

Topical and Transdermal Medications*

Class	Formulations (Generic & OTC)	Indications	Recommended Dosing
Counterirritants & Rubefacients (cream, lotion, gel, ointment, spray, & patch)	Numerous OTC formulations & varying combinations of camphor, salicylates, and/or menthol (Ex. BENGAY®, Biofreeze®)	Musculoskeletal pain: strains, sprains, backache	Generally, > 12 yo: Apply thin layer to affected area and massage up to QID Check labeling for age cutoff
	Salonpas® Patch (Methyl salicylate + menthol)		Q 8-12 h Max 2 patches/ day X 3 consecutive days
Capsaicin <1% (alone or in combination with other products)	Available as multiple OTC formulations +/- camphor or menthol (Ex. Theragen®, Zostrix®, Tiger Balm®)	Musculoskeletal pain: strains, sprains, backache Arthritis Post-herpetic neuralgia Peripheral neuropathy	TID - QID scheduled Continued use is recommended for optimal pain relief
NSAIDs: Diclofenac Combining topical and oral NSAIDs not recommended	Pennsaid** 1.5% solution 2% solution pump	Osteoarthritis	*Pediatric dosing unavailable for Pennsaid 1.5%: 40 drops QID 2 pumps (40 mg) BID to affected knee/joint
	Voltaren 1% gel (OTC- 2 g=2.25 in, see package dosing card)	Osteoarthritis	2 g upper extremity QID (max 8 g/day) 4 g lower extremity QID (max 16 g/day) 32 g/day max all joints
	Flector® 1.3% patch	Acute pain: sprains, strains, contusions	1 patch (180 mg) BID (to most painful area; ≥ 6yo)
Lidocaine (Available formulations influx due to supply chain issues)	5% patch (Lidoderm®)	Post-herpetic neuralgia	Adults: q 12 h; max 3 patches at one time
	4% patch (+/- menthol, OTC)	Musculoskeletal pain	Adults and children ≥ 12 yo: q 12 h
	4% lotion, spray, etc. (OTC)	Burns, cuts, insect bites	≥ 2 years: TID - QID
	4% L.M.X.4® cream (OTC) Onset 30 min; Duration 60 min	Burns, cuts, insect bites, venipuncture, LP, abscess I & D	≥ 2 years, up to 4 times per day. Apply in area <100 cm² if < 10 kg; < 600 cm² for 10-20 kg
	2% gel/jelly 5% ointment	Catheter/NG tube insertion; stomatitis	—
J-Tip™ with buffered lidocaine (https://jtip.com/)	IV starts: Onset 1-3 min	—	
Lidocaine combinations (use gloves, EMLA-cover with occlusive dressing, LET-cover with cotton ball & tape)	EMLA® (2.5% Lidocaine 2.5% Prilocaine); Onset 60 min; Duration 3-4 h; Max appl. = 1 h if <3mo/5 kg; otherwise 4 h	Dermal analgesic of intact skin (abscess I & D, LP, etc.)	< 3 mo (< 5 kg): up to 1 g on 10 cm² area; 3-12 mo (> 5 kg): up to 2 g on 20 cm²; 1-6 yo (> 10 kg): up tp 10 g on 100 cm²; 7 yo - adult (> 20 kg): up to 20 g on 200 cm²
	LET (4% Lidocaine, 1:2,000 Epinephrine, 0.5% Tetracaine) gel or liquid; Onset 10 min; Duration 30-60 min	Wound repair (non-mucosal)	3 mL (not to exceed maximal lidocaine dosage of 3-5 mg/kg)
Vapocoolant	Pain-Ease®	Cooling intact skin, mucus membranes and minor open wounds	Spray 4-10 sec from distance of 8-18 cm. Stop when skin turns white. Use with caution in children < 4 yo

*Dosages are guidelines to avoid systemic toxicity in patients with normal intact skin and with normal renal and hepatic function. Use gloves to apply and/or wash hands after application. Use with caution in children and older adults with thin skin.

Patient Resources

Patient Education & Activity Book



Educational Brochures, Videos, OTC Topical & Oral Medications



Pediatric Pain & Fever Dosing Guide (Liquid)

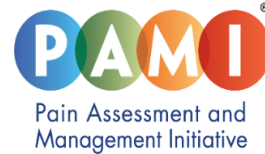


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<https://pami.emergency.med.jax.ufl.edu/>

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Pain Management & Dosing Guide™



Advancing innovation and safety in pain education, patient care and research

*See disclaimer. Dosages and opioid conversions cannot account for differences in genetics and pharmacokinetics. Common available formulations included.

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Opioid Prescribing and Equianalgesic Chart (based upon 2019 ASHP recommendations*)

Weight risk/benefit in special populations (older adults, renal/hepatic impairment, pregnancy, and lactation)

Generic (Brand) All CII except Tramadol	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
Fentanyl (Sublimaze®)	—	O: <1 min D: 30-60 min	—	150 mcg (0.15 mg)	—	50 mcg q 1-2 h	—	1-2 mcg/kg q 1-2 h (max 50 mcg/dose)
Fentanyl Patch (Duragesic®) (12, 25, 50, 75, 100 mcg)	Transdermal patch O: 12-24 h; D: 72 h		Transdermal patch 12.5 mcg		Do not use in opioid naive pt.		Do not use in opioid naive pt.	
Hydrocodone/APAP 325 mg (5, 7.5, 10 mg tablets) (7.5 mg/325 mg per 15 mL)	O: 30-60 min D: 4-6 h	—	25 mg	—	5-10 mg q 4-6 h	—	≥ 2 yo: 0.1-0.15 mg/kg Hydrocodone q 4-6 h	—
Hydromorphone (Dilaudid®) (2, 4, 8 mg tablets)	O: 30 min D: 3-4 h	O: 5 min D: 3-4 h	5 mg	2 mg	2-4 mg q 4-6 h	0.2-1 mg q 2-3 h	0.06 mg/kg q 4-6 h	0.015 mg/kg q 2-4 h
Methadone (Dolophine®) (5, 10 mg tablets, 5 mg/5 mL)	O: 30-60 min D: 6-8 h	O: 10-20 min	Variable	Variable	2.5 mg q 8-12 h	—	0.7 mg/kg/day PO/SC/IM/IV Divided q 4-6 h prn	—
Morphine (MSIR®) (15, 30 mg, 10 mg/5 mL)	O: 30-60 min D: 3-5 h	O: 5-10 min D: 3-5 h	25 mg	10 mg	5-10 mg q 4-6 h	2-4 mg q 2-4 h	0.3 mg/kg q 4 h	0.1 mg/kg q 2-4 h
Morphine ER (MScContin®) (15, 30, 60, 100 mg)	O: 2 h D: 8-24 h	—	25 mg	—	[^] Dosed q 8 or q 12 h	—	—	—
Oxycodone (5, 10, 15, 20, 30 mg tablets) Oxycodone/ 325 APAP (Percocet®) (5, 7.5, 10 mg)	O: 10-15 min D: 3-6 h	—	20 mg	—	5-10 mg q 4-6 h	—	0.05-0.15 mg/kg q 4-6 h	—
Oxycodone (Xtampza ER®) (9, 13.5, 18, 27, 36 mg caps) (Oxycontin®) (10, 20, 40, 60, 80 mg)	O: 1 h D: < 12 h	—	20 mg	—	[^] Dosed q 12 h	—	Xtampza ER® not approved for <18 yo	—
Tapentadol (Nucynta®) (50, 75, 100 mg)	O: 30 min D: 4-6 h	—	100 mg	—	50-100 mg q 4-6 h	—	—	—
Tramadol (CIV) (50, 100 mg)	O: 1 h D: 3-6 h	—	120 mg	—	50-100 mg q 6 h	—	—	—

Note: For Buprenorphine, refer to current national guidelines or your local pain specialty service.

[^]Dosing for extended release (ER) products individualized based on short acting MME.

†Do not exceed adult dosage when calculating pediatric medications in dose per kg.

Non-opioid Analgesics*†

Generic (Brand)	Adult	Pediatric (<12 yo)
Acetaminophen (Tylenol®)	325-650 mg PO q 4-6 h. Max: 4 g/day	15 mg/kg PO q 4-6 h. Max: 75 mg/kg/day
Acetaminophen IV <i>Use only if not tolerating PO</i>	1 g IV q 6 h prn pain or 650 mg q 4 h Max: 4 g/day	<50 kg: 15 mg/kg IV q 6 h or 12.5 mg/kg IV q 4 h Max: 75 mg/kg/day
Celecoxib (Celebrex®)	100-200 mg PO daily to q 12 h. Max: 400 mg/day	≥ 2 yo to adult 10-25 kg: 50 mg PO BID; > 25 kg: 100 mg BID
Diclofenac	50-75 mg PO q 8-12h; 50 mg packet in 30-60 mL H ₂ O	—
Ibuprofen (Motrin®)	400-800 mg PO q 6 to 8 h. Max: 3200 mg/day	10 mg/kg PO q 6 to 8 h. Max: 40 mg/kg/day or 2400 mg/day
Ketorolac (Toradol®)	15 mg IV or 15-30 mg IM q 6 h Max: 120 mg/day x 5 day	0.5 mg/kg IV/IM q 6 h up to 72 h Max: 30 mg/dose IM, 15 mg/dose IV
Meloxicam (Mobic®)	30mg IV daily; 7.5-15 mg PO daily	≥ 2 yo 0.125 mg/kg/dose. NTE adult dose
Naproxen (Naprosyn®)	250-500 mg PO q 12 h	≥ 2 yo 5-7 mg/kg/dose q 8 - 12 h Max: 1000 mg/day

*Avoid NSAIDs in renal/hepatic impairment, PUD, CHF, < 6 mo of age, >20 wks pregnant. Use with caution in age > 65 yo, and those with cardiovascular risks. Give with food. For pediatrics, do not exceed adult dosage.

†Lidocaine for renal colic† 1.5 mg/kg IV in 100 mL NS over 10-15 min. Max 200 mg

†Cardiac monitoring preferred. Contraindications: Pregnancy, cardiac arrhythmias, CAD, age > 65 yo, hepatic/renal failure, epilepsy, amide allergy.

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 increases when medications from the same opioid family are administered.
†Itchy, nausea, vomiting are not opioid allergies.

Procedural Sedation and Analgesia Medications			
Generic (Brand)	Adult	Pediatric	Comments
Dexmedetomidine (Precedex®)	IV 1 mcg/kg loading dose (over 10 min) followed by 0.5 to 2 mcg/kg/h 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
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.
Fentanyl	IV 0.5-1 mcg/kg (slow push)	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.
Ketamine (Ketalar®)	IV 0.5-1 mg/kg (slow push) 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	Small risk of laryngospasm increases with active asthma, URI and procedures involving posterior pharynx. Vomiting is common, consider pre-treatment with anti-emetic. Not recommended in patients <3 mo.
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. Recommend against mixing propofol + ketamine in the same syringe.
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.
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).
Propofol (Diprivan®)*	IV 0.5-1 mg/kg slow push (1-2 min); Additional doses 0.25-0.5 mg/kg over 1-3 min	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.

*No analgesic properties for Propofol and Midazolam.

Ketamine (Ketalar®)	
Indications	Starting Dose
Procedural Sedation	IV: Adult 0.5-1 mg/kg; Pediatric 1-2mg/kg; IM: 4- 5 mg/kg
Sub-dissociative Analgesia [^]	IV: 0.1 to 0.3 mg/kg IM: 0.5-1 mg/kg; IN: 0.5-1 mg/kg
Agitated Delirium	IV: 1 mg/kg; IM: 4 - 5 mg/kg
Infusions for Pain	IV: 0.1 - 0.5 mg/kg/hr

[^]Consider in opioid tolerant patients or those with contraindications to opioids. Administer IV over 10-15 minutes to minimize side effects. SQ dose same as IV. For IV-can dilute dose in 10 mL NS and administer as IV slow push over 5-10 min. Can also be given as a continuous infusion.

Intranasal* and Nebulized Medications			
Generic	Dose	Max Dose	Comments
Fentanyl	IN: 1.5-2 mcg/kg q 1-2 h Neb: 1.5-4 mcg/kg	4 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
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 MOST concentrated form available with atomizer. Limit 1 mL/nare. Ketamine: see separate Ketamine table.

Nerve Blocks	
Type of Block	General Distributions of Anesthesia
Axillary Plexus Block	Forearm, wrist and hand. Elbow if including musculocutaneous nerve
Deep Peroneal Block	Web space between 1st and 2nd toes
Femoral Nerve Block	Anterior thigh, femur, knee and medial leg distal to the knee
Infraclavicular Plexus Block	Mid humerus, elbow, wrist and hand
Interscalene Plexus Block	Shoulder, upper arm, lateral 2/3 clavicle
Median Nerve Block	Anterior forearm, palm of hand (lateral portion) and digits 1-4 ½
Popliteal Nerve Block	Posterior lateral leg distal to knee, ankle and foot
Radial Nerve Block	Lateral arm, posterior forearm, dorsal hand, digits 1-4 ½
Saphenous Nerve Block	Distal medial thigh, medial knee, medial ankle and medial foot
Superficial Peroneal Block	Dorsal surface of foot
Supraclavicular Plexus Block	Upper arm, elbow, wrist and hand
Sural Nerve Block	Lateral ankle and foot
Tibial Block	Plantar surface of foot
Ulnar Nerve Block	Medial Forearm, medial hand and digits 4 ½ to 5

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

†0.5% = 5mg/mL, 1% = 10mg/mL, 2% = 20mg/mL

Skeletal Muscle Relaxants		
Generic (Brand)	Starting Dose	Max Dose
Baclofen (Lioresal®)*	5 mg PO TID	80 mg/day
Cyclobenzaprine (Flexeril®)	5 mg PO TID	30 mg/day
Tizanidine (Zanaflex®)*	2-4 mg PO q 6-8 h prn	36 mg/day
Methocarbamol (Robaxin®)	1-1.5 g PO TID to 4x/day x 48-72 h, then 500-750 mg PO TID; 1 g IV/IM q 8 h	8 g/day PO 3 g/day IV/IM
Diazepam (Valium®) [CIV]	Adult: 2-5 mg PO q 6-8 h; 5-10 mg IV/IM Pediatric: (> 6 mo) 1 mg to 2.5 mg PO q 8 h prn; 0.04-0.2 mg/kg IV/IM q 2-4 h	— Peds: 0.6 mg/kg/8h IV/IM to adult max
Orphenadrine (Norflex®)	100 mg PO BID, 60 mg IV/IM q 12 h	—

*Requires dose adjustment based on renal function.

Neuropathic Pain Medications		
Generic (Brand)	Starting Dose	Max Dose
Gabapentin (Neurontin®)*	300 mg PO QHS to TID	3600 mg/day
Pregabalin (Lyrica®) [CV]*	50 mg PO TID	600 mg/day**
SNRI: Duloxetine (Cymbalta®)*	30 mg PO daily†	60 mg/day**
SNRI: Venlafaxine ER (Effexor XR®)*	37.5 mg PO daily	225 mg/day
TCAs: Amitriptyline (Elavil®)	10-25 mg PO QHS	150 mg/day
Nortriptyline (Pamelor®)	10-25 mg PO QHS	150 mg/day

See labeling recommendations for dose titration.
†30 mg daily for at least 7 days to decrease nausea
**Varies depending on indication