



National Hospice and Palliative Care Organization  
**Palliative Care Resource Series**

**PEDIATRIC PAIN MANAGEMENT  
STRATEGIES**

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Pain is one of the most prevalent symptoms in children who are receiving palliative care. Adequate pain management requires a multidisciplinary approach, including non-pharmacological interventions. Most children receiving palliative care will require pharmacological management for their pain.

There are four components often considered when initiating pharmacological pain medications:

1. Route
2. Clock
3. Ladder
4. Child

## ROUTE

As a rule, use the least invasive, most convenient route for the patient. The oral route (or via nasogastric-tube/PEG-tube) should be considered first if possible. Oral medication administration is associated with few side effects, is less invasive, and is typically less expensive. When choosing oral medications, consider if the patient is able to swallow tablets/capsules or if they have a feeding tube available for medication administration. Most liquid analgesics available for administration via a feeding tube are short-acting, except for methadone. Extended-release preparations should not be crushed, but can be administered whole rectally.

Route	Considerations
Oral & feeding tube	<ul style="list-style-type: none"> <li>■ Painless</li> <li>■ Typically preferred by children</li> <li>■ Consider taste</li> <li>■ Easy to titrate</li> <li>■ Not recommended in patients with bowel obstruction</li> <li>■ Difficult to tolerate in patients with nausea or vomiting</li> <li>■ Lack of available liquid options may limit use</li> </ul>
Sublingual	<ul style="list-style-type: none"> <li>■ Painless</li> <li>■ May need to mix with liquid if patient has dry mouth</li> <li>■ Consider volume of liquid</li> <li>■ Not all medications are absorbed sublingually; dose may trickle back, swallowed with saliva</li> </ul>
Intranasal	<ul style="list-style-type: none"> <li>■ May cause nasal irritation if solution is not isotonic</li> <li>■ Requires small volume (0.1 mL per nare)</li> <li>■ Divide the dose between nares</li> <li>■ Atomizer device prevents drainage and provides better absorption than nasal drops</li> <li>■ Ensure nasal cavity is clear of mucous or blood</li> </ul>
Transdermal	<ul style="list-style-type: none"> <li>■ Painless</li> <li>■ Patient must be opioid tolerant</li> <li>■ Difficult to titrate</li> <li>■ Patch cannot be cut or folded</li> <li>■ May have increased absorption in febrile patients or young children</li> <li>■ Requires another opioid for breakthrough pain</li> <li>■ Approximately 12 hours for onset of analgesia</li> <li>■ Buprenorphine (Butrans®) patch not approved in children</li> </ul>

Route	Considerations
Intravenous	<ul style="list-style-type: none"> <li>■ Rapid pain control</li> <li>■ Easiest to titrate and adjust quickly</li> <li>■ Useful if severe vomiting, mucositis, bowel obstruction, or questionable GI absorption</li> <li>■ Use lidocaine gel or cream prior to inserting new IV line or accessing port</li> <li>■ Invasive</li> <li>■ Requires equipment and electricity (if used in home, must consider alternative if loss of power)</li> <li>■ Bolus dosing may have increased side effects (especially itching &amp; vomiting), shortest duration, shortest frequency, increased risk of pseudo addiction</li> </ul>
Patient Controlled Analgesia (PCA) <sup>5-8</sup>	<ul style="list-style-type: none"> <li>■ Eliminates time between pain perception and relief</li> <li>■ Can provide basal maintenance rate, as well as breakthrough doses</li> <li>■ Requires patient understanding of the relationship between pushing the button and pain relief (typically &gt;7 years of age)</li> <li>■ Parents should be educated not to push button for their sleeping child</li> <li>■ Maximum amounts can be set to minimize the risk of overdose</li> <li>■ Breakthrough doses received should be monitored on a regular basis and maintenance dose adjusted as appropriate</li> <li>■ Requires equipment and electricity (if used in home, must consider alternative if loss of power)</li> </ul>
Subcutaneous <sup>9</sup>	<ul style="list-style-type: none"> <li>■ Small and portable pump</li> <li>■ Can be used for continuous infusion or PCA</li> <li>■ Bioavailability may be affected by fat, muscle, and water composition in children</li> <li>■ Use lidocaine gel or cream prior to insertion</li> <li>■ Minimize volume to minimize discomfort (max volume: typically, 2 mL; may vary based on location and child)</li> </ul>
Rectal	<ul style="list-style-type: none"> <li>■ Consider patient preference and privacy</li> <li>■ Wide variability in therapeutic blood levels</li> <li>■ Useful when unable to swallow or significant vomiting</li> <li>■ Use caution in neutropenic or thrombocytopenic patients</li> </ul>
Intramuscular	<ul style="list-style-type: none"> <li>■ Typically avoided</li> <li>■ Painful</li> <li>■ Wide fluctuations in absorption since decreased muscle mass in children</li> <li>■ Requires adequate blood flow to the injection site to ensure absorption</li> <li>■ Minimize volume to minimize discomfort (max volume: neonates= 0.5 mL, infants= 1 mL, children= 2 mL, adolescents= 3 mL)</li> </ul>
Epidural	<ul style="list-style-type: none"> <li>■ Short term use or may be tunneled subcutaneously</li> <li>■ Use only if consistent with child and family goals</li> <li>■ Maximize use of less invasive route first</li> <li>■ May be beneficial for uncontrolled neuropathic pain, severe lower extremity pain, or if intolerable side effects from systemic analgesia</li> </ul>

## CLOCK

- If the patient is having persistent pain, medication should be scheduled around the clock.
- Additional “as needed” medications should be anticipated for breakthrough pain.
- Regularly scheduled doses ensure a steady blood level, reducing the peaks and troughs associated with “as needed” dosing.
- Breakthrough doses are typically 10-15% of the 24-hour opioid requirement, and are available as often as every 1-2 hours as needed.

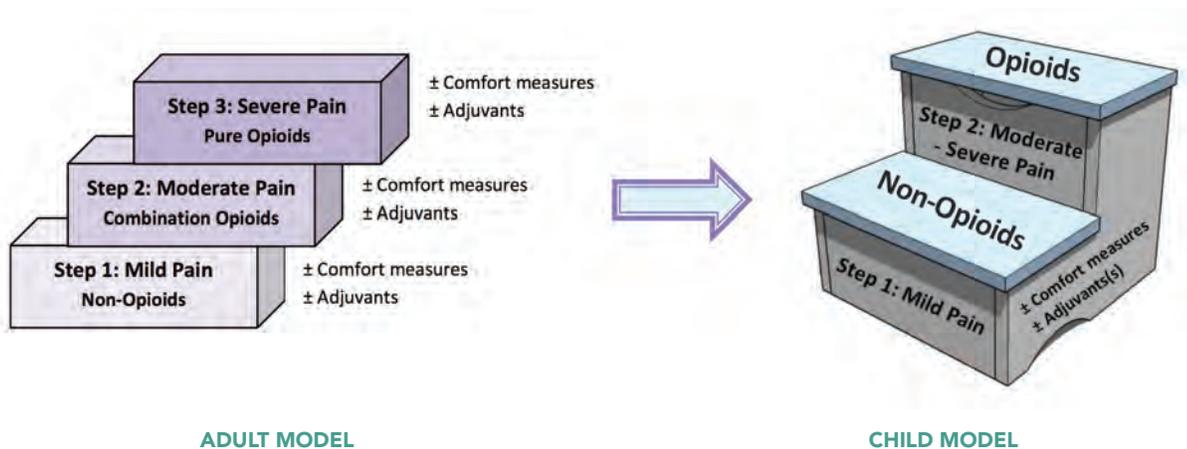
## LADDER<sup>10</sup>

The World Health Organization (WHO) stepladder approach (Figure 1) to cancer pain management is appropriate for most nociceptive, visceral, and somatic pain, including non-cancer chronic pain in the terminally-ill patient.

However, in children a two-step approach is recommended. While the concept is similar to adult pain management, weak opioids (e.g., codeine, traMADol) are not recommended in children due to the uncertainty of response and potential risks, eliminating the need for the traditional step 2. The two-step approach for pain management in children includes:

- non-opioids (e.g., acetaminophen, non-steroidal anti-inflammatories) for mild pain
- pure opioids for moderate to severe pain. Opioid dose should be based on patient-specific factors and titrated. Adjuvant agents can be initiated at any point during therapy as needed.

Figure 1. WHO Analgesic Step Ladder Approach- Adapted for Children<sup>1, 10</sup>



Consider using both non-opioids and opioids to maximize pain relief. Using combination products (e.g., acetaminophen with oxycodone) is not recommended since an increase in the dose can result in liver toxicity due to an increase in the acetaminophen dose. Additionally, combination products make rapid dose escalation difficult. Acetaminophen should be administered separately if warranted.

## CHILD

Tailor therapy to the child's circumstance, needs, and response. Before initiating therapy, the following factors should be assessed:

### Complete medical history

- History of gastritis, ulcers, gastrointestinal bleeding, or thrombocytopenia
- Presence of liver or renal dysfunction
  - ◆ Medications may need dosage adjustment
- Disease progression
- Associated symptoms: nausea, anorexia, sleep disturbances
- Sources of pain: neuropathic, bone, visceral, intracranial pressure, muscle spasms
- Medication allergies
- Current medications for potential drug interactions
- History of medication misuse or substance abuse in patient or family
- Previous opioid exposure and response

### Ease and appropriateness of schedule

- Parent/caregiver adherence to around the clock dosing

### Ease and appropriateness of route (Table 1)

## SUMMARY

Family involvement in assessment, interventions, evaluation, and treatment plans is essential for success, remembering that care should be centered on the child and family. These four components offer a valuable starting point for initiating medications for pain management.

## KEY REFERENCES

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