

# PEDIATRIC ACUTE PAIN MANAGEMENT

Use this card to improve the safety and effectiveness of pain management in neonates, infants and children. *These recommendations may not be appropriate for chronic (primary) pain.*

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## Non-opioids commonly used for mild to moderate pain

Drug	Route	Pediatric dose	Max. dose	Dosing interval
Ibuprofen	PO	5–10 mg/kg	400–600 mg	6–8 hrs
Acetaminophen	PO, PR	10–15 mg/kg	Do not exceed 5 doses in 24 hours or 4 grams per day	4–6 hrs
Acetaminophen*	IV	1–2 yrs = 10 mg/kg/dose >2 yrs = 15 mg/kg/dose >50 kg = 650–1,000 mg	<50 kg = 15 mg/kg/dose >50 kg = 1,000 mg/dose or 4 gm/day	6 hrs
Ketorolac** (Toradol)	IV	<2 yrs = 0.25 mg/kg >2 yrs = 0.5 mg/kg	30 mg	6–8 hrs
Celecoxib***	PO	10–25 kg = 50 mg >25 kg = 100 mg	50 mg 100 mg	12–24 hrs

\*ONLY if rectal or oral administration contraindicated; reevaluate daily

\*\*Recommend dosing no longer than five days

\*\*\*If classical NSAIDs contraindicated; safety and efficacy is not established in children less than 2 years of age

## Opioid analgesics commonly used for mild to moderate pain (term infants and older)

Drug	Route	Initial pediatric dose	Max. dose	Dosing interval
Tramadol*	PO	1–2 mg/kg	50–100 mg	4–6 hrs

\* Tramadol has a ceiling effect. If using >8 mg/kg/day change to strong opioid. If pain persists or increases, discontinue and change to strong opioids. Do not combine Tramadol with strong opioids. See 2017 FDA recommendations; benefits may outweigh risks.

### Medications NOT recommended:

- Codeine can **not** be recommended — up to 34 percent of children gain no analgesic effect due to poor (CYP 2D6) metabolism; on the other hand, ultra-rapid metabolizers produce dangerously high morphine levels.
- Acetaminophen combination products (e.g., Tylenol #3, Vicodin [hydrocodone], Percocet [oxycodone]) are not recommended as dosing cannot be increased with increasing pain without risking associated liver toxicity of high doses of acetaminophen.

## Opioid analgesics commonly used for moderate to severe pain (term infants and older)

*These represent starting doses only — children may require higher doses.*

Drug	Route	Initial pediatric dose	Initial adult dose	Dosing interval
Morphine	IV, SC PO/SL, PR	0.05–0.1 mg/kg 0.15–0.3 mg/kg	5–10 mg 10–15 mg	2–4 hrs
Morphine: patient/nurse controlled analgesia (PCA)		<b>Basal infusion:</b> 0.015 mg/kg/hr <b>PCA dose:</b> 0.015 mg/kg *recommend basal infusion=PCA dose	<b>Lockout interval =</b> 5–10 minutes	<b>1 hr max. limit =</b> 4–6 PCA boluses/hr (e.g., 0.1 mg/kg)
Hydromorphone (Dilaudid)	PO/SL	0.05 mg/kg	1–2 mg	3–4 hrs
Hydromorphone (Dilaudid)	IV	<b>Bolus:</b> 15 mcg/kg <b>Continuous infusion:</b> 2–5 mcg/kg/hr	200–600 mcg 100–250 mcg/hr	2–4 hrs (bolus)
Oxycodone	PO/SL	0.1–0.2 mg/kg	5–10 mg	4–6 hrs
Fentanyl	IV	<b>Bolus:</b> 1 mcg/kg <b>Continuous infusion:</b> 1 mcg/kg/hr	25–75 mcg 50 mcg/hr	10 min–1 hr (bolus)

## Opioid antagonist and side effect management

Drug	Route	Initial dose	Clinical indication	Dosing interval
Low dose Naloxone infusion	IV	0.5–2 mcg/kg/hr	Mild–moderate opioid induced side effects such as pruritus, nausea, etc. (Moderate to severe: opioid rotation)	
Naloxone	IV, SC	1–5 mcg/kg 10 mcg/kg	*Reverse opioid-induced depressed respiratory rate <b>Reverse opioid-induced apnea and coma; titrate to effect</b>	2–3 mins

\* Consider Naloxone for oversedation only; if conservative measures (e.g., tactile stimulation) show no effect.

## Analgesia for neonates and infants ages 0–6 months

Drug	Route	Pediatric dose (age)	Max. dose	Dosing interval
Acetaminophen	PO, PR	5–10 mg/kg (0–30 days) 10 mg/kg (1–3 mos) 10–15 mg/kg (3–6 mos)	20–40 mg/kg/day 40 mg/kg/day 40–60 mg/kg/day	4–6 hrs (max. 4 doses/day)
Acetaminophen*	IV	<10 kg = 7.5 mg/kg	30 mg/kg/day	6 hrs
Ibuprofen	PO	4–10 mg/kg (3–6 mos)	40 mg/kg/day	6–8 hrs
Morphine	PO/PR/SL	0.075–0.15 mg (0–30 days) 0.08–0.2 mg (1–12 mos)		6 hrs 4–6 hrs
Morphine	IV/SC	0.025–0.05 mg (0–30 days) 0.1 mg/kg (1–6 mos) <b>Infusion (with PCA bolus of same dose):</b> 0.005–0.01 mg/kg/hr (0–30 days) 0.01–0.03 mg/kg/hr (1–6 mos)		6 hrs
Fentanyl	IV/SC	0.5–1 mcg/kg (0–12 mos) <b>Infusion (with PCA bolus of same dose):</b> 0.5–1 mcg/kg/hr (0–6 mos)		2–4 hrs
Oxycodone	PO/SL	0.05–0.1 mg/kg (1–6 mos)		4–6 hrs

\* Only if rectal or oral administration contraindicated; reevaluate daily

### Procedural pain

(e.g., for venipuncture, lab draws, suturing, dressing changes)

#### 1. “Numb” the skin: topical local anesthetics

- **Should always be offered!** (Teenagers may decline)
- Choice of topical anesthetic depends on clinical scenario (ease of administration, cost, feasibility) — one of the following:
  - EMLA Cream (lidocaine 2.5% and prilocaine 2.5%) [at least 60 min]
  - 4% Lidocaine Topical Anesthetic Cream [at least 30 min]
  - J-tip (needleless lidocaine injector) [works in 1–3 minutes]
  - LET gel (for suturing): lidocaine 4%, epinephrine 0.18%, tetracaine 0.5% [30–45 minutes]

#### 2. Sucrose or breastfeeding for children 0–12 months

- Reduces pain and cry during painful procedure
- Effective dose (24%): 0.05–0.5 mL (= 0.012–0.12 g)
- Administer 2 minutes prior to procedure, lasts about 4 minutes
- Breastfeeding should begin 2–5 minutes prior to procedure and continue throughout

#### 3. Comfort positioning

- Infants <6 months: keep warm, swaddle and use facilitated tucking or skin to skin contact
- Upright positioning will increase sense of support and decrease pain and anxiety, suggest comfort positions (e.g., sit on parent lap, chest to chest hugging)
- When feasible, offer choice to child (parent’s lap?)
- Encourage parent to hold or be close
- Child should **NOT** be held down by adults

#### 4. Distraction and integrative therapies

- Identify modalities based on age and development: positioning, diaphragmatic breathing, distraction, imagery, hypnosis, books, bubbles and pinwheels; video games; tablet/smartphone “Apps”, “Buzzy Bee”
- At time of injection, offer to rub or stroke skin near injection site
- Parent coaching: Nonprocedural talk, suggestions on how to cope, humor decrease children’s distress and pain
- Include child life specialist or assign parent/nurse as “comfort coach”

#### 5. Other pharmacological approaches

- For short procedures (chest tube removal), consider using short acting opioid (e.g., intranasal fentanyl 1.4 mcg/kg/dose)
- Consider use of nitrous oxide for minimal sedation for needle phobia or significant anxiety

### Avoid medication errors while prescribing

Write comprehensive orders, avoid abbreviations.

- Spell out micrograms to avoid a transcription error.
- Spell out morphine, to avoid medication error when writing “ms.”
- Per kg dosing maximum = 50 kg (>50 kg = adult dosing)

Avoid decimal errors:

- Write “0.1” not “.1” / Write “1” not “1.0”. These can cause 10-fold dosing errors.
- NEVER prescribe volume [mL], ALWAYS prescribe dose [mg or mcg]

### WHO Principles of Pediatric Pain Management

1. Apply the WHO-pain ladder: Do **NOT** undermedicate; advance to opioids if pain control suboptimal
2. Use around the clock medications for predictable pain PLUS additional breakthrough doses (**NOT** just prn pain medication)
3. Use the simplest and least invasive routes whenever possible (e.g., oral vs. IV, NEVER IM)
4. Assess the pain regularly and change your plan accordingly
5. Always integrate non-drug strategies in combination with medications to enhance pain control (e.g., cuddling, distraction, relaxation techniques, massage, hypnosis, aromatherapy)

#### Multi-modal analgesia

In complex pain situations opioids alone might not be sufficient. Effective opioid-sparing analgesia includes some or all of:

- Acetaminophen and/or NSAID/Cox-2 inhibitor
- Opioids
- Anesthetic intervention (nerve block, epidural infusion, etc.)
- Adjuvant analgesia
- Physical therapy, sleep hygiene
- Psychology, child life

#### Denying Pain

When a child denies or minimizes pain, consider possibility that the child:

- was previously treated for pain with injections or painful procedures
- has been encouraged to be “brave”
- lacks understanding that the pain can be treated
- lacks understanding regarding the words being used to ask about pain
- is afraid of medication side effects or addiction
- is worried that if still in pain, they will not be discharged as planned
- believes that tubes (such as NG) won’t come out until pain medications are stopped

If you have questions about medications or pain management, please call the Pain and Palliative Care Team 24/7 at 651-220-5400.

**Children’s  
COMFORT  
PROMISE**

*We will do everything possible  
to prevent and treat pain.*

**Children’s**  
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