Dilute in 50 mL NS over 15 min	IV Push Undiluted over 1 - 2 minutes at 5 mg/min
Metoprolol	Push IVPB	Push† IVPB	Push† IVPB	Push IVPB	Push† IVPB		Dilute in 50 mL NS over 30 min	IV Push Undiluted over 1-2 minutes at 2.5 mg/min
metroNIDAZOLE	IVPB	IVPB	IVPB	IVPB	IVPB		500 mg/100 mL NS over 1 hr	------
Micafungin	IVPB	IVPB	IVPB	IVPB	IVPB		50-150 mg/100 mL NS over 1 hr	------
Midazolam *See Appendix 2 for titration protocol*	Push Drip	Push† ---	Push† ---	Push† ---	Push† ---	Drip: mechanical vent required except for DNR/End of Life/Comfort/Palliative Care	100 mg/100 mL NS - titrate per order; See Pain/Sedation Protocol	IV Push 1 mg/mL concentration over at least 2 min
Milrinone *See Appendix 2 for titration protocol	Drip	---	---	---	---	-Caution in patients with renal dysfunction -May cause significant hypotension - Do not titrate; PHYSICIANS to order changes	20 mg/100 mL NS; 40 mg/200 mL NS	------
mitoMYcin	Ophth Bladder Irrigation	--- ---	--- ---	--- ---	--- ---	Mostly Clinic setting	Ophth: 0.4 mg/mL totlal volume 1 mL syringe BI: 40 mg/40 mL NS for bladder irrigation	------ ------
Mitoxantrone HCl	IVPB	---	---	IVPB	IVPB		100 mL NS over 5 -15 minutes	------
Morphine Sulfate *See Appendix 2 for titration protocol*	Push PCA Drip	Push PCA Drip	Push PCA Drip	Push PCA Drip*	Push PCA Drip*	Drip: mechanical vent required except for DNR/End of Life/Comfort/Palliative Care *NO Titration Drips on 2500 or MED/SURG units; set rate only.	100 mg/100 mL D5W - titrate per order; PCA 30 mg/30 mL	May give undiluted or dilute to a final concentration of 0.5 - 5 mg/mL IV Push over 4-5 min at a max rate of 1 mg/min

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Nafcillin	IVPB	IVPB	IVPB	IVPB	IVPB		1 gm/50 mL D5W over 30 min 2 gm/100 mL D5W over 30 min	-----
Nalbuphine	Push	Push	Push	Push	Push			IV Push Undiluted over at least 2 - 3 min at 2.5 - 5 mg/min; Larger induction doses should be given over 10 - 15 min
Naloxone	Push	Push	Push	Push	Push		2 mg/500 mL NS	IV Push Undiluted over 30 seconds (may be diluted to a 0.04 mg/mL concentation for intermittent IV Push)
	Drip	---	---	---	---			
Neostigmine Methylsulfate	Push	Push	Push	Push	Push		-----	Undiluted over 3 - 5 min at ~ 0.5 mg/min
Nesiritide	Push	---	---	---	---	Restricted to Cardiology	1.5 mg/250 mL D5W; refer to order for patient-specific rate	IV bolus from bag over 1 min followed by continuous infusion (bolus optional)
	Drip	---	---	---	---			
niCARdipine **See Appendix 2 for titration protocol*	Drip	---	---	---	---	Administer infusion via central line or through a large peripheral vein. Peripheral venous irritation may be minimized by changing the site of infusion every 12 hours.	25 mg/250 mL NS; 20 mg/200 mL NS PREMIX;	
Nitroglycerin **See Appendix 2 for titration protocol*	Drip	---	---	---	---	Adsorption occurs to soft plastic (eg, PVC); use administration sets intended for nitroglycerin. Avoid in-line IV filters that adsorb nitroglycerin.	50 mg/250 mL D5W in glass bottle	-----
Nitroprusside Sodium *See Appendix 2 for titration protocol	Drip	---	---	---	---	Protect from light. Do not use discolored solutions (eg, blue, green, red) or solutions with visible particles. Monitor for cyanide/thiocyanate toxicity	50 mg/250 mL D5W	-----

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Norepiphrine Bitrartrate *See Appendix 2 for titration protocol*	Drip	---	---	---	---	Monitor infusion site for phlebitis and symptoms of extravasation. Central line preferred. Peripheral line for short term use only with large bore needles (at least 20 gauge). Peripheral line should be placed in the upper arm or forearm contralateral to the blood pressure cuff. Hand/wrist lines should be avoided as well as any IV sites requiring more than 1 venipuncture.	8 mg/250 mL D5W or NS (peripheral); 16 mg/250 mL D5W or NS (central)	------
Octreotide	Push/SubQ IVPB Drip	Push/SubQ IVPB Drip	Push/SubQ IVPB Drip	Push/SubQ IVPB Drip	Push/SubQ IVPB Drip	May give SubQ, Depot formulation is given IM intragluteal ONLY (avoid deltoid)	Continuous IV Infusion (drip): 1250 mcg/ 250 mL NS – run at 50 mcg/hr 600 mcg/250 mL NS – run at 25 mcg/hr Intermittent IV Infusion: IVPB dilute in 50 mL NS over 15-30 min	IV Push Undiluted over 3 min at ~ 50 mcg/min; Rapid IV bolus given only during emergency situations (e.g. carcinoid crisis)
Olanzapine	IM	IM	IM	IM	IM	Reconstitute 10 mg vial with 2.1 mL SWFI; Resulting solution is ~5 mg/mL: Use immediately (within 1 hour) following reconstitution	------	------
Ondansetron	Push IVPB	Push IVPB	Push IVPB	Push IVPB	Push IVPB		12 mg/50 mL D5W or NS; 16 mg/50 mL D5W or NS – over 15 - 30 min	IV Push Undiluted over 2 - 5 min at 2 - 4 mg/min

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Drug Name	ACCU ED PACU	L&D	POST-PARTUM	2500 UNIT	MED/ SURG	COMMENTS	IVPB/Drip STANDARD CONCENTRATIONS / RATE OF ADMINISTRATION	IV Push/IM STANDARD CONCENTRATIONS / RATE OF ADMINISTRATION
Oxaliplatin	IVPB	---	---	IVPB	IVPB	Flush infusion line with D5W prior to administration. Avoid ice chips, exposure to cold temperatures, or consumption of cold food/beverages during or within hours after oxaliplatin infusion (may exacerbate acute neurological symptoms). Do not use needles or administration sets containing aluminum. Avoid extravasation; monitor IV site for redness, swelling, or pain.	Mix in 500 mL D5W over 2 - 6 hrs	------
Oxytocin *See Appendix 2 for titration protocol	Drip IVPB IM Push	Drip IVPB IM Push	Drip IVPB IM Push	---	---	May give IM for postpartum uterine bleeding Hazardous agent (NIOSH 2016 [group 3]) Monitor: BP, fluid status, labor/uterine activity, fetal monitoring	20 units/1000 mL NS Induction: See Appendix 2 titration protocol Post Partum: bolus over 30 min (max 40 unit) then 125 mL/hour (2.5 unit/hour)	IM: 10 unit/mL (when IV access unavailable) Caution with IVPush: cardiovascular risk (give over ≥ 5 minutes)
PACLitaxel	IVPB	---	---	IVPB	IVPB	Final conc 0.3 – 1.2 mg/mL	Mix in 250 mL NS over 1 – 2 hours for weekly dose; Mix in 500 mL NS over 3 hour for q3 wk dose	------
Polidocanol	MISC	MISC	MISC	MISC	MISC	Restricted surgeons in OR and vascular clinic; administer by surgeons only	------	------
Paliperidone	IM	IM	IM	IM	IM	Restricted to INPT Psychiatry ONLY		Invega Sustenna: Do not mix with any other product or diluent; shake syringe for at least 10 seconds to ensure a homogenous suspension
Palonosetron	Push	Push	Push	Push	Push	Restricted to the following: oncology attending, moderate or highly emetogenic chemotherapy treatment, or failure to ondansetron regimen	------	IV push over 30 seconds, beginning ~30 minutes prior to the start of chemotherapy
Pamidronate	IVPB	IVPB	IVPB	IVPB	IVPB	Infusion concentration/rate are indication-dependent .	90 mg/250 mL NS; 90 mg/500 mL NS; 90 mg/1000 mL NS infuse over 2-24 hours	------
Pancuronium Bromide	Push Drip	---	---	---	---		100 mg/100 mL NS	2 mg/mL (undiluted); Rate: over 60-90 sec

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Drug Name	ACCU ED PACU	L&D	POST-PARTUM	2500 UNIT	MED/ SURG	COMMENTS	IVPB/Drip STANDARD CONCENTRATIONS / RATE OF ADMINISTRATION	IV Push/IM STANDARD CONCENTRATIONS / RATE OF ADMINISTRATION
Pantoprazole	Push Drip	Push Drip	Push Drip	Push Drip	Push Drip		80 mg/100 mL NS, run at 10 mL/hr	Rate: reconstituted with 10 mL NS and adminsitered over 2 min
Papaverine HCl	Push	---	---	---	---	Rapid IV administration may result in fatal arrhythmias and apnea		No faster than over 1-2 minutes
Pemetrexed	IVPB	---	---	IVPB	IVPB	Restricted to Infusion Center only.	Mix in 100 mL NS over 10 min	------
Penicillin G Benzathine	IM	IM	IM	IM	IM		------	------
Penicillin G Potassium	IVPB	IVPB	IVPB	IVPB	IVPB		3 MU/50 mL D5W; 4 MU/100 mL D5W; 6 MU/100 mL D5W over 30 min; for OB 6 MU/100 mL D5W over 1 hr	------
Penicillin G Procaine	IM	IM	IM	IM	IM		------	------
Pentamidine	IVPB	IVPB	IVPB	IVPB	IVPB		300 mg/100 mL D5W over 1 hr	------
PENTobarbital	Push Drip	---	---	---	---		2500 mg/250 mL NS	Max rate 50 mg/min
Perflutren Lipid Microspheres	---	---	---	---	---	Radiologic Contrast Agent – see specific procedures	IV infusion 4 mL/min	Bolus over 30-60 sec
PHENobarbital	Push IVPB	Push IVPB	Push IVPB	Push IVPB	Push IVPB	Loading Dose (20 mg/kg) in ED/ACCU only, respiratory support may be needed with larger doses	Max rate 50 mg/min	Max rate 50 mg/min
phentolamine	MISC	MISC	MISC	MISC	MISC	Inject 5 - 10 mg (dilute in 10 mL NS) into extravasation area		
Phenylephrine *See Appendix 2 for titration protocol*	Push Drip	---	---	---	---	Monitor infusion site for phlebitis and symptoms of extravasation. Central line preferred. Peripheral line for short term use only with large bore needles (at least 20 gauge). Peripheral line should be placed in the upper arm or forearm contralateral to the blood pressure cuff. Hand/wrist lines should be avoided as well as any IV sites requiring more than 1 venipuncture.	40 mg/250 mL D5W or NS (peripheral) 80 mg/250 mL D5W or NS (central)	100 mcg/mL; Rate: 100 mcg/min
Phenytoin	IVPB	---	---	IVPB	---	Stock: 250 mg / 5 mL Stock: 100 mg / 2 mL	IV administration of 50 mg/mL in 100 mL NS. Only compatible in NS. Dilute from 100 mg / 2 mL or 250 mg /	NOT for IM administration.

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Drug Name	ACCU ED PACU	L&D	POST-PARTUM	2500 UNIT	MED/ SURG	COMMENTS	IVPB/Drip STANDARD CONCENTRATIONS / RATE OF ADMINISTRATION	IV Push/IM STANDARD CONCENTRATIONS / RATE OF ADMINISTRATION
						Telemetry trained nurses ONLY may give IV administration. Use double chemotherapy gloves and a protective gown during administration by the reproductive employee; at minimum, use single chemotherapy gloves during administration by the non-reproductive employee. Continuous monitoring of the electrocardiogram, blood pressure, and respiratory function is required during infusion and for 10 to 30 minutes after the end of infusion.	5 mL using patient specific dosing (may be further diluted in NS to a final concentration ≥5 mg/mL; infusion must be completed within 4 hours after preparation). Adult infusion rate: 20-50 mg/min (Max Rate: 50 mg/min). Load: 10-20 mg / kg, Usual: 100 mg every 6 to 8 hours. An in-line 0.22 to 0.55 micron filter is recommended for IVPB solutions due to the potential for precipitation of the solution. Infusion must be completed within 4 hours after preparation.	
Physostigmine	Push	Push	Push	---	---	Monitor HR; Significant bradicardia, respiratory distress, and seizures may occur from too rapid administration	-----	Infuse no faster than 1 mg/minute
Phytonadione	IVPB	IVPB	IVPB	IVPB	IVPB	Never IV Push, may give SubQ	10 mg/50 mL NS run over 30 min	-----
Piperacillin/ Tazobactam	IVPB	IVPB	IVPB	IVPB	IVPB	Refer to Autosubstitution Policy for Extended Infusion Criteria/Dosing	2.25 gm/50 mL D5W, 3.375 gm/50 mL D5W; 4.5 gm/100 mL D5W over 30 min for Conventional Infusion; IV infuse over 4 hrs for Extended Infusion	-----
Polymyxin B Sulfate	IVPB	IVPB	IVPB	IVPB	IVPB		500,000 units in 500 mL D5W Infuse over 60 - 120 minutes	-----
Potassium Acetate	IVPB	IVPB	IVPB	IVPB	IVPB		40 mEq/100 mL NS (central); 40 mEq/250 mL NS (peripheral) Drip varies as ordered, rate not to exceed 10 mEq/hr (in pt with central line on tele may be 20 mEq/hr)	-----
	Drip	Drip	Drip	Drip	Drip			
Potassium Chloride	IVPB	IVPB	IVPB	IVPB	IVPB		40 mEq/100 mL SW (central); 40 mEq/250 mL NS (peripheral) Drip varies as ordered, rate not to exceed 10	-----

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Drug Name	ACCU ED PACU	L&D	POST-PARTUM	2500 UNIT	MED/ SURG	COMMENTS	IVPB/Drip STANDARD CONCENTRATIONS / RATE OF ADMINISTRATION	IV Push/IM STANDARD CONCENTRATIONS / RATE OF ADMINISTRATION
	Drip	Drip	Drip	Drip	Drip		mEq/hr (in pt w/ central line on tele may be 20 mEq/hr) In the ICU, a maximum rate of 21-30 mEq/hr may be administered in patients with a central line only when ordered by an attending physician.	
Potassium Phosphate	IVPB	IVPB	IVPB	IVPB	IVPB		20 mmol/100 mL NS (central); 30 mmol/250 mL NS, 30 mmol/500 mL NS (central or peripheral); run at 5 mmol/hr (in pt w/ central line on tele may be 7 mmol/hr)	-----
	Drip	Drip	Drip	Drip	Drip			
Pralidoxime	IM	---	---	---	---	Cardiac Monitor and BP monitor needed	infuse over 15 - 30 minutes	May administer IM (anterolateral aspect of thigh) if IV administration is not feasible
	IVPB	---	---	---	---			
Procainamide HCl	Push	---	---	---	---	Can cause significant hypotension and/or QRS widening	Drip: 2 gm/250 mL NS Maintenance: 1 to 6 mg/min by continuous infusion	500 mg/mL; Rate: <50 mg/min; max concentration 20 mg/mL (load)
	IVPB							
	Drip							
Prochlorperazine	Push/IM	Push/IM	Push/IM	Push/IM	Push/IM	AVOID skin contact with injection solution DO NOT administer SubQ	-----	Slow IV Push at a rate not exceeding 5 mg/min Deep IM into outer quadrant of buttocks
Promethazine	IM	IM	IM	IM	IM	IM is preferred. Do not administer SubQ or intra-arterially as necrotic lesions may occur. IV is not the preferred route, monitor for phlebitis. Administer through a large bore vein (not hand or wrist), preferably a central line. Administer via running I.V. line at port furthest from patient's vein. Instruct patients to report immediately signs of pain or burning	25 mg/50 mL NS to infused over 15 min. IV: Doses 6.25-12.5 mg must be diluted into 10 mL NS (normal saline) to administer over at least 5 minutes. Doses greater than 12.5 mg must be diluted into 50 mL NS IVPB by Pharmacy	DO NOT ADMINISTER VIA IV PUSH IM: Preferred route of administration
	IVPB	IVPB	IVPB	IVPB	IVPB			
Propofol	[a,†]Push	---	---	---	---	Must be on mech vent for drip and BP	Drip: 1000 mg/100 mL	10 mg/mL

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Drug Name	ACCU ED PACU	L&D	POST-PARTUM	2500 UNIT	MED/ SURG	COMMENTS	IVPB/Drip STANDARD CONCENTRATIONS / RATE OF ADMINISTRATION	IV Push/IM STANDARD CONCENTRATIONS / RATE OF ADMINISTRATION
*See Appendix 2 for titration protocol	Drip					monitoring [a]In non intubated patients, for the purpose of rapid sequence intubation, the nurse can administer propofol IV push under the direct supervision of the physcian performing the intubation		Max Rate for induction: 40 mg/10 seconds
Propranolol	Push	---	---	Push	---		Up to 10 mg in 50 mL NS over 30 min	Undiluted; Rate: 1 mg/min
	IVPB	---	---	IVPB	---			
Protamine Sulfate	Push	Push	Push	Push	Push		-----	Over 10 min; max 50 mg; may be given undiluted or diluted with D5W or NS
Prothrombin Complex Concentrate/ 4-factor PCC (Kcentra)	Push	Push	Push	Push	---	Do NOT introduce other medications or blood products in the same IV line. ONLY indicated in reversal of urgent warfarin-associated acute major bleeding. Reduce infusion rate or interrupt infusion if patient's	Max rate: 8.4 mL/min (~ 210 units/minute)	Max rate: 8.4 mL/min (~ 210 units/minute)
	Drip	Drip	Drip	Drip	---			
Rasburicase	Drip	---	---	Drip	Drip	Inpatient: restricted to attending physicians	Mix in NS 50mL; Infuse over 30 minute	-----
Remifentanil	---	---	---	---	---	OR only	-----	-----
Rifampin	IVPB	IVPB	IVPB	IVPB	IVPB		300 mg/100 mL NS; 600 mg/100 mL NS over 1 hour	-----
Risperidone	IM Only	IM Only	IM Only	IM Only	IM Only		-----	-----
riTUXimab	IVPB	---	---	IVPB	IVPB		Final conc 1 mg/mL start at IV rate at 50 mg/hr increase rate by 50 mg/hr every 30 min until reach max	-----
Rocuronium *See Appendix 2 for	Push	---	---	---	---	Mech vent required; sedation required	500 mg/100 mL NS	Undiluted over 30 seconds
	Drip							
Romiplostim	SubQ	SubQ	SubQ	SubQ	SubQ	Restrict to hematology	-----	Reconstitute with only preservative free SWFI (add 0.72 mL to 250 mcg vial or 1.2 mL to 500 mcg vial

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Drug Name	ACCU ED PACU	L&D	POST-PARTUM	2500 UNIT	MED/ SURG	COMMENTS	IVPB/Drip STANDARD CONCENTRATIONS / RATE OF ADMINISTRATION	IV Push/IM STANDARD CONCENTRATIONS / RATE OF ADMINISTRATION
Ropivacaine	Epidural/Peripheral nerve block**					Rate is adjusted by Anesthesiologists	200 mg/100 mL (0.2% solution)** Peripheral nerve block: On-Q Pump Infusion @ 2 - 14 mL/hr	
Secretin	Push	Push	Push	Push	Push		-------	Undiluted over 1 min
Selenium	TPN	TPN	TPN	TPN	TPN	Component in TPN	-------	-------
Sodium Bicarbonate	Push	Push	Push	Push	Push	Caution – addition in NS will result in hypertonic solution	150 mEq in 850 mL D5W	50 mEq/50 mL – Rapid Push
	IVPB	IVPB	IVPB	IVPB	IVPB			
	Drip	Drip	Drip	Drip	Drip			
Sodium Chloride, Hypertonic saline (HTS) (Greater than 0.9% Sodium Chloride)	Push	---	---	---	---	Hypertonic Saline is defined as any concentration greater than 0.9% Sodium Chloride; HTS should be reserved for severe symptomatic hyponatremia or Refractory	Rate varies depending on indication and clinical status. Max peripheral infusion concentration 2.6% (900mOsm/L)	23.4% Sodium Chloride IVP 30 mL over 2-20 minutes via central line for refractory ICP elevation to be administered by physician only.
	IVPB			IVPB	IVPB			
Sodium Ferric Gluconate	IVPB	IVPB	IVPB	IVPB	IVPB		125 mg/100 mL NS over 1 hour	Slow IV Injection at a rate up to 12.5 mg/min
Sodium Phosphate	IVPB	IVPB	IVPB	IVPB	IVPB		Drip varies as ordered: 30 mmol/250 mL NS rate 5 mmol/hr	DO NOT Administer IV push
	Drip	Drip	Drip	Drip	Drip			
Sodium Tetradecyl Sulfate	MISC	MISC	MISC	MISC	MISC	Restricted to Surgery Department for Varicose Vein Treatment	-------	-------
Streptomycin Sulfate	IVPB	IVPB	IVPB	IVPB	IVPB	IM preferred (may be given IV in patients w/ insufficient muscle mass)	Max 1gm/dose – mix in 100 mL NS over 1 hr	-------
Streptozocin	Push	---	---	Push	Push		Mix in 100 mL NS over 30-60 min Mix in 250 mL NS over 6 hrs	
	IVPB			IVPB	IVPB			
Succinylcholine Chloride	Push	---	---	---	---	OK in intubation during Code/RRT	-------	Undiluted; Rate: 10-30 seconds
Sumitriptan Succinate	SubQ	SubQ	SubQ	SubQ	SubQ		-------	-------

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Temsirolimus	IVPB	---	---	IVPB	IVPB	Restricted to Infusion Center Use polyethylene-lined non-DEHP	Mix in 250 mL NS over 30 – 60 minutes	-------
Tenecteplase	Push					Incompatible with D5W; Dextrose-containing lines must be flushed with NS before and after administration		Administer as a single IV bolus over 5 seconds
Terbutaline Sulfate	SubQ Push	SubQ Push	SubQ Push	SubQ Push	SubQ Push	See Extravasation Guidelines when used for management of vasoconstrictor extravasation	-------	IV push: 2.5-5 mcg/min; SubQ: Refer to Extravasation Guidelines for dilution instructions, SubQ undiluted for all other indications
Testosterone Cypionate	IM	IM	IM	IM	IM		-------	-------
Tetracaine HCl	Procedural anesthesia/Spinal anesthesia					Not recommended for IV administration	-------	-------
Thiamine	IVPB Drip Push	IVPB Drip ---	IVPB Drip ---	IVPB Drip ---	IVPB Drip ---	Local injection reactions can be minimized by slow administration. Thiamine should be given prior to IV dextrose containing	100 mg/50 mL NS over 30 min; Drip usually a component in other solutions	Max Rate: 100 mg slow IV push over 5 minutes
Thiopental	Push	---	---	---	---		-------	Over 20-30 seconds
Thyrotropin	---	---	---	---	---	Radiologic Contrast Agent – IM only	-------	-------
Tobramycin	IVPB	IVPB	IVPB	IVPB	IVPB		100 mg/100 mL D5W; 80 mg/100 mL D5W; 5 mg/kg in 100 mL D5W - over 30 min	-------
Topotecan	IVPB	---	---	IVPB	IVPB		100 mL NS over 30 minutes	-------
Trace Metals	Drip	Drip	Drip	Drip	Drip		Usually infused with TPN	-------
Tranexamic Acid	IVPB Push	IVPB	IVPB	IVPB	IVPB	For trauma-associated hemorrhage: Loading dose 1000 mg IV infuse over 10 minutes,	Loading dose IV infuse over 10-30 minutes.	IV push max rate: 100 mg/min
Trastuzumab	IVPB	---	---	IVPB	IVPB		Mix in 250 mL NS over 90 minutes for loading dose; 30 minutes for maintenance dose	------
Triamcinolone acetonide	IM	IM	IM	IM	IM		-------	-------
Trimethoprim/ Sulfamethoxazole	IVPB	IVPB	IVPB	IVPB	IVPB		100 mg-250 mg/250 mL D5W over 90 min; 251-500 mg/500 mL D5W over 2 hrs	------
Valproic Acid	IVPB	---	IVPB	IVPB	IVPB	Pregnancy category D	500 mg/100 mL NS over 1 hr; rate ≤ 20 mg/min	------

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Vancomycin	IVPB	IVPB	IVPB	IVPB	IVPB		500-750 mg/150 mL D5W over 60 min; 1g/200 mL D5W over 60 min; 751-1000/200 mL D5W over 60 min; 1001-1500/300 mL D5W over 90 min; 1501 – 2000 mg/500 mLD5W over 2 hr.	------
Vasopressin **See Appendix 2 for titration protocol*	Drip	---	---	---	---	Maximum infusion rate recommended not to exceed: 0.04 units/min	20 units/100 mL NS	------
Vecuronium Bromide **See Appendix 2 for titration protocol*	Drip	---	---	---	---	Mech vent required for drip	100 mg/100 mL NS 0.8 mcg/kg/min to max of 1.7 mcg/kg/min	Rapid IV Injection with dilution of 1 mg/mL
	Push							
Verapamil	Push	Push	---	---	---	Requires tele	------	Rate: 5-10 mg over 2 min; give over 3 minutes for older patients
vinBLAStine Sulfate	IVPB	---	---	IVPB	IVPB		Mix in 50 mL NS over 10 min	------
vinCRIStine Sulfate	IVPB	---	---	IVPB	IVPB		Mix in 50 mL NS over 10 min	------
Vinorelvine	IVPB	---	---	IVPB	IVPB		Mix in 50 mL NS over 10 min	------
Vitamin B-1 (see thiamine)								
Vitamin B-12 (cyanocobalamin)	IM Only	IM Only	IM Only	IM Only	IM Only		------	------
Vitamin B-6 (pyridoxine)	IM	IM	IM	IM	IM		Mix in 50 mL NS give over 15-30 min	------
	IVPB	IVPB	IVPB	IVPB	IVPB			
Vitamin C (ascorbic acid)	IVPB	IVPB	IVPB	IVPB	IVPB	Also in TPN	Mix in 50 mL NS give over 30 min	------
Vitamins, Multiple	IVPB	IVPB	IVPB	IVPB	IVPB	Also in TPN	Drip varies as ordered; mix in 50 mL NS, give over 15 min	------
	Drip	Drip	Drip	Drip	Drip			
voriconazole	IVPB	IVPB	IVPB	IVPB	IVPB	Restricted to ID	Mix in 100 mL or 250 mL infuse over 2 hours	------
Zidovudine	IVPB	IVPB	IVPB	IVPB	IVPB		200 mg/100 mL D5W over 1 hour	------
Ziprasidone	IM Only	IM Only	IM Only	IM Only	IM Only			------

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Zoledronic Acid	---	---	---	---	---	Chemo Clinic only	Mix in 100 mL NS over 15 min	-----

APPENDIX 2: TITRATION OF CRITICAL MEDICATIONS-ADULT

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Drug Name	Standard Concentration	Loading Dose	Initial Infusion Rate (suggested rate)	Adjust by (suggested rate)	Frequency (suggested time)	Maximum Rate	Titration Parameter	Comments
Vasopressors and Inotropes								
DOBUTamine (Dobutrex)	500 mg/250 mL (2 mg/mL)	---	2.5 mcg/kg/min	---	---	40 mcg/kg/min	Do not titrate. PHYSICIANS to order changes	
DOPamine (Inotropin)	400 mg/ 250 mL (*peripheral*) or 800 mg/ 250 mL (*central*)	---	1 - 5 mcg/kg/min	1 - 4 mcg/kg/min	3-5 min	20 mcg/kg/min	MAP	
EPINEPHrine	2 mg/ 250 mL (*peripheral*) or 4 mg / 250 mL (*central*)	---	0.5 - 1 mcg/min	1 - 5 mcg/min	3-5 min	10 mcg/min	MAP	
Norepinephrine (Levophed)	8 mg/ 250 mL (*peripheral*) or 16 mg/ 250 mL (*central*)	---	0.5 - 1 mcg/min	2 - 10 mcg/min	3-5 min	50 mcg/min	MAP	
Milrinone (Primacor)	20 mg/ 100 mL or 40 mg/ 200 mL	50 mcg/kg over 10 min	0.1 - 0.75 mcg/kg/min	---	---	1 mcg/kg/min	Do not titrate. PHYSICIANS to order changes	-Caution in patients with renal dysfunction - May cause significant hypotension
Phenylephrine (Neo-synephrine)	40 mg/ 250 mL (*peripheral*) or 80 mg / 250 mL (*central*)	---	100 - 180 mcg/min	20 - 40 mcg/min	3-5 min	300 mcg/min	MAP	
Vasopressin (Pitressin)	20 units/ 100 mL (0.2 units/mL)	---	0.01 unit/min	0.01 unit/min	3-5 min	0.04 unit/min	MAP	
Vasodilators								
Nitroglycerin (Tridil)	50 mg/ 250 mL (0.2 mg/mL)	---	5 - 10 mcg/min	5 mcg/min	3-5 min	200 mcg/min.	Chest Pain score hold for SBP	
Nitroprusside (Nipride)	50 mg/ 250 mL (0.2 mg/mL)	---	0.3 - 0.5 mcg/kg/min	0.5 mcg/kg/min	3-5 min	10 mcg/kg/min	SBP	
Ni**CAR**dipine (Cardene)	20 mg/ 200 mL NS (Peripheral) or 40 mg/ 200 mL NS (central)	---	5 mg/hr	2.5 mg/hr	5-15 min	15 mg/hr	HR and/or SBP	
Antiarrhythmics								
Amiodarone (Cordarone)	450 mg/ 250 mL (1.8 mg/mL)	150 mg over 10 min	1 mg/min x 6 hr, then 0.5 mg/min	---	---	---	---	
Dil**TIAZ**em (Cardizem)	125 mg/ 125 mL (1 mg/mL)	0.25 mg/kg over 2 min	5 mg/hr	5 mg/hr	5-10 min	15 mg/hr	HR and/or SBP	
Esmolol (Brevibloc)	2500 mg/ 250 mL (10 mg/mL)	0.5 mg/kg over 1 min	50 mcg/kg/min	50 mcg/kg/min	5-10 min	300 mcg/kg/min	HR and/or SBP	
Labetalol (Normodyne)	300 mg/ 300 mL (1 mg/mL)	20 mg over 2 min	0.5 - 2 mg/min	0.5-2 mg/min	5-10 min	max 300 mg/day max 4 mg/min	HR and/or SBP	
Diuretics								

Bumetanide (Bumex)	10 mg/ 100 mL (0.1 mg/mL)	---	0.5 - 1 mg/hr	0.1 -0.5 mg/hr	0.5-1 hr	5 mg/hr	UOP	
Furosemide (Lasix)	100 mg/ 100 mL (1 mg/mL) 500 mg/50 mL (10 mg/mL)	---	3 - 5 mg/hr	5 mg/hr	0.5-1 hr	40 mg/hr	UOP	

Paralytics

Rocuronium (Zemuron)	200 mg/100 mL (2 mg/mL) 500 mg/ 100 mL (5 mg/mL)	0.5 mg/kg	6 - 10 mcg/kg/min	1 - 5 mcg/kg/min	3 - 5 min	16 mcg/kg/min	Maintain Train of Four (TOF) at 2/4	
Vecuronium (Norcuron)	100 mg/ 100 mL (1 mg/mL)	0.08 - 0.1 mg/kg	0.8 mcg/kg/min	0.2 - 0.3 mcg/kg/min	10 - 15 min	1.7 mcg/kg/min	Maintain Train of Four (TOF) at 2/4	Caution in patients with renal dysfunction
Cisatracurium (Nimbex)	100 mg/ 100 mL (1 mg/mL)	0.1 - 0.2 mg/kg	1 - 3 mcg/kg/min	0.2 - 0.5 mcg/kg/min	5 - 10 min	10 mcg/kg/min	Maintain Train of Four (TOF) at 2/4	

Analgesics

Fenta**NYL** (Sublimaze)	1000 mcg/ 100 mL (10 mcg/mL)	50 - 100 mcg	25 - 75 mcg/hr	25 - 50 mcg/hr	2 - 15 min	450 mcg/hr	CPOT	
Morphine	100 mg/ 100 mL (1 mg/mL)	2 - 5 mg	1 - 3 mg/hr	0.5 - 1.5 mg/hr	5 - 15 min	12 mg/hr	CPOT	Caution in patients with renal dysfunction
Hydromorphone (Dilaudid)	50 mg/ 100mL (0.5 mg/mL)	1 - 3 mg	0.5 - 2 mg/hr	0.5 - 1 mg/hr	5 - 15 min	5 mg/hr	CPOT	

Sedatives

Dexmedetomidine (Precedex)	400 mcg/ 100 mL 200 mcg/ 50 mL (4 mcg/mL)	1 mcg/kg over 10 min	0.4 mcg/kg/hr	0.2 - 0.7 mcg/kg/hr	every 30 min	1.5 mcg/kg/hr	RASS scale	Monitor HR and BP
Ketamine (Ketalar)	100 mg/ 100 mL (1 mg/mL)	0.5 - 2 mg/kg	0.1 - 0.5 mg/min	0.1 - 0.5 mg/min	every 5 - 15 min	0.015 - 0.09 mg/kg/min	RASS scale	Monitor BP
Midazolam (Versed)	100 mg/ 100 mL (1 mg/mL)	2 - 5 mg	1 - 3 mg/hr	0.5 - 2 mg/hr	2 - 15 min	10 mg/hr	RASS scale	
Lorazepam (Ativan)	120 mg/ 60 mL (2 mg/mL)	2 - 4 mg	1 - 3 mg/hr	0.5 - 2 mg/hr	5 - 15 min	10 mg/hr	RASS scale	
Propofol (Diprivan)	1000 mg/ 100 mL (10mg/mL)	---	5 - 10 mcg/kg/min	5 - 10 mcg/kg/min	2 - 15 min	50 mcg/kg/min	RASS scale	Monitor BP

Anticoagulants

Argatroban	250 mg/ 250 ml (1 mg/mL)	---	0.5 - 2 mcg/kg/min based on physician order	0.25 - 0.5 mcg/kg/min based on protocol	every 4 hours until 2 consecutive aPTTs are in therapeutic range	---	aPTT	Caution in patients with hepatic dysfunction. Baseline CBC with platelets, PT/INR, aPTT, LFTs STAT PTT 2 hours after argatroban drip started. Repeat PTT 4 hours after each rate adjustment until PTT is in therapeutic range on 2 consecutive checks. Then monitor PTT QAM
Heparin	25,000 units/250 mL (100 units/mL)	60-80 units/kg ACS: 60 units/kg (**max** 5000 units) DVT/PE: 80 units/kg (**max** 8000 units) Rebolus as needed if ordered by physician	12-18 units/kg/hr based on physician order	100-300 units/hr based on protocol	every 6 hours until 2 consecutive aPTTs are in therapeutic range	ACS: initial **max rate** 1000 units/hr DVT/PE: initial **max rate** 1800 units/hr Then titrate to therapeutic range	aPTT	Baseline CBC with platelets, PT/INR, aPTT STAT PTT 6 hours after heparin drip started. Repeat PTT 6 hours after each rate adjustment until PTT is in therapeutic range on 2 consecutive checks. Then monitor PTT QAM

Labor & Delivery

Oxytoxin	20 units/1000 mL (20 mili-unit/mL)	none	1-2 milli-unit/min	1 - 2 milli-unit/min	every 30 min	20 milli-unit/min (without an order*)	**Adequate uterine activity:** a) 3-5 uterine contractions per 10 minute; Maximum of 5 contractions per 10 minute b) moderate - strong in palpation (or 50-70 mmHg via IUPC); 30-60 second duration. *See department guideline for further instructions	Hazardous agent (NIOSH 2016 [group 3]) Monitor: BP, fluid status, labor/uterine activity, fetal monitoring

Abreviations: min (minute); hr (hour); MAP (mean arterial pressure); SBP (systolic blood pressure); HR (heart rate); UOP (urine output); TOF (train of four); CPOT (critical-care pain observation tool); RASS (Richmond Agitation-Sedation Scale); BP (blood pressure); LFT (liver function test); aPTT (activated partial thromboplastin time); PT (prothrombin time); INR (international normalized ratio); max (maximum); DVT/PE (deep vein thrombosis/pulmonary embolism); QAM (every morning)