



Pain Management and Dosing Guide Includes:

- Stepwise Approach to Pain Management and Procedural Sedation
- Non-opioid Analgesics, Opioid Prescribing and Equianalgesic Chart, and Opioid Cross-Sensitivities
- Intranasal and Nebulized Medications
- Procedural Sedation and Analgesia (PSA) Medications
- Pain Management, Discharge and Patient Safety Considerations
- Nerve Blocks, Neuropathic and Muscle Relaxer Medications
- Ketamine Indications and Dosing
- Topical and Transdermal Medications
- Nonpharmacologic and other Interventions



[Take a tour of the dosing guide here!](#)

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PANEL A

PANEL B

PANEL C

| Non-Opioid Analgesics* | | |
|--|---|--|
| Generic (Brand) | Adult | Pediatric (<12 yo) |
| Acetaminophen (Tylenol®) | 325-650 mg PO q 4-6 h Max: 4 g/d or 1 g q 4 h | 15 mg/kg PO q 4-6 h Max: 90 mg/kg/d |
| Acetaminophen IV (Ofirmev®) Use only if not tolerating PO | 1 g IV q 6 h Max: 4 g/d or 650 mg q 4 h prn pain | <50 kg 15 mg/kg IV q 6 h or 12.5 mg/kg IV q 4 h prn pain Max: 75 mg/kg/d |
| Celecoxib (Celebrex®) | 100-200 mg PO daily to q 12 h Max: 400 mg/d | >2 yo 50 mg PO BID |
| Ibuprofen (Motrin®) | 400-800 mg PO q 6 to 8 h Max: 3200 mg/d | 10 mg/kg PO q 6 to 8 h Max: 40 mg/kg/d or 2400 mg/d |
| Indomethacin (Indocin®) | 25-50 mg PO q 6 to 12 h Max: 200 mg/d | 1-2 mg/kg PO q 6 to 12 h >6 mo Max: 4 mg/kg/d or 200 mg/d |
| Ketorolac (Toradol®) | 15-30 mg IV/IM q 6 h Max: 120 mg/d x 5 d | 0.5-1 mg/kg/dose IM/IV q 6 h Max: 15-30 mg q 6 h x 5 d |
| Naproxen (Naprosyn®) | 250-500 mg PO q 8 to 12 h Max: 1500 mg/d | 5 mg/kg PO q 12 h Max: 1000 mg/d |
| Meloxicam (Mobic®) | 7.5-15 mg PO daily Max: 15 mg/d | — |

*Doses can be scheduled or PRN pain. Avoid NSAIDs in renal dysfunction, PUD, CHF, and if < 6 mo of age. Use with caution in elderly and those with cardiovascular risks.

| Opioid Prescribing and Equianalgesic Chart | | | | | | | | | |
|--|--|------------------------------|--------------------------------|------------------|--------------------------------------|------------------|---|--------------------------------------|--|
| Generic (Brand) | Onset (O) and Duration (D) | | Approximate Equianalgesic Dose | | Recommended STARTING dose for ADULTS | | Recommended STARTING dose for CHILDREN (> 6 mo) | | |
| | Oral | IV | Oral | IV | Oral | IV | Oral | IV | |
| Morphine (MSIR®) [CII] | O: 30-60 min D: 3-6 h | O: 5-10 min D: 3-6 h | 30 mg | 10 mg | 15-30 mg q 2-4 h | 2-10 mg q 2-4 h | 0.3 mg/kg q 4 h | 0.1 mg/kg q 2-4 h | |
| Morphine extended release (MS Contin®) [CII] | O: 30-90 min D: 8-12 h | — | 30 mg | 10 mg | 15-30 mg q 12 h | — | 0.3-0.6 mg/kg q 12 h | — | |
| Hydromorphone (Dilaudid®) [CII] | O: 15-30 min D: 4-6 h | O: 15 min D: 4-6 h | 7.5 mg | 1.5 mg | 2-4 mg q 4 h | 0.5-2 mg q 2-4 h | 0.06 mg/kg q 4 h | 0.015 mg/kg q 4 h | |
| Hydrocodone/APAP 325 mg (Norco 5, 7.5, 10®) [CII] Hycet (7.5 mg/325 mg per 15 mL) | O: 30-60 min D: 4-6 h | — | 30 mg | — | 5-10 mg q 6 h | — | 0.1-0.2 mg/kg q 4-6 h | — | |
| Fentanyl [CII] (Sublimaze® Duragesic®) Patch for opioid tolerant patients ONLY | Transdermal O: 12-24 h D: 72 h per patch | O: immediate D: 30-60 min | — | 100 mcg (0.1 mg) | Transdermal 12-25 mcg/h q 72 h | 50 mcg q 1-2 h | Transdermal 12-25 mcg/h q 72 h | 1-2 mcg/kg q 1-2 h (max 50 mcg/dose) | |
| Methadone (Dolophine®) [CII] Opioid tolerant patients ONLY | O: 30-60 min D: >8 h (chronic use) | — | Variable | Variable | 5-10 mg q 8-12 h | — | 0.7 mg/kg/d PO/SC/IM/IV divided q 4-6 h prn severe chronic pain | — | |
| Oxycodone 5, 15, 30 mg (Roxicodone®), Oxycodone 5, 7.5, 10 mg/APAP 325 mg (Percocet®), ER-Oxycontin® [CII] | O: 10-15 min D: 4-6 h | — | 20-30 mg | — | 5-10 mg q 6 h ER 10 mg q 12 h | — | 0.05-0.15 mg/kg q 4-6 h | — | |
| Tramadol (Ultram®) [CIV] ^ | O: 1 h D: 3-6 h | — | 300 mg | — | 50-100 mg q 6 h Max: 400 mg/d | — | — | — | |

^ Not recommended in nursing mothers.

| Opioid Cross-Sensitivities |
|--|
| Phenanthrenes (related to morphine): morphine, codeine, oxycodone, hydrocodone, hydromorphone |
| Phenylpiperidines (related to meperidine): meperidine, fentanyl |
| Risk of cross-sensitivity in patients with allergies is greater when medications from the same opioid family are administered. |

| Intranasal* and Nebulized Medications | | | |
|---------------------------------------|---|--|---|
| Generic | Dose | Max Dose | Comments |
| Fentanyl | IN: 1.5-2 mcg/kg q 1-2 h Neb: 1.7-3 mcg/kg | 3 mcg/kg or 100 mcg | Divide dose equally between each nostril |
| Midazolam (5 mg/mL) | IN: 0.3 mg/kg | 10 mg or 1 mL per nostril (total 2 mL) | Divide dose equally between each nostril |
| Ketamine | See Ketamine table | | |
| Lidocaine | Neb: 4% (40 mg/mL) 100-200 mg or 2.5-5 mL | 4.5 mg/kg total or 300 mg | >5 mg/kg associated with serious toxicity |

*Use the MOST concentrated form available with an atomizer.

| Procedural Sedation and Analgesia Medications | | | |
|---|---|---|---|
| Generic (Brand) | Adult | Pediatric | Comments |
| Ketamine (Ketalar®) | IV 0.5-1.0 mg/kg IM 4-5 mg/kg | >3 mo: IV 1-2 mg/kg; additional doses 0.5 mg/kg IV q 10-15 min prn; IM 4-5 mg/kg | Risk of laryngospasm increases with active asthma, upper respiratory infection and procedures involving posterior pharynx; vomiting occurs, commonly consider premedication. Not recommended in patients <3 mo. |
| Midazolam (Versed®) | IV 0.05-0.1 mg/kg IV slow push over 1-2 min | IV 0.05-0.1 mg/kg IN 0.2-0.3 mg/kg (IN max 10 mg) | Initial max dose 2 mg. Max total dose in >60 yo is 0.1 mg/kg Decrease dose by 33-50% when given with opioid |
| Propofol (Diprivan®) | IV 0.5-1 mg/kg slow push (1-2 min); additional doses 0.5 mg/kg | IV 1 mg/kg slow push (1-2 min); additional doses 0.5 mg/kg | Risk of apnea, hypoventilation, respiratory depression, rapid changes in sedative depth, hypotension; provides no analgesia |
| Etomidate (Amidate®) | IV 0.1 - 0.2mg/kg; additional doses 0.05mg/kg | | Risk of myoclonus (premedication w/ benzo or opioid can decrease), pain with injection, nausea and vomiting, risk of adrenal suppression; provides no analgesia |
| Ketamine + Propofol | — | IV ketamine 0.75 mg/kg + propofol 0.75 mg/kg. Additional doses: ketamine 0.5 mg/kg, propofol 0.5-1 mg/kg | See ketamine and propofol comments respectively |
| Dexmedetomidine (Precedex®) | IV 1 mcg/kg loading dose (over 10 min) followed by 0.5 to 2 mcg/kg continuous infusion. Use 0.5 mcg/kg for geriatric patients | IV 0.5-2 mcg/kg loading dose (over 10 min) followed by 0.5 to 2 mcg/kg/h continuous infusion IN 2-3 mcg/kg | Risk of bradycardia, hypotension, especially with loading dose or rapid infusions, apnea, bronchospasm, respiratory depression |
| Nitrous oxide | — | 50% N2O/50% O2 inhaled | Do not use if acute asthma exacerbation, suspected pneumothorax/other trapped air or head injury with altered level of consciousness |
| Morphine | IV 0.05-0.1 mg/kg or 5-10 mg | IV 0.1-0.2 mg/kg, titrated to effect | Monitor mental status, hemodynamics, and histamine release. Requires longer recovery time than fentanyl. Difficult to titrate during procedural sedation due to slower onset and longer duration of action. Reduce dosing when combined with benzodiazepines (combination increases risk of respiratory compromise) |
| Fentanyl | IV 0.5-1 mcg/kg | 1-3 yo: 2 mcg/kg; 3-12 yo: 1-2 mcg/kg | 100 times more potent than morphine; Rapid bolus infusion may lead to chest wall rigidity. Reduce dosing when combined with benzodiazepines and in elderly. Preferred agent due to rapid onset and short duration. |

Pain Management Considerations

- Type of pain: nociceptive, neuropathic, inflammatory
- Acute vs. chronic vs. acute on chronic pain exacerbation
- Pain medication history: OTC, Rx and PDMP
- Patient factors: genetics, culture, age, comorbidities, past pain experiences and mental health
- Pharmacologic Interventions: systemic, topical, transdermal, nerve block
- Dose based on ideal body weight
- Nonpharmacologic Interventions
- Refer to pain, palliative or other specialists for advanced treatment

Reassessment

- Reassess pain and monitor for medication efficacy and side effects
- Use scale that is age and cognitively appropriate
- If no improvement, adjust regimen

Discharge Planning & Patient Safety

- Assess and counsel regarding falls, driving, work safety, and medication interactions
- Bowel regimen for opioid induced constipation
- Vital signs and oral intake before discharge
- Document all pain medications administered and response at time of disposition
- Consider OTC and nonpharmacologic options
- Can patient implement pain management plan?
- insurance coverage, transportation, etc.

For more information on Discharge Planning, please visit <http://pami.emergency.med.jax.ufl.edu/resources/discharge-planning/>

NERVE BLOCKS

| Type of Block | General Distribution of Anesthesia |
|------------------------------|--|
| Interscalene Plexus Block | Shoulder, upper arm, elbow and forearm |
| Supraclavicular Plexus Block | Upper arm, elbow, wrist and hand |
| Infraclavicular Plexus Block | Upper arm, elbow, wrist and hand |
| Axillary Plexus Block | Forearm, wrist and hand. Elbow if including musculocutaneous nerve |
| Median Nerve Block | Hand and Forearm |
| Radial Nerve Block | Hand and Forearm |
| Ulnar Nerve Block | Hand and Forearm |
| Femoral Nerve Block | Anterior thigh, femur, knee and skin over the medial aspect below the knee |
| Popliteal Nerve Block | Foot and ankle and skin over the posterior lateral portion, distal to the knee |
| Tibial Block | Foot and ankle |
| Deep Peroneal Block | Foot |
| Saphenous Nerve Block | Foot |
| Sural Nerve Block | Foot |

| Local Anesthetics [†] | Onset | Duration without Epi (h) | Duration with Epi (h) | Max Dose without Epi, mg/kg | Max Dose with Epi, mg/kg |
|--------------------------------|--------|--------------------------|-----------------------|-----------------------------|--------------------------|
| Lidocaine (1%) | Rapid | 0.5-2 | 1-6 | 4.5 (300 mg) | 7 (500 mg) |
| Bupivacaine (0.5%)* | Slow | 2-4 | 4-8 | 2.5 | 3 |
| Mepivacaine (1.5%) | Rapid | 2-3 | 2-6 | 5 | 7 |
| 2-Chloroprocaine (3%) | Rapid | 0.5-1 | 1.5-2 | 10 | 15 |
| Ropivacaine (0.5%) | Medium | 3 | 6 | 2-3 | 2-3 |

*Most cardiotoxic †1% = 10mg/ml, 0.5% = 5mg/ml

Neuropathic Pain Medications

| Generic (Brand) | Beginning dose | Max dose |
|---|-------------------------------------|-----------------------|
| Gabapentin* (Neurontin®) | 300 mg PO QHS to TID | 3600 mg/d |
| Pregabalin* (Lyrica®) | 50 mg PO TID | 300 mg/d** |
| SNRIs: Duloxetine (Cymbalta®) Venlafaxine ER (Effexor XR®) | 30 mg PO daily† 37.5 mg PO daily | 60 mg/d** 225 mg/d |
| TCAs: Amitriptyline (Elavil®) Nortriptyline (Pamelor®) | 25 mg PO QHS 25 mg PO QHS | 200 mg/d 150 mg/d |

†30 mg daily for at least 7 days to decrease nausea

*Requires dose adjustment based on renal function **Varies depending on indication

Muscle Relaxer Pain Medications

| Generic (Brand) | Beginning dose | Max dose |
|-----------------------------|--|--|
| Baclofen (Lioresal®) | 5 mg PO TID | 80 mg/d |
| Cyclobenzaprine (Flexeril®) | 5 mg PO TID | 30 mg/d |
| Methocarbamol (Robaxin®) | 1-1.5 g PO TID to 4x/day x 48-72 h, then 500-750 mg PO TID to 4x/day | 8 g/d |
| Diazepam (Valium®) | Adult: 2-10 mg PO q 6-8 h; 5-10 mg IV/IM Ped: (6-12yo): 0.12-0.8 mg/kg/day PO divided q 6-8 h; 0.04-0.2 mg/kg IV/IM q 2-4 h | Peds: 0.6 mg/kg/8h IV/IM to adult max |

Ketamine (Ketalar®) Indications and Dosing

| Indications | Starting Dose |
|---|--|
| Procedural Sedation | IV: Adult 0.5-1.0 mg/kg; Ped 1-2mg/kg; IM: 4-5 mg/kg |
| Sub-dissociative Analgesia [^] | IV: 0.1 to 0.3 mg/kg; IM: 0.5-1.0 mg/kg; *IN: 0.5-1.0 mg/kg |
| Excited Delirium Syndrome | IV: 1 mg/kg; IM: 4-5 mg/kg |

[^]Consider in opioid tolerant patients or those with contraindications to opioids. Contraindications: Acute schizophrenia, pregnancy. Administer IV over 10-15 minutes to minimize side effects.

*Dosing ranges not well established.

Topical and Transdermal Medications*

| Generic (Brand) | Indications | Onset (O) and Duration (D) | Recommended STARTING dose for ADULTS | Recommended STARTING dose for CHILDREN | Maximum Dose |
|--|---|-------------------------------------|---|--|---|
| Diclofenac sodium 1.5%, 2% w/w topical solution (Pennsaid) 1% gel (Voltaren gel) | Osteoarthritis | Variable | 1.5% soln: 40 drops QID 2% soln: 2 pumps (40mg) BID to affected knee 1% gel: 2 g for upper ext. or 4 g for lower ext. QID | — | 1.5% soln: 40 drops QID 2% soln: 2 pumps (40mg) BID 1% gel (2g): 8 g/d to single joint of upper extremity; 1% (4g): 16 g/d to single joint of lower extremity |
| Diclofenac epolamine 1.3% patch (Flector patch) | Acute pain from sprains, strains, contusion | Variable | 1 patch (180 mg) BID | — | 1 patch BID |
| Lidocaine 5% patch (Lidoderm patch) | Postherpetic neuralgia | Variable | 1-3 patches applied once daily, remove after 12 h | — | 3 patches in a 12 h period per day |
| Fentanyl (Duragesic®) | Persistent moderate to severe chronic pain in opioid tolerant patients | O: 12-24 h D: 72 h per patch | 12-25 mcg/h q 72 h | | Variable |
| Capsaicin cream (Theragen®, Zostrix®, Salonpas) Exists as several OTC formulations in combination with camphor and menthol | Strains, sprains, backache or arthritis | Variable | Apply a thin layer to the affected area and gently massage up to QID | >12 yo: Apply a thin layer to the affected area and gently massage up to QID | Up to QID |
| Lidocaine 4% (L.M.X.4®) | Minor cuts, scrapes, burns, sunburn, insect bites, and minor skin irritations | O: 20-30 min D: 60 min | Apply externally | | Externally 3-4 times per day. Apply in area less than 100cm ² for children less than 10kg. Apply in area less than 600cm ² for children between 10 and 20kg |
| LET (Lidocaine Epinephrine Tetracaine) (gel or liquid) | Wound repair (non-mucosal) | O: 10 min D: 30-60 min | Topical 4% Lidocaine, 1:2,000 Epinephrine, 0.5% Tetracaine | | 3 mL (not to exceed maximal Lidocaine dosage of 3-5 mg/kg) |
| EMLA (2.5% Lidocaine 2.5% Prilocaine) Cover with occlusive dressing Maximum application time 4 hours | Dermal analgesic (intact skin) | O: 60 min D: 3-4 h | 20 gm | 3-12 mo (>5 kg): 2 gm 1-6 yo (>10kg): 10 gm 7-12 yo (>20kg): 20 gm | 3-12 mo max area 20cm ² 1-6 yo max area 100cm ² 7-12 yo max area 200cm ² |
| Pain-Ease® Vapocoolant/Skin Refrigerant | Cooling intact skin and mucus membranes and minor open wounds | O: immediate D: few sec to 1 min | — | Spray for 4-10 sec from distance of 8-18 cm. Not recommended for < 3 yo | Stop when skin turns white to avoid frostbite |
| Lidocaine | Foley catheter and nasogastric tube insertion; intubation; nasal packing; gingivostomatitis | O: 2-5 min D: 30-60 min | 2% topical gel/jelly, 5% topical ointment, 2% oropharyngeal viscous topical solution | | 3-5 mg/kg |

*Dosages are guidelines to avoid systemic toxicity in patients with normal intact skin and with normal renal and hepatic function

Nonpharmacologic Interventions (pediatric and adult)*

| Physical (Sensory) Interventions | Cognitive-Behavioral Interventions |
|----------------------------------|--|
| Comfort positioning | Psychological preparation, education, or coaching |
| Cutaneous stimulation | Distraction tools: movies, games, videos, apps, toys with light/sound, bubbles |
| Nonnutritive sucking | Relaxation techniques (breathing, meditation, etc.) |
| Pacifier +/- sucrose solution | Music and singing |
| Pressure, massage | Guided imagery |
| Hot or Cold treatments | Conversation and therapeutic language |

*Used alone or in conjunction with pharmacologic interventions. Intervention based on age, developmental stage, setting and situation

Other Interventions

| |
|------------------------------|
| Lidocaine IV for renal colic |
| Acupuncture |
| Trigger Point Injections |



For more information on nonpharmacologic interventions or to download a distraction toolkit, visit

<http://pami.emergency.med.jax.ufl.edu/resources/new-approaches-to-pain-course/>

or scan the QR code

Educational Pain Videos

| | | | |
|---|---|--|---|
| Additional Therapies to help Manage Pain https://goo.gl/Sd8siS | Preventing and Relieving Back Pain https://goo.gl/DxLfYA | Ways to Manage Chronic Pain https://goo.gl/KoVUFx | Pain Medication Safety https://goo.gl/M9NCJh |
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Send your feedback on all PAMI materials and how you improved patient safety and clinical care to emresearch@jax.ufl.edu or 904-244-4986.

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