

Pharmacologic Pain Therapies

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Drug Name

Generic Name	Brand Name
• Acetaminophen	• Aleve
• Amitriptyline	• Bentyl
• Baclofen	• Capzasin
• Capsaicin	• CeleBREX
• Celecoxib	• Dilaudid
• Dicyclomine	• Elavil
• Gabapentin	• Levsin
• Hydrocodone/Acetaminophen	• Lidoderm
• HYDROmorphone	• Lioresal
• Hyoscyamine	• LMX
• Ibuprofen	• Medrol
• Ketorolac	• Motrin
• Lidocaine ointment	• MS Contin
• Lidocaine patch	• Neurontin
• Menthol-Methyl Salicylate	• OxyCONTIN
• Methylprednisolone	• Salonpas
• Morphine	• Toradol
• Naproxen	• Tylenol
• OxyCODONE	• Ultram
• TiZANidine	• Zanaflex
• TraMADol	

Unit or Delivery System Specific Dosing

- PICU
- NICU
- PCA
- Epidural

Gastrointestinal (GI) Pain:

Hyoscyamine		
Age	PO Dose	Comments
Infants and children < 2 years	ELIXIR (0.125mg/5ml)	
	3.4 – 5 kg: 0.01375 mg (0.55 mL) every 4 hours or PRN	
	5 – 7 kg: 0.0175 mg (0.7 mL) every 4 hours or PRN	
	7-10 kg: 0.02 mg (0.8 mL) every 4 hours or PRN	
	>10kg: 0.0275 mg (1.1 mL) every 4 hours or PRN	
	DROPS (0.125mg/ml)	
	3.4 – 5 kg: 0.01375 mg (4 drops) every 4 hours or PRN	
	5 – 7 kg: 0.0175 mg (5 drops) every 4 hours or PRN	
	7-10 kg: 0.02 mg (6 drops) every 4 hours or PRN	
	>10kg: 0.0275 mg (8 drops) every 4 hours or PRN	
Children 2-12 years	ELIXIR (0.125mg/5ml)	Do not exceed 6 doses in 24 hours
	10 – 20 kg: 0.03125 mg (1.25 mL) every 4 hours or PRN	
	20 – 40 kg: 0.0625 mg (2.5 mL) every 4 hours or PRN	
	40 – 50 kg: 0.09375 mg (3.75 mL) every 4 hours or PRN	
	>50 kg: 0.125 mg (5 mL) every 4 hours or PRN	
	DROPS (0.125mg/ml)	
	All weights: 0.03125 mg (0.25 mL) to 0.125 mg (1 mL) every 4 hours or PRN	
	TABLETS	
All weights: 0.0625 to 0.125 mg every 4 hours or PRN		
Children > 12 years	ELIXIR (0.125mg/5ml):	
	0.125 mg (5 mL) to 0.25 mg (10 mL) every 4 hours or PRN	
	DROPS (0.125mg/ml)	
	0.125 mg (1 mL) to 0.25 mg (2 mL) every 4 hours or PRN	
	TABLETS	
	0.125 to 0.25 mg every 4 hours or PRN	
	EXTENDED RELEASE TABLETS	
0.375 mg to 0.75 mg every 12 hours or 0.375 mg every 8 hours	Max 1.5 mg/day	

Dicyclomine

Age	PO Dose	Comments
Children 6 months to 2 years	5 - 10 mg 3 to 4 times daily or PRN	Discontinue if no improvement after 2 weeks
Children > 2 - 12 years	10 mg 3 to 4 times daily or PRN	
Children > 12 years	10 - 20 mg 3 to 4 times daily or PRN	

Muscle Relaxants:

Baclofen		
Age	PO Dose	Comments
Link to NICU specific dosing for baclofen		
Infants ≥4 months and Children <2 years	1 mg to 2.5 mg TID	Start at the lowest dose and slowly titrate to response every 3 to 7 days. Adolescents may require dosing every 6 hours. If scheduled for greater than 2 weeks, must wean to discontinue.
Children 2 to 7 years	2.5 mg TID (max 60 mg/DAY)	
Children 8 to 12 years	5 mg TID (max 60 mg/DAY)	
Adults	5 mg every 8 hours, Increase by 5mg/dose every 3 days to desired effect (max 80mg/DAY)	
TiZANidine		
Age	PO Dose	Comments
Children 2 to <10 years	1 mg at bedtime Titrate dose to effective range of 0.3 to 0.5 mg/kg/DAY divided 3 to 4 times a day. (max 24 mg/DAY)	The tablet and capsule dosage forms are not bioequivalent when administered with food. Discontinuation: gradually decrease dose by 2 to 4 mg daily.
Children ≥10 years and Adolescents	2 mg at bedtime Titrate dose to effective range of 0.3 to 0.5 mg/kg/DAY divided 3 to 4 times a day. (max 24 mg/DAY)	
Adults	2 mg up to 3 times a day, titrate to effect by 2 mg/ dose every 1 to 4 days. (max 36 mg/DAY)	

Non-Opioid Analgesics:

Acetaminophen				
Age	IV Dose	PO Dose	Rectal Dose	Comments
Link to NICU specific dosing for acetaminophen				
Neonates (≥ 32 weeks gestational age to 28 days)	12.5 mg/kg q6h or PRN (max 50 mg/kg/day)	10-15 mg/kg q6h or PRN (32 weeks – Term: max 60 mg/kg/day, Term ≥10 days: max 75 mg/kg/day)		<p>The combination of acetaminophen and ibuprofen administered at the same time has been demonstrated to have additive analgesic activity, is opioid sparing with less side effects and is preferred for certain indications such as post-surgical pain. ***Do not administer Ibuprofen in children less than 6 months.</p> <p>The combination should be administered in a scheduled fashion for a duration not to exceed 5 days then can be changed to an as needed basis.</p> <p>Inpatient doses will be rounded to CCMC Standardized Dosing per policy.</p>
Infants (29 days to 2 years)	15 mg/kg q6h or PRN (max 60 mg/kg/day)	10-15 mg/kg q4-6h or PRN (max 5 doses/24h, 75 mg/kg/day, 4 g/day)	<u>6 to 11 months:</u> 80 mg q6h; max 320 mg/day <u>12 to 36 months:</u> 80 mg q4-6h; max 400 mg/day	
Children > 2-12 years	12.5 mg/kg q4h or PRN 15 mg/kg q6h or PRN (max 750 mg/dose, 75 mg/kg/day, 3.75 g/day)		<u>3-6 years:</u> 120 mg q4-6h; max 600 mg/day <u>6-12 years:</u> 325 mg q4-6h; max 1,625 mg/day	
Adolescents/Adults	<50 kg: 12.5 mg/kg q4h or PRN OR 15 mg/kg q6h or PRN (max 750 mg/dose, 75 mg/kg/day, 3.75 g/day) ≥50 kg: 12.5 mg/kg q4h or PRN OR 15 mg/kg q6h or PRN (max 1,000 mg/dose, 4g/day)	Regular Strength: 650 mg q4-6h or PRN Extra Strength: 1,000 mg q6h or PRN (max 3-4g/day)	<u>12 years and older/adolescents:</u> 650 mg q4-6h Max 3,900 mg/day	

Neuropathic Pain:

Amitriptyline		
Age	PO Dose	Comments
Children and Adolescents	0.1 mg/kg nightly at bedtime May advance over 2 to 3 weeks to 0.5 mg/kg to 2 mg/kg	Recommend obtaining a baseline ECG to monitor for QTc prolongation.
Adults	10-25 mg at bedtime Increase dose based on response by 10 to 25 mg every 2 to 7 days as tolerated. (max dose 200 mg/day)	Recommend obtaining a baseline ECG to monitor for QTc prolongation. Dose may be divided into two daily doses
Gabapentin		
Age	PO Dose	Comments
Link to NICU specific dosing for gabapentin		
Children 3 to <12 years	Initial: 1-5 mg/kg/ (max of 300 mg) QHS Increase frequency of dosing to twice daily, then 3 times a day as tolerated. May increase dose to effect as tolerated. (max dose of 3,600 mg/DAY)	Usual effective dose is 8-35 mg/kg/DAY in 3 divided doses
Children ≥ 12 years /Adolescents and Adults	Initial: 100-300 mg QHS or 1 to 3 times a day Titrate to effect as tolerated. (max dose of 3,600 mg/DAY)	Usual dose is 1,200 mg to 3,600 mg /DAY in 3 divided doses.

Non-Steroidal Anti-Inflammatory Agents:

Ibuprofen			
Age	IV Dose	PO Dose	Comments
Infants ≥ 6 months/children <12 years	10mg/kg q4-6 h or PRN max 400 mg/dose or 2,400 mg/DAY	4-10 mg/kg q6-8h or PRN max 400 mg/dose, 40 mg/kg/DAY	<p>The combination of acetaminophen and ibuprofen administered at the same time has been demonstrated to have additive analgesic activity, is opioid sparing with less side effects and is preferred for certain indications such as post-surgical pain. The combination should be administered in a scheduled fashion for a duration not to exceed 5 days then can be changed to an as needed basis. ***Do not administer Ibuprofen in children less than 6 months.</p> <p>Inpatient doses will be rounded to CCMC Standardized Dosing per policy.</p>
Children 12-17 years	400 mg q4-6h or PRN max 2,400 mg/DAY		
Adolescents/Adults	400 to 800 mg q6h or PRN max 3,200 mg/DAY	200 to 800 mg given 3- 4 times a day or PRN Usual dose is 400 mg (1,200 mg daily) max 3,200 mg/DAY	
Naproxen			
Age	IV Dose	PO Dose	Comments
Children/Adolescents <60 kg	N/A	5-6 mg/kg q12h or PRN max 1,000 mg/DAY	200 mg of naproxen base is equivalent to 220 mg naproxen sodium
Children/Adolescents ≥60 kg		250 mg to 375 mg q12h or PRN max 1,000 mg/DAY	
Adults		500 mg q12h or 250 mg q6-8h max 1,000 mg/DAY	
Ketorolac			
Age	IV Dose	PO Dose	Comments
Link to NICU specific dosing for Ketorolac			
Full-term Neonates (PNA >14 days)	0.5 mg/kg q6-8h	N/A	Max of 48 to 72 hours treatment
Infants and Children <2 years			

Children and Adolescents ≥ 2 years to < 16 years Or Adolescents ≥ 16 years but < 50 kg	0.5 mg/kg q6h max 30 mg/dose	1 mg/kg as a single dose	Usual duration 48 to 72 hours, MAX of 5 days or 20 doses
Adolescents/Adults ≥ 17 years and ≥ 50 kg	30 mg q6h	20 mg, then 10 mg q4-6h or PRN	MAX of 5 days or 20 doses

Celecoxib

Age	IV Dose	PO Dose	Comments
Children ≥ 2 years and Adolescents	N/A	≥ 10 kg to ≤ 25 kg: 50 mg bid or PRN	Capsules may be swallowed whole or contents opened up and mixed in a spoonful of applesauce
		> 25 kg: 100 mg bid or PRN	
Adults		400 mg initially, then 200 mg bid or PRN	

Opioids: Limit discharge prescription duration: Emergency or Urgent Care - 3 days, Ambulatory service - 3 days, and Inpatient service - 7 days.

TraMADol			
Age	IV Dose	PO Dose	Comments
Children 12 to 17 years (Contraindicated in children < 12 years, and post tonsillectomy/adenoidectomy)	N/A	1-2 mg/kg q4 to 6h or PRN (max 100 mg/dose)	
Adolescents > 17 years/Adults	N/A	50 to 100 mg q4 to 6h or PRN (max 400 mg/DAY)	Initiate dosing with 25 mg dosed in the morning and titrate up by 25 mg every 3 days until 25 mg four times a day is reached. As tolerated, dose may then be increased by 50 mg every 3 days.
Morphine			
Age	IV Dose	PO Dose	Comments
Link to NICU specific dosing for Morphine			
Infants < 6 months	0.025 mg/kg/dose every 2 to 4 hrs or PRN	0.08 – 0.1 mg/kg q3-4h or PRN	Start at lower doses, especially for opioid naïve patients.
Children ≥ 6 months and < 50 kg	0.05 – 0.2mg/kg/dose every 2 to 4 hrs or PRN Initial Max Dose: < 1 year: 2mg 1-6 years: 4mg > 6 years: 5mg	0.2 – 0.5 mg/kg q3-4h or PRN	
Children ≥ 6 months and ≥ 50 kg	2 – 5 mg every 2 – 4hrs or PRN	15 – 20 mg q3-4h or PRN	
Link to PICU specific dosing for Morphine			

OxyCODONE

Age	IV Dose	PO Dose	Comments
Infants < 6 months	N/A	0.025 – 0.05 mg/kg/dose every 4 to 6 hrs or PRN	Start at lower doses, especially for opioid naïve patients.
Children ≥6 months and under 50 kg	N/A	0.1 – 0.2mg/kg/dose every 4 to 6 hrs or PRN (Initial Max: 5mg)	
Children ≥ 6 months and ≥ 50 kg	N/A	5 – 10 mg every 4 to 6 hrs or PRN (Initial Max: 10mg)	

HYDROmorphine

Age	IV Dose	PO Dose	Comments
Infants >6 months and >10 kg	0.01 mg/kg q3 to 4h or PRN	0.03 mg/kg q4h or PRN	Dosing recommendations are for initial doses of immediate release dosage forms in opioid naïve patients
Children/Adolescents <50 kg	0.015 mg/kg q3 to 6h or PRN	0.03 to 0.08 mg/kg q3 to 4h or PRN	
Children/Adolescents ≥ 50 kg	0.2 -0.6 mg q2 to 4h or PRN	1-2 mg q3 to 4h or PRN	

[Link to PICU specific dosing for HYDROmorphine](#)

Hydrocodone and Acetaminophen (Hycet)

Indication	Oral Dose	Dosage form	CommentsComments
Link to NICU specific dosing for hydrocodone/acetaminophen			
Child (< 50 kg)	0.1 to 0.2 mg/kg of HYDROCODONE every 4-6 hours	Hycet liquid contains 0.5 mg hydrocodone and ~22 mg acetaminophen per mL	**this product is <u>not preferred</u> . Recommend to use products with single active ingredient to achieve appropriate dose for multimodal pain control
Child (> 50 kg)	5 mg to 10 mg of HYDROCODONE every 4-6 hours		

Steroids:

Methylprednisolone		
Age	PO Dose	Comments
Adolescents and Adults	<p>Day 1: 24 mg on day 1 administered as 8 mg (2 tablets) before breakfast, 4 mg (1 tablet) after lunch, 4 mg (1 tablet) after supper, and 8 mg (2 tablets) at bedtime OR 24 mg (6 tablets) as a single dose or divided into 2 or 3 doses upon initiation (regardless of time of day)</p> <p>Day 2: 20 mg on day 2 administered as 4 mg (1 tablet) before breakfast, 4 mg (1 tablet) after lunch, 4 mg (1 tablet) after supper, and 8 mg (2 tablets) at bedtime</p> <p>Day 3: 16 mg on day 3 administered as 4 mg (1 tablet) before breakfast, 4 mg (1 tablet) after lunch, 4 mg (1 tablet) after supper, and 4 mg (1 tablet) at bedtime</p> <p>Day 4: 12 mg on day 4 administered as 4 mg (1 tablet) before breakfast, 4 mg (1 tablet) after lunch, and 4 mg (1 tablet) at bedtime</p> <p>Day 5: 8 mg on day 5 administered as 4 mg (1 tablet) before breakfast and 4 mg (1 tablet) at bedtime</p> <p>Day 6: 4 mg on day 6 administered as 4 mg (1 tablet) before breakfast</p>	Dose Pack (4 mg tablets)

Topicals:

Lidocaine 5% Ointment

Age	Dose	Comments
Children ≥ 12 years	Apply topically for adequate control of symptoms two to three times a day. Maximum dose: 4.5 mg/kg (2 mg/lb)	Indications- pain near incisions or scars, pain from burns, nerve pain, traumatic injuries such as rib fractures, localized back, neck, abdominal pain, complex regional pain syndrome Contraindications - Known hypersensitivity, 2nd or 3rd degree heart block, severe SA block without a pacemaker, open wound. Avoid contact with the eyes, mucous membranes. Do not use with heating pad.

Lidocaine 5% Patch

Age	Dose	Comments
Age > 6 years	> 20kg: Apply 1 to 2 patches depending on location of pain and size of patient. Apply for 12 hours on and 12 hours off. May cut to size.	Targeted application to block the pain impulse generator Produce analgesia without numbness Please note patch may not be covered by insurance so consider lidocaine ointment instead.

Capsaicin

Age	Dose	Comments
0.025% children ≥ 2 years and 0.05% ≥ 12 years	Apply up to 4 times daily	Indications- Muscle, joint pain, nerve pain Contraindications- Known hypersensitivity to ointment, chili peppers, open wound. Avoid contact with the eyes, mucous membranes. Do not use with heating pad

Menthol and Methyl Salicylate (Salonpas)

Age	Dose	Comments

Age > 12 years	<p>Apply one patch for 12 hours</p> <p>Apply gel up to 4 times daily</p>	<p>Salonpas Pain Relief Patch and Salonpas Arthritis Pain topical patch are not indicated in children</p> <p>Indications- muscle and joint pain Contraindications- open wounds, rash, or damaged skin. Allergic to aspirin or salicylates. Avoid contact with the eyes, mucous membranes. Do not use with heating pad.</p>
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PICU (Comfort B Policy: PI 258)

Recommended continuous infusion dosing for intubated patients

Medication	Age or Weight	Initial Dose Range	Max Maintenance Dose
Dexmedetomidine	Pediatric and Adult	0.2 – 0.5 mcg/kg/hr	1.5 mcg/kg/hr
FentaNYL	Pediatric and Adult	0.5 – 1 mcg/kg/hr (adult 25 – 100 mcg/hr)	2 mcg/kg/hr (max 200 mcg/hr)
HYDROmorphine	Pediatric and Adult	1 – 5 mcg/kg/hr (adult 0.5 – 3 mg/hr)	20 mcg/kg/hr (max 3 mg/hr)
Morphine	Neonates	0.005 – 0.05 mg/kg/hr	0.15 mg/kg/hr
	Infant, Children, and Adult	0.01 – 0.1 mg/kg/hr (adult 2 – 5 mg/hr)	0.3 mg/kg/hr (max 10 mg/hr)
Midazolam	Pediatric and Adult	0.02 - 0.1 mg/kg/hr (adult 1 – 5 mg/hr)	0.25 mg/kg/hr (max 8 mg/hr)

Recommended PRN Dosing

Medication	Age or Weight	Initial Dose Range	Max PRN Dose
FentaNYL	Pediatric	0.5 - 2 mcg/kg/dose	4 mcg/kg/dose
	Adolescent and Adult	25 – 50 mcg/dose	100 mcg/dose
HYDROmorphine	Pediatric	10 - 15 mcg/kg	20 mcg/kg/dose
	Adolescent and Adult	0.2 – 0.6 mg/dose	2 mg/dose
Morphine	Neonates	0.05 - 0.1 mg/kg/dose	0.1 mg/kg/dose
	Infants and Children	0.05 - 0.2 mg/kg/dose	0.2 mg/kg/dose
	Adolescent and Adult	2.5 - 5 mg/dose	10 mg/dose
Midazolam	Neonates	0.05 - 0.1 mg/kg/dose	0.15 mg/kg/dose
	Infant and Children	0.025 - 0.1 mg/kg/dose	0.2 mg/kg/dose

	Adolescent and Adult	0.5 - 5 mg/dose	10 mg/dose
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NICU

Acetaminophen Tylenol

CGA	Oral	Rectal	Comments
≤ 32 wk	10 mg/kg/dose Q6-8h (Max 40 mg/kg/DAY)	20 mg/kg/dose Q12h (Max 40 mg/kg/DAY)	Oral dosage form: 32 mg/mL liquid Rectal dosage form: 120 mg suppositories [round to ¼ (30 mg), ½ (60 mg), ¾ (90 mg) or whole suppository]
33-41 wk	10-15 mg/kg/dose Q6h (Max 60 mg/kg/DAY)	Loading dose: 30 mg/kg Maintenance dose: 15 mg/kg/dose Q8h (Max 60 mg/kg/DAY)	
≥ 42 wk	10-15 mg/kg/dose Q4-6h (Max 75 mg/kg/DAY or 5 doses/DAY)	Loading dose: 30 mg/kg Maintenance dose: 15 mg/kg/dose Q8h (Max 75 mg/kg/DAY or 5 doses/DAY)	

Acetaminophen Ofirmev IV

CGA	IV	Comments
28-31 wk	Loading dose: 20 mg/kg Maintenance dose: 7.5 mg/kg Q6h	IV dosage form: 10 mg/mL *automatic 2 day stop per P&T, may reorder if needed
32-44 wk	Loading dose: 20 mg/kg Maintenance dose: 10 mg/kg Q6h	
> 44 wk	No loading dose recommended Maintenance dose: 15 mg/kg Q6h	

Baclofen

Indication	Dose	Comments
Spasticity/Hypertonia	0.33 mg/kg/dose PO Q8H	Oral dosage form: 5 mg/mL suspension *compounded by CCMC pharmacy

FentaNYL

Indication	Bolus	Continuous Infusion	Intubation dose	Comments
Sedation/ Analgesia	IV: 1-2 mcg/kg/dose slow IV push NASAL: 1.5-2 mcg/kg/dose 5 minutes prior to minor procedure	Starting dose 0.5-1 mcg/kg/hour, titrate up based on response	2 mcg/kg slow IV push	IV dosage forms: 10 mcg/mL standard, 50 mcg/mL fluid restricted

Gabapentin (Neurontin)			
Indication	Dose		Comments
Facilitation of difficult medication wean, adjunct	5 mg/kg/dose PO Q12h, may be titrated to 5 mg/kg/dose PO Q8h (MAX 50 mg/kg/DAY)		*Do not stop abruptly, wean weekly by interval Oral dosage form: 50 mg/mL solution
Hydrocodone and Acetaminophen (Hycet)			
Indication	Oral Dose	Dosage form	Comments
Pain	0.1 - 0.2 mg HYDROCODONE/kg/dose oral every 6-8h prn	Hycet liquid contains 0.5 mg hydrocodone and ~22 mg acetaminophen per mL	**Not preferred due to low acetaminophen content per mL---use oral morphine and acetaminophen to achieve appropriate doses of acetaminophen for multimodal pain control
Ketamine (Ketalar)			
Intermittent Dosing	Continuous Dosing	Comments	
0.5 - 2 mg/kg/dose intravenous Q2h prn (start low and titrate up as needed)	Pain: 0.06 - 0.3 mg/kg/hr (start low and titrate up as needed) Sedation: 0.3 - 2 mg/kg/hr (start low and titrate up as needed)	*Not routinely recommended—only use as last line option when first and second line agents have failed to achieve desired effect. Follow hospital policy (PS 255 ketamine) for appropriate patient usage. IV dosage form: 10 mg/mL (intermittent doses), 2 mg/mL (continuous infusion)	
Ketorolac (Toradol)			
GA	Dose	Exclusion Criteria/ Comments	
28-37 weeks corrected gestational age OR less than 21 days of age	Post op day one: 0.5 mg/kg/dose x 1	Exclusion Criteria: <ul style="list-style-type: none"> • IVH • Significant PDA • Concomitant aspirin therapy • Steroid use in the past 3 days • Renal insufficiency (SCr > 0.6 mg/dL or GFR < 30) and/or UOP < 1 mL/kg/hr in the previous 24 hours • Coagulopathy • Thrombocytopenia • GI bleed or perforation within the past 2 months • Liver disease • Multiple nephrotoxic medications IV dosage form: 10 mg/mL	
> 37 weeks corrected gestational age AND greater than 21 days of age:	Post op day one: 0.5 mg/kg/dose x 1 (may schedule Q6-8h for a total of 36-48 hr if needed) *Discontinue scheduled ketorolac if UOP < 1 mL/kg/hr in previous 6 hours		

Lidocaine 4% (LMX-4)			
Indication	Dose	Topical Dosage form	Comments
Mild Minor Procedures (immunizations, lumbar puncture, or subcutaneous injections)	0.5 – 1 gram (~pea size to ~½ tube to cover site) applied 20-30 minutes prior to procedure then remove and clean site (for LP clean cream off as usual then clean with betadine prior to LP)	lidocaine 4% cream, 5 gram tube	*see Pain Management Needlestick Protocol PS 115
Lorazepam (Ativan)			
Indication	Dose	Dosage Form	Comments
Sedation, Agitation	IV/PO dose: 0.05 - 0.1 mg/kg/dose q4-8h prn (may gradually increase to as high as 0.5 mg/kg/dose in tolerant patients)	IV dosage form: 2 mg/mL Oral dosage form: 2 mg/mL solution	*Best to avoid IV formulation in preterm neonates (contains 2% benzyl alcohol as preservative) **Not routinely recommended—only use as last line option when first and second line agents have failed to achieve desired effect due to risk of poor neurodevelopment with repeated and prolonged use.
Methadone (Dolophine)			
Indication	Dose	Dosage Form	Comments
Pain, Sedation, Weaning narcotics	0.05 - 0.1 mg/kg/dose q6-12h (usual dose – may need to increase as needed in tolerant pts)	IV dosage form: 1 mg/mL Oral dosage form: 1 mg/mL solution	*Usually wean daily to every other day by either 10-20% of total peak daily dose or by interval (Q6 --> Q8 --> Q12h, decrease dose 0.05 mg/kg/dose until ≤ 0.05 mg/kg/dose q12h, then Q24, then d/c). See weaning algorithm in NICU pain sedation weaning guidelines.

Midazolam (Versed)				
Indication	Dose		Dosage Form	Comments
Sedation, Agitation	IV dose: 0.05 – 0.2 mg/kg/dose q4-8h IV continuous infusion: 0.03 – 0.2 mg/kg/hr (start low and titrate; start 0.03 mg/kg/hr in ≤ 32 weeks, start 0.05 mg/kg/hr in > 32 weeks) Intranasal (use only in pts > 1kg and use with MAD device): 0.1 mg/kg intranasal, may repeat x 1 if needed Oral dose: 0.25-0.5 mg/kg/dose Q4-8h		IV dosage form: 1 mg/mL Oral dosage form: 2 mg/mL	**Not routinely recommended—only use as last line option when first and second line agents have failed to achieve desired effect due to risk of poor neurodevelopment with repeated and prolonged use.
Morphine				
Indication	Dose			Comments
Intermittent PRN	IV dose: 0.05-0.1 mg/kg/dose IV q4-8h prn ORAL dose: 0.08 mg/kg/dose oral Q4-6h prn			IV dosage form: 0.5 mg/mL standard infusion, 1 mg/mL fluid restricted infusion and intermittent conc Oral dosage form: 2 mg/mL solution *minimum volume 0.1 mL (0.05 mg) for pump bolus **if pressors infusing in line and not able to bolus off pump use a higher dose and longer interval due to increased line access
Age	Initial bolus	Continuous infusion	PRN bolus	
≤ 7 days of age, regardless of GA	0.05 mg/kg x 1	0.005 - 0.01 mg/kg/hr	0.02 mg/kg/dose PRN Q20 min off pump*	
>7 days of age, regardless of GA	0.1 mg/kg x 1	0.01 - 0.02 mg/kg/hr	0.02 mg/kg/dose PRN Q20 min off pump*	

PCA – Initial Dosing

Morphine

	Continuous Infusion	PCA Dose	Clinician Bolus Every 1 hr prn pain
Naïve (< 60kg)	0.01 - 0.02 mg/kg/hr	0.015 mg/kg	0.1 mg/kg
Naïve (≥ 60kg)	0.5 - 1 mg/hr	0.5 - 1.5 mg	2 - 5 mg

FentaNYL

	Continuous Infusion	PCA Dose	Clinician Bolus Every 1 hr prn pain
Naïve (< 60kg)	0.1 – 0.3 mcg/kg/hr	0.1 - 0.3 mcg/kg	0.3 - 0.5 mcg/kg
Naïve (≥ 60kg)	15 - 25 mcg/hr	15 - 25 mcg	25 - 50 mcg

HYDROmorphine

	Continuous Infusion	PCA Dose	Clinician Bolus Every 1 hr prn pain
Naïve (< 60kg)	1 - 3 mcg/kg/hr	1 - 2 mcg/kg	3 – 5 mcg/kg
Naïve (≥ 60kg)	0.1 - 0.2 mg/hr	0.1-0.2 mg	0.25-0.5 mg

Epidural

Medications	Dose
Bupivacaine	Caudal block: Usual concentration ≤ 0.25% solution with or without epinephrine: 0.5 to 1.3 mL/kg (maximal volume of drug: 20 mL); Not to exceed a suggested maximum dose of 2 mg/kg plain solution, or 3 mg/kg with epinephrine.
	Epidural block (lumbar, thoracic): <u>Infants</u> : Usual concentration ≤ 0.25% with or without epinephrine: 0.7 to 0.75 mL/kg; maximum dose: 2.5 mg/kg; <u>Children</u> : Usual concentration < 0.25% with or without epinephrine: Initial: 0.3 to 0.6 mL/kg (maximal volume of drug: 20 mL); maximum dose: 2.5 mg/kg <u>Adolescents</u> : 0.25% or 0.5% solution: 10 to 20 mL, maximum dose: 2.5 mg/kg
	Epidural, continuous infusion: Loading dose: Usual concentration: 0.25%: 2 to 2.5 mg/kg.

	<p>Infusion:</p> <p>Infants <4 months: 0.2 mg/kg/hour.</p> <p>Infants ≥4 months: 0.25 mg/kg/hour.</p> <p>Children and Adolescents: 0.3 mg/kg/hour; max rate of 14 mL/hr</p> <hr/> <p>Peripheral nerve block: Dose varies with location of block (i.e., procedure), depth of anesthesia, vascularity of tissues, duration of anesthesia, and condition of patient.</p> <p>Infants ≥ 6 months and Children: Usual concentration 0.125% or 0.25% solution with or without epinephrine: For infants <6 months, maximum doses should be reduced by 30% (Coté 2013; Miller 2015). Maximum dose plain solution: 2 mg/kg or 150 mg, whichever is less, or maximum dose with epinephrine: 3 mg/kg or 200 mg of bupivacaine, whichever is less.</p> <p>Adolescents: 0.25% or 0.5% solution with or without epinephrine: maximum daily dose: 400 mg/day</p> <hr/> <p>Local anesthesia:</p> <p>Infants, Children, and Adolescents: Usual concentration 0.25% solution: Infiltrate area local; maximum dose in infants and children: 2.5 mg/kg or 150 mg, whichever is less; maximum dose in adolescents: 175 mg (Coté 2013).</p> <hr/> <p>Spinal anesthesia:</p> <p>Usual concentration: 0.25 or 0.5% solution (isobaric) or 0.75% bupivacaine in 8.25% dextrose solution (hyperbaric): Intrathecal: 0.5 to 1 mg/kg</p>
Ropivacaine	<p>Caudal block: 0.2% (2 mg/mL) solution: 0.5 to 1 mL/kg. Not to exceed a suggested maximum dose of 3 mg/kg/dose.</p> <hr/> <p>Epidural block (eg, lumbar, thoracic): Usual 0.2% (2 mg/mL): 0.7 mL/kg</p> <hr/> <p>Epidural, continuous infusion:</p> <p><u>Infants < 3 months</u>: Bolus: Usual concentration 0.2% (2 mg/mL) solution: 0.5 to 1 mL/kg. In some cases, a more dilute solution (eg, 0.1% [1 mg/mL]) may be required to ensure adequate volume and minimize toxicity. Follow with continuous epidural infusion of 0.2% (2 mg/mL) solution at 0.2 mg/kg/hour</p> <p><u>Infants ≥ 3 months, Children, and Adolescents</u>: Epidural injection: 0.2% (2 mg/mL) solution: Bolus: 0.5 to 1 mL/kg administered over several minutes (eg, 3 to 5 minutes) followed by continuous epidural infusion at 0.3-0.5 mg/kg/hour; max rate of 14 mL/hr</p> <hr/> <p>Peripheral nerve blocks / local anesthesia: Dose varies with location of block (ie, procedure), depth of anesthesia, vascularity of tissues, duration of anesthesia, and patient parameters (eg, age, weight, condition).</p> <p>Single injection: The volume of dose (mL/kg) and concentration of solution are site-specific based upon anatomy and variable among patients and procedure.</p> <p><u>Infants ≥ 6 months, Children, and Adolescents</u>: Not to exceed a suggested maximum dose of 3 mg/kg/dose based on lean body mass; Note: For infants <6 months, dose reductions (eg, by 30%) have been suggested by experts (Coté 2013; Visoiu 2015).</p>

	<p>Continuous peripheral nerve block infusion (CPNB):</p> <p><u>Infants ≥ 6 months, Children, and Adolescents</u>: Initial bolus: 0.2% (2 mg/mL) solution: Dose dependent on nerve catheter location: Commonly reported dose range: ~0.5 to 1.32 mg/kg</p> <p>Continuous peripheral nerve block infusion: 0.2% (2 mg/mL) solution: Reported mean rate range: 0.2 to 0.3 mg/kg/hr; max rate of 10 mL/hr</p>
	<p>Spinal anesthesia:</p> <p><u>Infant, Children, and Adolescents ≤ 17 years</u>: Intrathecal (via LP site; L 3-5): Preservative-free 0.5% (5 mg/mL) isobaric solution: 0.5 mg/kg; maximum dose: 20 mg/dose</p>
Clonidine	<p>Periperal nerve block: 1 mcg/kg (max of 100mcg)</p>
	<p>Continuous peripheral nerve block or epidural infusion: 0.08 - 0.12 mcg/kg/hr</p>