Stollery Children's Hospital
Pediatric Pain Handbook

Pediatric Pain
Management Committee
Stollery Children’s Hospital
2014
# Stollery Children's Hospital Pediatric Pain Handbook

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INTRODUCTION

This handbook is intended for healthcare providers at Stollery Children’s Hospital Children's Hospital and zone Child Health sites (Alberta Health Services, Edmonton zone) caring for infants, children and youth with acute pain (postoperative / trauma), pain with procedures, chronic or recurrent nonmalignant pain and palliative pain.

The handbook provides a brief overview of general information and should not supplant the recognized policies, procedures, formulary, etc. in the Stollery Children's Hospital or other Child Health sites. It may, however, generate interest in altering established pain management practices. Consultation in this regard is available through the Pediatric Pain Management Committee of the Stollery Children’s Hospital and co-Chairs Kathy Reid, RN, MN, NP and Dr. Bruce Dick, PhD, RPsych (AB).

SECTION 1 - WHAT IS PAIN?

PAIN: An unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage. The inability to communicate verbally does not negate the possibility that an individual is experiencing pain and is in need of appropriate pain-relieving treatment. (IASP, 1979, 2011).

WE BELIEVE THAT:

1. Good pain management is essential to patient well-being.
2. Children of all ages experience pain.
3. Whenever possible, children and their parents* should be actively involved in pain assessment and pain management.
4. If a child says he or she is in pain, the child must be believed. The child’s report of pain, if available and solicited in an appropriate manner, is the best indicator of pain.
5. If a child denies pain when there is obvious evidence of tissue damage or if behavior indicates pain, the reasons for the inconsistency between physical findings, behavior and self report should be investigated thoroughly.
6. When there is uncertainty whether behaviour indicates pain, and if there is reason to suspect pain, an analgesic trial can be diagnostic as well as therapeutic.
7. Use of opioids for the short term management of pain does not cause addiction.
8. It may not be practical or desirable to eliminate all post-operative and procedure related pain. Techniques are now available, however, that make pain reduction to acceptable levels a realistic goal in the majority of circumstances.
10. Pain management is everyone’s responsibility.

NOTE: Any reference to “parent” includes others (such as guardian or relative) who have taken on or assist with the parental care-giving role.
Consequences of Unrelieved Pain
Unrelieved pain has both physical and psychological consequences. Physical effects of unrelieved pain include:

- rapid shallow breathing, which can lead to hypoxemia
- inadequate lung expansion and impaired cough, which can lead to secretion retention and atelectasis
- increased secretion of stress hormones (for example, cortisol, epinephrine norepinephrine) which can increase metabolic rate, impair tissue healing, and decrease immune function
- impaired gastric mobility and bowel function leading to nausea and constipation

Psychological effects of unrelieved pain include:

- increased anxiety regarding future procedures
- in infants, unrelieved pain in early life appears to change nociceptive processing and sensitize infants to subsequent painful procedures
- disrupted sleep
- increased risk of developing chronic pain.

(Oakes, 2011; Dowden, 2009; Schechter, Berde & Yaster, 2003)

Standards of Care for Pain Management

1. Screen all patients at risk for pain at least once each shift by asking the child or family/care provider about the presence of pain, ache or discomfort. For non verbal or preverbal children use behavioural indicators to identify the presence of pain.

   - Several reliable, well validated tools are available for use and should be used.

2. Self-report is the primary source of assessment for verbal, cognitively intact children. Always attempt to obtain a self report. Family/care provider reports of pain are included for children unable to give self-report.

3. Document on a standardized form such as the Pediatric Vital Sign record or other unit specific form. Documentation will include:

   - Comprehensive assessment and re-assessment.
   - Monitoring tools that track efficacy of intervention (0-10 scale).
   - All interventions (pharmacological, psychological and physical) must be documented on the patient care record.

4. Establish an interdisciplinary team plan for pain management that is consistent with individual and family goals for pain relief.

   - the pain management plan should include both pharmacologic and non-pharmacologic strategies

Adapted from RNAO Best Practice Guidelines for Assessment and Management of Pain. 2007 Version See: http://www.rnao.org/Page.asp?PageID=924&ContentID=720
SECTION 2 - PAIN: A BIO-PSYCHO-SOCIAL PHENOMENON

Many factors affect a child’s perception of pain and can help to explain why children behave differently when experiencing similar painful interventions and situations. These factors include the child’s age and level of cognitive development, genetics, previous experiences with pain, personality and temperament, as well as family factors such as parental anxiety, culture.

Treatment approaches to managing pediatric pain must be multifaceted to address all factors. (American Academy of Pediatrics and American Pain Society, 2001)

Remember the “3-P” approach -- Pharmacological therapies, Physical therapies and Psychological Therapies -- all are effective for all pain conditions. (McGrath & Ruskin, 2007)

SECTION 3 - PAIN ASSESSMENT

Assessment of children’s pain should be implemented in the presence of pain and in all health care situations where it is reasonably expected that pain will occur.

Pain assessment is ongoing. Information is used to evaluate effect of pain management interventions.

A comprehensive pain assessment must be completed. A helpful mnemonic is LOPQRST:

L = Pain Location
O = Onset
P = Pain provoking and pain relieving factors
Q = Quality descriptors
R = Radiation of the pain
S = Severity
T = Timing

Pain measurement scales (indicators of pain intensity only)

For Children over the age of 8 years:

- Self-report using the Numeric rating scale (0-10 scale)

For Children ages 4 – 9 years:

- Self-report using the Faces Pain Scale - Revised® (see next page)
For Nonverbal or preverbal child:

- The FLACC® scale is used for infants and up to an age where the self-report scales are appropriate. It can be used for a child with a disability which renders the child unable to give a self-report of pain.
- Although toddlers may be able to verbally report pain, a behaviour scale should also be used.

**FLACC Behavioural Pain Scale Scoring**

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<tr>
<th>Categories</th>
<th>0</th>
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<th>2</th>
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<tbody>
<tr>
<td>Face</td>
<td>No particular expression or smile</td>
<td>Occasional grimace or frown, withdrawn, disinterested</td>
<td>Frequent to constant frown, clenched jaw, quivering chin</td>
</tr>
<tr>
<td>Legs</td>
<td>Normal position or relaxed</td>
<td>Uneasy, restless, tense</td>
<td>Kicking, or legs drawn up</td>
</tr>
<tr>
<td>Activity</td>
<td>Lying quietly, normal position, moves easily</td>
<td>Squirming, shifting back and forth, tense</td>
<td>Arched, rigid or jerky</td>
</tr>
<tr>
<td>Cry</td>
<td>No cry (awake or asleep)</td>
<td>Moans or whimpers, occasional complaint</td>
<td>Crying steadily, screams or sobs, frequent complaints</td>
</tr>
<tr>
<td>Consolability</td>
<td>Content, relaxed</td>
<td>Reassured by occasional touching, hugging, or being talked to, distractible</td>
<td>Difficult to console or comfort</td>
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</table>

Each of the five categories FLACC is scored from 0 – 2, which results in a total score between zero and ten.


Use language which is developmentally appropriate for the child, such as “hurt, owie or sore”.

It is important to explain the pain rating scale to the child at his or her developmental level before you need to use it.

Other tools are available for specific populations, including the Non-Communicating Children’s Pain Checklist – Revised (NCCPC-R). This tool (Breau et al, 2004) is useful for assessing pain in non verbal children ages 3 – 18 years of age. The tool and instructions can be accessed at [http://pediatric-pain.ca/files/02/79/NCCPCPV_200901.pdf](http://pediatric-pain.ca/files/02/79/NCCPCPV_200901.pdf)
Reassessment of Pain:  
Pain must be assessed and reassessed on a regular basis, according to the child’s needs and the plan of care. At minimum, assess pain:

- on admission,
- at least once per shift for inpatients, and once at each out patient and home care appointment
- one hour after any intervention (pharmacological, psychological or physical)
- prior to, during, and after any invasive intervention
- frequently in the post-operative period. If a child is receiving opioids by infusion, pain must be assessed every 2 hours while awake, and every 4 hours while sleeping (see Stollery Children’s Hospital Patient Care Policy 15.2)

SECTION 4  PAIN MANAGEMENT AT THE STOLLERY CHILDREN’S HOSPITAL

Pain management involves the entire interdisciplinary team, and the team includes the child and family.

- **Physician / Nurse Practitioner** - must be involved in assessment of pain, the development and implementation of the treatment plan including prescription of appropriate pain treatment medications, as well as monitoring effectiveness of all interventions.

- **Nursing Staff** - must be involved in pain assessment and the development and implementation of the treatment plan, including administration of medications, implementation of non pharmacological strategies reassessment following interventions, and communicating with prescribers.

- **Child Life Specialists** - must be involved in the preparation of children in advance of painful procedures as well as helping children and families with developing effective coping strategies. This includes preoperative teaching, the use of medical play, and helping out with painful procedures when time allows.

- **Psychology** - can also provide specialized services for a child with higher levels of anxiety or a history of coping difficulties. There are behavioural and cognitive strategies that can be effectively used. Psychology and other allied health professionals are most effective when given time to prepare a child. While they can be helpful in supporting a child who has had a negative experience with you and your service on a more urgent basis, involving these professionals early on when difficulties are noted can make a tremendous difference for the child, the child’s family, and for you and your team.

- **Physiotherapists** - are involved in the assessment of pain and implementation of interventions. Some of these interventions may include: use of heat, cold, TENS, Acupuncture, therapeutic exercise, positioning aids or mobility equipment, swelling control, functionally graded activities, graded motor imagery, and use of aquatic therapy. Physiotherapists are often involved in the pre-operative teaching of painful orthopedic procedures. This is to establish the baseline function of a child and to provide education on the anticipated post surgical recovery surrounding mobility, strength and pain.
• **Parents** - should be encouraged to be involved in both assessing and managing their child's pain at their own comfort level.

## SECTION 5 ACUTE PAIN

_Acute pain may be defined as pain that subsides as healing takes place i.e. has a limited duration and with a predictable end._ *(Royal College of Nurses, 2009)*

Pharmacologic Management of acute pain includes these key concepts:

_i) “By the ladder” - Stepwise 'analgesic ladder' approach to acute pain management:_

<table>
<thead>
<tr>
<th>Step 1 (mild pain)</th>
<th>administer a non-opioid such as acetaminophen and/or ibuprofen</th>
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<tr>
<th>Step 2</th>
<th>(moderate pain) continue step one and add a simple opioid such as low dose oral morphine</th>
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<tr>
<th>Step 3 (severe pain)</th>
<th>Continue step one and add a strong opioid such as morphine, or HYDROMorphone or oxycodone</th>
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_ii) “Multi-modal analgesia” – combining different analgesics to target different pain mechanisms can produce good pain relief while lowering overall drug doses._

_iii) “By the child” – analgesic doses should be adjusted safely to suit the child’s specific needs and medical condition(s)._  

_iv) “By the clock” – regular analgesic administration with consideration for pain severity and drug duration helps to prevent breakthrough pain._

_v) “By the mouth” – when possible use the oral route for analgesic administration.  

   NOTE: For opioids consult the equianalgesic chart (page 29) for proper conversion of parenteral to oral route._
ANALGESICS:

I. NON – OPIOID ANALGESICS

<table>
<thead>
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<th>DRUG DOSAGE</th>
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<th>DRUG DOSAGE</th>
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<tr>
<td>ACETAMINOPHEN</td>
<td>Oral dosage: 10-15 mg/kg/dose every 4 to 6 hours around the clock or prn.</td>
<td>Used for mild pain or, as an adjunct to opioids.</td>
<td>Toxicity can occur with high doses of acetaminophen greater than 75 mg/kg/day or 4 grams per day.</td>
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<td>Maximum of 5 doses in 24 hours or not exceeding 4 grams in 24 hours.</td>
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<td>Rectal dosage – 20 mg/kg/dose every 6 hours around the clock or prn</td>
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2. NON-STEROIDAL ANTI-INFLAMMATORY DRUGS (NSAIDS)

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<th>INDICATIONS</th>
<th>COMMENTS</th>
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<tr>
<td>IBUPROFEN</td>
<td>5-10 mg/kg/dose by mouth up to every 6 to 8 hours around the clock or prn.</td>
<td>Can be effective for musculoskeletal pain or headaches or, as an adjunct to systemic or epidural analgesia to manage post-op pain.</td>
<td>Usual maximum dose is 40 mg/kg/day or 2400 mg/day Adverse effects may include decreased platelet function, peptic ulcer formation, decreased glomerular filtration or bronchospasm.</td>
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<tr>
<th>DRUG</th>
<th>DRUG DOSAGE</th>
<th>INDICATIONS</th>
<th>COMMENTS</th>
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<tr>
<td>KETOROLAC</td>
<td>0.25-0.5 mg/kg/dose IV every 6 to 8 hours around the clock or prn for up to 48 hours post-op.</td>
<td>Can be effective for musculoskeletal pain or headaches or, as an adjunct to systemic or epidural analgesia to manage post-op pain.</td>
<td>Maximum total daily dose 120 mg. Maximum 20 doses or 5 days. Adverse effects may include decreased platelet function, peptic ulcer formation, decreased glomerular filtration or bronchospasm.</td>
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### 3. GABAPENTIN AS AN ADJUVANT FOR NEUROPATHIC ACUTE PAIN

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<th>DRUG</th>
<th>DRUG DOSAGE</th>
<th>INDICATIONS</th>
<th>COMMENTS</th>
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<tr>
<td>GABAPENTIN</td>
<td>Initiate 5 mg/kg/dose po at bedtime. If tolerated well, can increase to twice daily dosing on Day 2, and three times daily on Day 3.</td>
<td>Gabapentin may reduce post operative pain sensitivity and reduce opioid consumption.</td>
<td>Further dose titration may be required over a period of several days up to 8-35 mg/kg/day in 3 doses daily.</td>
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### 4. KETAMINE

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<th>DRUG DOSAGE</th>
<th>INDICATIONS</th>
<th>COMMENTS</th>
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<tr>
<td>KETAMINE (low dose ketamine infusion for post-op pain)</td>
<td>Consult Pediatric Anesthesiology to initiate and manage ketamine infusions</td>
<td>At sub-anesthetic doses ketamine may spare opioid induced pain sensitivity and pharmacologic tolerance for select patients</td>
<td></td>
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### 5. DIAZEPAM

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<th>INDICATIONS</th>
<th>COMMENTS</th>
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<tr>
<td>DIAZEPAM (Valium®)</td>
<td>0.1 mg/kg/dose p.o. every 6-8 hours prn in the absence of opioids. <strong>NOTE</strong>: Decrease the dose to reduce the risk of respiratory depression when using concurrently with opioids. Ensure the child is monitored appropriately!</td>
<td>For painful, postoperative muscle spasm in select patients only.</td>
<td>In children with neurological impairment i.e. cerebral palsy or brain injury, treatment of spasticity is an important element of pain management post-operatively.</td>
</tr>
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II. OPIOID ANALGESICS:

General Considerations in the use of opioids:

- Codeine is pro-drug that is no longer recommended as a suitable analgesic choice for children. (Kelly et al, 2012; WHO, 2012)
- Reassess opioid dosing daily as acute pain is anticipated to eventually subside
- Decrease opioid dosing for premature infants and neonates (see Section 9 on neonates); for renal or hepatic insufficiency; demonstrated sensitivity to opioid effects; respiratory compromise
- Avoid administration routes requiring repeated injections (e.g. intramuscular)
- Initial suggested dosing based on opioid-naïve status and can be carefully titrated to relief and/or presence of adverse effects
- For the obese patient dose is calculated on estimated lean body mass
- Caution when adding other CNS depressant medication while patient on opioids
- Children receiving opioids regularly for 7 days or more should be monitored for withdrawal symptoms during weaning period.
- Always confirm doses with pediatric drug reference manual e.g. Taketomo, Hodding and Kraus, 2011.

Adverse Effects and Patient Monitoring While on Opioids:

By far the most serious opioid adverse effect is the potential for respiratory depression.
- All opioids administered to a child require at least a respiratory rate/depth and sedation score for the duration of drug action. This assessment is made every hour for parenteral opioids or infusions such as epidural or low dose ketamine as per policy. Following intermittent IV opioid administration frequency of assessment is every 15 minutes X 3 after the initiation of the dose and then hourly, if stable. (see link below)
- Additional monitoring such as continuous oximetry or continuous cardio-respiratory monitoring will be required for children meeting high risk criteria. (see link below)
- Findings will be documented on the Vital Sign Record (regular wards) or area specific documentation sheets in the critical care areas.
- Monitoring and high risk criteria requirements are on preprinted continuous infusion patient care order sheets for morphine and HYDROmorphine

OPIOID DOSING GUIDELINES FOR OPIOID-NAÏVE PEDIATRIC PATIENTS:

<table>
<thead>
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<th>DRUG</th>
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<th>INDICATIONS</th>
<th>COMMENTS</th>
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<tr>
<td>MORPHINE</td>
<td>Immediate release oral morphine: 0.15 to 0.3 mg/kg/dose by mouth every 3-4 hours around the clock or prn.</td>
<td>Strong opioid. Suggested dosing for acute pain as per opioid-naïve child.</td>
<td>For immediate release oral morphine -- titrate to effect. Immediate release formulation can also be used to treat break-through pain.</td>
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<td></td>
<td><strong>Intermittent intravenous route</strong> – morphine 0.05-0.1 mg/kg/dose IV every 3-4 hours around the clock or prn. Maximum dose: 15 mg/dose</td>
<td></td>
<td>Use preprinted infusion order sheet. <strong>Note:</strong> a small percentage of children may require higher dosing with appropriate monitoring</td>
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<td><strong>Continuous IV morphine infusion</strong> Usual dosing guideline is 10-40 mcg/kg/hr.</td>
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<td></td>
<td><strong>Infants (less than 3 months) guidelines</strong> suggest initial dosing not to exceed 15 mcg/kg/hr</td>
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<tr>
<td>HYDROMORPHINE (e.g. Dilaudid®)</td>
<td>Immediate release oral HYDROMORPHINE: children 0.03-0.08 mg/kg/dose po every 4 hours around the clock or prn. Maximum 5 mg per dose. adolescents 1-2 mg/dose po every 4 hours around the clock or prn.</td>
<td>Strong opioid as an alternative to morphine for moderate to severe acute pain.</td>
<td>Considered about 5 times more potent than morphine. Consult Peds Acute Pain Service for assistance with dose conversions as needed</td>
</tr>
<tr>
<td></td>
<td><strong>Intermittent IV</strong>– HYDROMORPHINE: 0.01-0.02 mg/kg/dose IV every 4 to 6 hours prn <strong>Continuous IV HYDROMORPHINE infusion:</strong> Usual dosing guidelines 2-8 mcg/kg/hr however, a small percentage of children may require higher dosing with appropriate monitoring</td>
<td></td>
<td>Use preprinted infusion orders.</td>
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HYDROMorphone (e.g. Dilaudid®)

Consult Peds Acute Pain Service for assistance with dose conversions as needed

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<tr>
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<th>COMMENTS</th>
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<tr>
<td>OXYCODONE</td>
<td>Immediate release oxycodone 0.05-0.2 mg/kg/dose orally every 4 to 6 hours prn, <strong>OR</strong> If patient weighs over 50 kg, use 10 mg every 4 hours, around the clock or prn</td>
<td>Indicated for moderate to severe pain.</td>
<td>Only available via oral route. Note: Oxycodone is also available in combination with acetaminophen (e.g. Percocet®). Inform parents of the acetaminophen content if using Percocet as a discharge medication.</td>
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TREATMENT OF LIFE-THREATENING ADVERSE EFFECTS OF OPIOIDS

Certain patients are at higher risk of respiratory depression with opioids. If this is the case, consideration should be given to increase monitoring such as more frequent vital signs, O2 saturations, and sedation score.

**Naloxone** (Narcan®) is a drug which reverses certain actions of opioid drugs (narcotics)

**Indications for Naloxone:**
- For respiratory failure due to presumed opioid over-dosage in circumstances where spontaneous breathing is preferred to tracheal intubation and controlled ventilation (Note: attempts should be made first to stimulate the patient and urge them to breathe).
- For unusual circumstances in which somnolence needs to be reversed for neurological evaluation (e.g. during spinal surgery or intensive care). For most other patients receiving opioids who are somnolent, but stable and breathing well, naloxone is not required.

**Equipment Required:**
- Immediate availability of oxygen, resuscitation bag, mask, suction at bedside
- Emergency basket in room
- IV administration set-up

Naloxone may be administered IV (bolus or infusion) or IM (if no IV available). Duration of action ranges from 20 - 60 minutes according to the dose and may need to be repeated. Any patient receiving naloxone requires prolonged observation for recurrence of respiratory depression.

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Dosing for Naloxone is situation dependent:

- **Call a code**
- if complete apnea or cyanosis: 0.01 – 0.1 mg/kg IV push or IM if no venous access.
- **Repeat in 1 minute** if no effect. (Note: this is the dosing for total reversal of narcotic effect).

**NOTE:** **Registered Nurses with direct IV competency may administer IV push medications with patient care order.**

**IF moderate respiratory depression** (hypercarbia and somnolence):
titrates increments of 0.005 - 0.01 mg/kg every 1-2 minutes until respiration improves.

Naloxone should not be relied upon to substitute for proper air-way management, assisted ventilation and oxygen administration. Side effects include agitation, dysphoria, acute pain, nausea, vomiting, and rarely pulmonary edema. These effects may be deleterious for patients with cardiac disease.

**Simple method for dilution of Naloxone:**

Dilute: 0.4 mg ampoule with 10 mL total volume sterile saline (resulting concentration will be 0.04 mg/mL OR 40 mcg/ml)

**Administer:** 0.5 - 1.0 mL amounts every 1 to 2 minutes

**TREATMENT OF OTHER OPIOID SIDE EFFECTS**

1. **Nausea and Vomiting**
   - Occurs in some children and often stops within a few days. Treat aggressively.
   - If persistent consider switch to a different opioid.

**Preparations:**

- **ondansetron (Zofran®):**
  - If less than 40 kg: 0.1 mg/kg/dose PO/IV q8 h prn
  - If more than 40 kg: 4 mg/dose PO/IV every 8 h prn
  - **NOTE:** ondansetron (Zofran® 4mg ODT): oral disintegrating tablet available for older children. Tablets dissolve on the tongue (and are half the price of regular tablets).

- **dimenhydrinate (Gravol®):** 0.5-1mg/kg/dose PO/IV every 6-8 hrs prn.
  - Under 2 years will require close monitoring for drug-related and/or idiosyncratic toxicity
  - For 2-5 years: Do not exceed 75 mg/day
  - From 6-12 years: Do not exceed 150 mg/day
  - Over 12 years: Do not exceed 300 mg/day

- **metoclopramide (Maxeran®):** 0.1-0.2 mg/kg/dose PO/IV every 6-8 hrs prn
  - If over 14 years: 10mg every 6-8 hrs prn (*maximum 10 mg/dose*)
2. **Pruritus (Itching)**
   - Occurs in some children and usually stops in a few days. Pruritis should be treated. If persistent consider switch to a different opioid.
   **Preparations:**
   - Diphenhydramine (Benadryl®): 0.5-1 mg/kg/dose PO/IV q 4-6 hrs prn (maximum of 50 mg/dose)
     - Under 6 years will require close monitoring for drug-related and/or idiosyncratic toxicity.
     - From 6-12 years: Do not exceed 150 mg/day
     - Over 12 years: Do not exceed 300 mg/day
   - Hydroxyzine (Atarax®): up to 2 mg/kg/day PO divided every 6-8 hrs prn up to a maximum of 25 mg every 6-8 hrs.

3. **Constipation**
   Occurs in 99% children who take opioids for more than a few days. Laxatives/stool softeners need to be given routinely whenever opioid medications are used and until the opioid is stopped. If the patient has had no bowel movement in 3 days despite oral stool softeners, consider the use of a suppository (glycerin or ducolax), or oral fleet (fleet phosphosoda) (NOTE: for children greater than 2 years of age only).
   **Preparations:**
   - Docusate sodium (Colace®):
     - Under age 3: 10-40 mg/day in 1-4 divided doses
     - Age 3-6yrs: 20-60 mg/day in 1-4 divided doses
     - Age 6-12 yrs: 40-150 mg/day in 1-4 divided doses
     - Adolescents: 50-400 mg/day in 1-4 divided doses
   - Polyethylene glycol 3350 WITHOUT electrolytes (Miralax®):
     - 0.5g/kg Maximum starting dose 17g dissolved in 8 oz water or juice ONCE daily
   - Lactulose:
     - Under 1yr: 2.5ml every 12-24 hrs
     - Age 1-5 yrs: 5 ml every 12-24 hrs
     - Age 6-10 yrs: 10 ml every 12-24 hrs
     - Over 10 yrs: 15-30 ml every 12-24 hrs
   - Bisocadyl (Ducolax®):
     - Rectal suppository
       - Less than 2yrs: 5 mg/day as a single dose
       - 2-11 yrs: 5-10 mg/day as a single dose
       - Over 12 yrs: 10 mg/day as a single dose
     - Oral bisocadyl
       - 3-12 years: 5-10 mg/day as a single dose
       - 12 years: 5-15 mg/day as a single dose
   - Glycerin rectal suppository:
     - Under 6 yrs: 1 infant suppository
     - Over 6 yrs: 1 adult suppository
6. PATIENT CONTROLLED ANALGESIA (PCA)
This method is prescribed **ONLY** by the Pediatric Acute Pain Service (PAPS) or anesthesia resident. This includes any PCA order changes and discontinuing PCA.
PCA is useful in managing acute pain (post operative, trauma) or cancer pain. A programmable pump allows the child to self-administer a small dose of intravenous opioid after which there is a period of pump inactivation (lockout period), of about 10 minutes duration.
PCA can be used by a child over 7 years of age who is alert and able to understand the concept of pressing a button when having pain. PCA gives the child a sense of control and is associated with high patient satisfaction. The PCA hand control must **NOT** be activated by the RN or parent due to the potential for oversedation.
While on PCA, the child must not receive opioid via any other route or method of administration, **unless approved by the Pediatric Acute Pain Service**.
Sedatives, hypnotics or CNS depressants should be given only if the Pediatric Acute Pain Service anesthesiologist is aware.
For monitoring protocol, refer to specific patient care order sheets:

http://www.intranet2.capitalhealth.ca/uah-learningcentre/PoliciesandProcedures/Patient_CareP&P/15_Medication_Administration/15_9.pdf

7. EPIDURAL ANALGESIA
This method is prescribed and adjusted **ONLY** by the Pediatric Acute Pain Service or anesthesia resident.
Epidural analgesia involves infusion of a solution of bupivacaine with or without opioid (e.g. fentanyl) into the epidural space.
It is used for selected abdominal, thoracic, urologic and orthopedic surgical procedures where significant pain or some respiratory compromise is anticipated.
While receiving epidural analgesia, the child **must not** receive opioid via any other route or method of administration, **unless approved by the Pediatric Acute Pain Service**.
Sedatives, hypnotics or CNS depressants should be given only if the Pediatric Acute Pain Service anesthesiologist is aware.
Monitoring requirements are on the preprinted epidural analgesia order sheets.
**Note:** Epidural Nursing care guidelines now available on the Stollery link.
See:
8. NON-PHARMACOLOGIC APPROACHES TO PAIN MANAGEMENT

a. Physical Management of Acute Pain:
   - application of heat and/or cold, as appropriate
   - massage
   - TENS (transcutaneous electrical nerve stimulation)
   - Movement and repositioning
   - Cuddling/soother for neonates and infants

b. Psychological Management of Acute Pain:
   - Believe the child and family
   - Provide pain management education / information for parent and child (if appropriate)
   - Relaxation strategies such as deep breathing, guided imagery
   - Distraction strategies such as games, toys, music and books.

9. The PEDIATRIC ACUTE PAIN SERVICE (PAPS)
   PAPS is provided by the Department of Anesthesiology of the Stollery Children’s Hospital.
   The role of PAPS is to provide consultation for management of difficult pain situations and encompasses:
   - Patient controlled analgesia
   - Ketamine infusion
   - Epidural analgesia

   NOTE: PAPS does not manage all postoperative or trauma pain but is available for consult if necessary to assist in managing pain.

   For questions or concerns, page through locating (7- 6191)
   - PAPS Nurse: Mon.- Fri. from 0800h to 1615h
   - PAPS Anesthesiologist (available 24/7)

SECTION 6 - PROCEDURAL PAIN

   Procedures include all medical interventions which have the potential to cause pain, or to cause distress or anxiety.
   *(Royal Children’s Hospital, Melbourne)*

Procedures which may cause pain include (but are not limited to):
   o All skin breaking procedures such as needles, IV insertions, venipunctures, heel sticks
   o Tube insertions or tube removals,
   o Dressing changes.
Lumbar punctures, bone marrow aspirations

The choice of appropriate approach depends upon many factors such as:
  - Child’s previous experience of specific procedure
  - Child/parent anxiety
  - Severity of pain anticipated with the procedure
  - Child’s previously developed coping skills

Pain should be assessed prior, during and post all procedures, to assist the child in both managing the pain during the intervention, and in developing mastery to cope with painful interventions.

Child Life Specialists are available in the Stollery Children’s Hospital to assist with procedural pain management. Call 7-6818 or 7-7758. Pager numbers for individual child life therapists are at the nursing desks for each unit.

Pharmacologic Management of Procedural Pain:

a. Liposomal Lidocaine Cream 4% (Maxilene®)
   - Maxilene is a liposomal encapsulated formula which results in rapid delivery of the topical anaesthetic into the dermis of the skin.
   - It should be covered with a transparent dressing to prevent it from being rubbed off.
   - Maxilene should be applied to all inpatients at the Stollery Children’s Hospital prior to potentially painful skin breaking procedures including initiation of intravenous therapy, intramuscular or subcutaneous injection, and venipuncture.
   - A patient care order is not required at the Stollery as per protocol
   - Maxilene is safe to use on all children including neonates (see NICU policy)
   - It is available “over the counter” at pharmacies for parents who wish to purchase it for use in the community for needles.
   - [Link](http://insite.albertahealthservices.ca/Files/clp-topical-local-anesthetic-use-and-application-protocol.pdf)

b. EMLA Cream or Patch (Eutectic Mixture of Local Anesthetics)
   - EMLA, a mixture of Lidocaine and Prilocaine may be used if Maxilene is unavailable.
   - EMLA should be used with caution on neonates due to the very small risk of modest increase in methemoglobin concentration. *(Weise & Nahata, 2005)*

c. Sucrose (24% sucrose in water ie Tootsweet®)
   - Oral sucrose decreases pain behaviours in infants when administered two minutes prior to minor painful interventions (e.g. venipuncture, immunization). This mechanism is considered to be an orally mediated release of endogenous opioids.
   - Oral sucrose shall be administered to infants up to the age of 18 months prior to brief procedural painful interventions (e.g. venipuncture, immunization, urinary catheter insertion, intramuscular/subcutaneous injections, heel lance).
The recommended dosage for oral sucrose is two milliliters (mL) of 24% sucrose solution administered two minutes prior to a painful intervention. The dosage may be repeated if the procedure is not completed within five minutes.

(policy 18.2 - http://www.intranet2.capitalhealth.ca/uah-learningcentre/PoliciesandProcedures/Child_HealthP&P/18_Comfort/18.2%20-June%2030,%202011.doc)

Subcutaneous Lidocaine

- may be administered by a physician/NP for wound repair, lumbar puncture, drainage of abscess, etc. In the Emergency room it may be administered by a Registered Nurse.

Physical management of procedural pain:
- comfort holds
- comfort touch
- use of heat, cold, and/or vibration

Children should not be restrained for painful procedures. If the child is not able to hold still on his own, the procedure should be discontinued until other methods -- including sedation-- are available.

Psychological management of procedural pain:
- Children and families need preparation time and information to effectively manage painful procedures.
- Establish a trusting relationship with the child and family
- Provide simple, honest explanations at the appropriate developmental level
- Provide children with realistic choices and encourage active involvement such as blowing bubbles, playing with a toy or video game.
- Deep and steady breathing can reduce pain and help a child remain in control
- Distraction is much more effective than reassurance

Sedation / Analgesia

To promote patient safety refer to the Stollery Children's Hospital Guidelines for Sedation / Analgesia for Pediatric Patients Receiving Sedation for Procedures Outside NICU, PICU, the Operating Room and the Emergency Room which outline:

Patient selection criteria, role of non-anesthesiologist physician providing sedation, credentials and role of nurses, required care in the pre-procedural, procedural and recovery phases, and required facilities/booking, equipment, staffing. See:


Requests for anesthesia, sedation, peripheral nerve blockade, etc. on Stollery nursing units and the Burn Unit can be made through the Pediatric Operating Room.
SECTION 7 - CHRONIC PAIN

Chronic pain in children is the result of a dynamic integration of biological processes, psychological factors, and sociocultural context considered within a developmental trajectory. (American Pain Society, 2001)

Chronic pain is common in children, with approximately 25% of children reporting it in developed countries. Moderate to severe chronic pain affects 5-8% of children worldwide. In Canada, 2% of males and 6% of females between the ages of 12 – 17 years of age report chronic pain (StatsCanada, 2010)

The most common causes of chronic pain are:
- headache
- abdominal pain
- musculo-skeletal pain
- disease-related pain such as juvenile arthritis, sickle cell disease, Crohn’s and colitis

Pharmacologic Management of Chronic Pain:
- Limited evidence in the use of pharmacologic interventions for children with chronic pain in general, (WHO, 2012) however there is evidence on the effectiveness of medications for specific conditions such as headache, abdominal pain.
- Anticonvulsants may be prescribed for neuropathic pain
- Opioids may be appropriate
- Monitor the over the counter medications!

Physical Management of Chronic Pain:
- encourage active therapies (for example, exercise) over passive therapies (such as massage, naturopathic remedies)
- graded exercise programs and activity management
- daily activity such as walking, swimming or yoga
- application of heat/cold

Psychological Management of Chronic Pain:
- Believe the child! Chronic pain is real pain
- Cognitive-behavioural therapy is effective in managing chronic pain
- Children and families can be taught relaxation strategies, breathing exercises, mindfulness meditation
- Assessing for concurrent anxiety or depression is important.

Children with chronic, difficult to manage pain may be referred to the Pediatric Chronic Pain Clinic at the Stollery Children’s Hospital.

Contact Kathy Reid, Nurse Practitioner at 7-1363 or call 7-7035 for a referral form
Palliative care seeks to enhance quality of life in the face of an ultimately terminal condition. Palliative treatments focus on the relief of symptoms (e.g., pain, dyspnea) and conditions (e.g., loneliness) that cause distress and detract from the child's enjoyment of life. (American Academy of Pediatrics, 2000)

Whenever simpler approaches to analgesia are effective, they are preferable to more complex technologic approaches.

The mainstay of management of pain due to cancer is analgesic medication:

- The oral route for analgesia is usually preferable.
- Opioid analgesic doses should be titrated to effect without adherence to “standard doses and ranges”. The “right” dose is the dose which is sufficient to produce pain relief without causing excessive side effects.
- Continuous pain requires regular around-the-clock administration of analgesia to maintain constant levels of analgesia.
- The plan should include a prn dose for breakthrough pain.
- The breakthrough dose is generally 10% of the total daily dose and may be given up to \textbf{q1h prn}. If 3 or more breakthrough doses are required in a 24 hour period, the regular dose should be increased accordingly.
- Side effects must be treated. Children may not report side effects such as constipation, nausea, pruritis or dysphoria voluntarily. They should be asked specifically about these. \textbf{NOTE} Re: constipation - the regular use of opioids almost always causes decreased GI motility. Stool softeners / bowel stimulants should be started regularly with the onset of regular opioid use.
- Adjuvant therapies (medications with secondary indication for treatment of pain) are also often helpful alongside analgesia for pain at the end of life. (Collins, 2011; WHO, 1998)

**OPIOID PREPARATIONS (check availability at site)**

**MORPHINE**

- Morphine available is liquid, tablets, suppositories, parental form, M-Eslon (long acting granules) and MS Contin
- Dosing recommendations for morphine: 0.15 mg/kg po q4h if opioid naive
- Morphine clearance delayed in first 3 months of life

- \textbf{Long Acting Morphine Preparations}
  - Generally given q12h.
  - If there is return of pain in the last 4 hours of the dosing interval, consider administering q8h
  - Titration should be done FIRST with immediate release preparation.
  - To convert from immediate release dosing: determine total daily dose and divide by two: e.g. Morphine 10 mg. po q4h around the clock
20 mg. total daily dose (which converts to 30 mg. po q12h).

**HYDROMORPHONE** (Dilaudid)

- Hydromorphone available in liquid, tablets, suppositories, hydromorph contin and parental form

REMEMBER: hydromorphone is generally five times a potent as morphine. For example 10 mg Morphine equals 2 mg Dilaudid.

**Dosing Recommendations for Hydromorphone:**
1) Young children: 0.03-0.08 mg/kg/dose po q3-4h (maximum 5 mg per dose).
2) Older children: 1-2 mg/dose po q3-4h

**Methadone**

Methadone is a potent opioid with a long unpredictable half life. The use of methadone for analgesia purposes is increasing. Methadone has a long and variable half-life and can be given orally or intravenously commonly under the direction of the Pediatric Palliative Care Physician. Although it can provide optimal analgesia in some cases, it must be used with caution. It cannot be prescribed unless the prescriber hold a Methadone exception from Health Canada.

**Fentanyl (Duragesic™) patches**

A transdermal delivery system for fentanyl is available, but must only be ordered by physicians who specialize in palliative care or pain management.

Fentanyl patch is no longer indicated for children due to a number of deaths related to apnea.

[http://www.cps.ca/english/surveillance/cpssp/Publications/ADRTips.htm#Sept04](http://www.cps.ca/english/surveillance/cpssp/Publications/ADRTips.htm#Sept04)

Fentanyl patch should **NEVER** be used for post-operative pain. Fatalities due to respiratory arrest in this context have been reported in adults and in children.

Consultation with a Pediatric Pain or Pediatric Palliative Care physician is recommended prior to use of transdermal Fentanyl or parental fentanyl outside of the ICU.

*See Equi-analgesic Table for Comparison - page 29*
KEY POINTS:

- Titrate dose to effect.
- ALL single entity opioids require a triplicate prescription (TPP) (including ketamine for outpatient use which is rare).
- Methadone requires special license i.e. specialized approval (to the prescriber) from the College of Physicians and Surgeons of Alberta and Health Canada, and a triplicate prescription.
- In switching from one opioid to another after extended use there may or may not be complete drug cross-tolerance (incomplete cross-tolerance). This means the patient's drug receptors may have less tolerance to the new medication than the one they've been exposed to.
- As the initial starting dose, give 20% less than the equi-analgesic dose of the new drug. NOTE: provision is made for doses for breakthrough pain, titrating the new drug to effect.

METHODS OF ADMINISTRATION OF OPIOIDS:

Subcutaneous Infusion
Opioids (morphine or hydromorphone) can be administered via continuous subcutaneous infusion. Currently, we do not use methadone for subcutaneous infusions as the solution can be irritating to tissues, however adult practice guidelines are available and in practice if no other route of administration or analgesia were available.

Subcutaneous Indwelling Site for Intermittent Administration
A butterfly needle with short tubing and injection port or an Insulfion ™ can be used for intermittent subcutaneous injections. Administration of the medication through it should be done slowly (over about 5 minutes) to minimize stinging. Such subcutaneous sites can generally be maintained for 3-5 days or up to 7 days in some cases.

Medical Ambulatory Infusion
This equipment is used primarily by Edmonton Home Care / Community Care sectors of Alberta Health Services. These pumps deliver a continuous infusion of opioid with the capability of providing patient- initiated boluses for breakthrough pain. The medication cassette or bag is prepared by a community pharmacy not affiliated with Stollery Children’s Hospital.

A child receiving continuous subcutaneous or intravenous (via central line) opioids can go home on pass/ discharge using an ambulatory infusion pump.

NOTE: in order for a child to go home with an ambulatory infusion pump, the parent or guardian requires some teaching prior to leaving the hospital (on pass or discharge).

A referral to Home Care Children’s Services (780-342-4842 or 780-496-1300) is required to initiate the process of medical ambulatory infusion.

As well, Stollery Palliative Care team has ambulatory pumps which can be used in conjunction with Home Care Children’s Services.
**Definition of Neonate:** Newborn infant to corrected gestational age of 44 weeks gestation.

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**N-PASS:**

**Neonatal Pain, Agitation, & Sedation Scale**

*(developed by Pat Hummel MA, RNC, NNP, PNP, APN/CNP)*

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Sedation</th>
<th>Sedation/Pain</th>
<th>Pain / Agitation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Criteria</strong></td>
<td>-2</td>
<td>-1</td>
<td>0/0</td>
</tr>
<tr>
<td><strong>Crying</strong></td>
<td>No cry with painful stimuli</td>
<td>Moans or cries minimally with painful stimuli</td>
<td>No sedation/No pain signs</td>
</tr>
<tr>
<td><strong>Irritability</strong></td>
<td>No arousal to any stimuli</td>
<td>Arouses minimally to stimuli</td>
<td>Little spontaneous movement</td>
</tr>
<tr>
<td><strong>Behavior</strong></td>
<td>Mouth is lax</td>
<td>Minimal expression with stimuli</td>
<td>No sedation/No pain signs</td>
</tr>
<tr>
<td><strong>State</strong></td>
<td>No expression</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Facial</strong></td>
<td>No grasp reflex</td>
<td>Weak grasp reflex ↓ muscle tone</td>
<td>No sedation/No pain signs</td>
</tr>
<tr>
<td><strong>Expression</strong></td>
<td>Flaccid tone</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Extremities</strong></td>
<td>No variability with stimuli</td>
<td>&lt; 10% variability from baseline with stimuli</td>
<td>No sedation/No pain signs</td>
</tr>
<tr>
<td><strong>Tone</strong></td>
<td>Hypoventilation or apnea</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Vital Signs</strong></td>
<td>HR, RR, BP, SaO₂</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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**Pharmacologic Management of Pain in Neonates** (opiod, non-opioid)
- most commonly used analgesics are Fentanyl and Morphine

**Fentanyl Citrate:** analgesic, opioid

**Dosage:**

i) **Analgesia** (titrate to effect)
- Intermittent: 1-4mcg/kg/dose every 2-4 hours.
- Continuous: 1-5mcg/kg/hour

ii) **Sedation for premedication** in non-emergency intubation:
- greater than 33wks. gestation 5mcg/kg/dose I.V.
- less than 33wks. gestation 2.5mcg/kg/dose I.V. proceeded by Atropine and followed by Succinylcholine in case of muscle rigidity.
Morphine Sulfate:

**Dosage:**

**Loading Dose:** 0.05-0.1mg/kg/dose every 4-6 hours prn. or bolus of 0.1-0.2 mg then maintain with 10-20 mcg/kg/hour by continuous infusion. Higher doses may be ordered as required.

**Most pertinent side effects** noted: hypotension, respiratory depression, and decreased gastrointestinal motility (which ↑ time required to achieve full volume feeding).

Continued opioid use is also noted for withdrawal reactions when the medication weaning is attempted.

**Ketamine:** is also used in the neonatal population with few side effects.

**General Anesthetic Dosage:** 1-2 mg/kg/dose I.V.

Onset of action after I.V. administration is ~30 seconds

Duration (following single dose): 5-10 minutes; recovery 1-2 hours.

**Acetaminophen:** Analgesic, Non-narcotic, Antipyretic

- useful for treatment of mild pain and fever.

**Dosage:**

- 10-15 mg/kg/dose po every 4-6 hours prn.
- 20 mg/kg/dose per rectum every 6-8 hours prn.

Dose should not exceed 90 mg/kg/24 hours.

**Non-Pharmacologic interventions:**

“Non-pharmacologic” interventions are sometimes termed environmental and behavioral interventions. Environmental and behavioral interventions for the management of pain in the neonatal population are widely used because they can be used alone or in combination with pharmacological management. These include:

- Sucrose with and without non-nutritive sucking
- Facilitated tuck
- Skin-to-skin techniques (kangaroo care)
- Organization of care
- Environmental support

**Sucrose with and without Non-nutritive Sucking:**

The use of sucrose for effectiveness in the relief of procedural pain in the neonatal population has been extensively researched in both human and animal studies. The mechanism of action is thought to involve the endogenous opioid system through taste. The analgesic effect of sucrose has been found to last approximately 3 to 5 minutes with peak effect in 2 minutes.

The administration of sucrose in combination with NNS (pacifiers) has been examined in relation to calming effects in distress in the neonate. Co-administration of sucrose with the effects of non-nutritive sucking produces a significant improvement in calming and pain-relieving effects. The mechanisms underlying the effect of non-nutritive sucking are
not yet determined but it is speculated that sucking triggers the release of serotonin that may alter the transmission and processing of the pain response.


**Facilitated tuck:**
Facilitated tuck is defined as the containment of the neonate's arms and legs in a flexed, midline position close to the infant's trunk, also known as swaddling. Containment is not restraint. The infant must be able to move in order for the musculoskeletal system to develop appropriately. This measure is utilized to compensate for the infant's immature and/or disorganized motor control in an environment where the security of the womb is absent and the negative influence of gravity is relentless. Tucking is thought to facilitate the infant's ability to self-regulate thus decreasing stress and agitation levels. Appropriate use of facilitated tuck promotes improved rest and neurobehavioral organization. See: [http://www.intranet2.capitalhealth.ca/NICU/Documents/PoliciesProcedures/Developmental%20Care/positioning_pro.pdf](http://www.intranet2.capitalhealth.ca/NICU/Documents/PoliciesProcedures/Developmental%20Care/positioning_pro.pdf)

**Skin-to-skin/ Kangaroo maternal care:**
Skin-to-skin contact, which is a normal mammalian postnatal characteristic, has been found to improve neonatal state organization, thermal regulation, respiration, and oxygen saturation, reduce apnea and bradycardia, increased milk production (for the mother), accelerated weight gain, and early hospital discharge. Another benefit of KMC that has been documented is in the management and relief of procedural pain such as heel lancing. See: [http://www.intranet2.capitalhealth.ca/NICU/Documents/PoliciesProcedures/Developmental%20Care/skintoskin_pro.pdf](http://www.intranet2.capitalhealth.ca/NICU/Documents/PoliciesProcedures/Developmental%20Care/skintoskin_pro.pdf)

**Environmental support:**
Recommendations have been made regarding protection for the neonate in the NICU environment such as reduction in environmental noise, lighting, over stimulation from excessive handling, and cycled lighting to support circadian rhythm. By reducing the noxious load to which the infant is exposed and restructuring the physical environment we can hope that the neonate will experience minimal adverse effects from the different types of pain associated with NICU care.

Use of pharmacologic therapies for the management of neonatal pain remains an area of therapeutic ambivalence. In light of more recent research on the developing brain's vulnerabilities to neurotoxic agents, caregivers must assume responsibility for safe and judicious administration of analgesic and sedative agents. Some non-pharmacologic approaches to pain or distress management in the neonate such as swaddling, non-nutritive sucking, kangaroo-care and environmental support, are adjuncts to the administration of medications to treat these conditions. It is important to consider all approaches and their effects upon the neonatal population for the alleviation of pain and distress.

**Relevant NICU Policies:**
SECTION 10: P.A.R.R. GUIDELINES FOR ANALGESIA & SYMPTOM MANAGEMENT

The following Pediatric Drug Dosages (adopted 07/2006) are to be used as a reference for nursing staff in Post-Anaesthesia Recovery Room (PARR):

- Opioid doses should always be titrated against the patient pain and vital signs.
- Doctor’s advice should be sought when a child continues to appear to be in pain, yet the dose given has resulted in sedation, slowed ventilation rate, and/or decreasing Saturations requiring oxygen.
- In Peds OR the anesthetist writes specific orders for PARR narcotics on each child and should tell the nurse what he expects the child will need.
- Demerol and Morphine, if given after narcotics in the OR are usually given in smaller amounts in the PARR.
- Drug Dosages should include what was given in the OR also, therefore check anesthetic record prior to administration of any medication.
- Doses of opioids in PARR can be higher if the patient has not had any in the OR e.g. for morphine:
  - If the patient has had morphine in the OR then starting with 0.02 mg/kg in PARR is okay.
  - If the child has not had any opioid then you can start with 0.05 mg/kg.

- **Recommended Dosages:**
  - Benadryl 0.5-1 mg/kg
  - Demerol 0.2 – 0.5 mg/kg/dose
  - Gravol 0.5 – 1 mg/kg (if given in OR, do not repeat)
  - Midazolam 0.05 mg/kg/dose
  - Morphine 0.02 – 0.05 mg/kg/dose
  - Ondansetron 0.05 - 0.1 mg/kg (if given in OR, do not repeat)
  - Toradol 0.25 - 0.5 mg/kg (if given in OR, do not repeat)

**NOTE:** When giving anti-emetics, never repeat the same drug if ineffective; try a different one.
SECTION 11  RESOURCES

11.1 References:


11.2 Helpful Websites

Procedural Pain Management. Royal Children’s Hospital, Melbourne Australia

Clinical guidelines on Pain in children
http://www.rcn.org.uk/development/practice/clinicalguidelines/pain

Center for Pediatric Pain Research
http://pediatric-pain.ca/content/Home

Pain Resource Center at Sick Kids in Toronto. Information for children and families.
http://www.aboutkidshealth.ca/En/ResourceCentres/Pain/Pages/default.aspx

International Association for the Study of Pain – Pain in Childhood Special Interest Group
http://childpain.org/
http://www.who.int/cancer/palliative/painladder/en/
Appendix 1: Opioid Analgesic Conversion Chart

Pediatric and Neonatal Lexi-Drugs Online
Abbreviated from http://online.lexi.com/crlsql/servlet/crlonline?siteid=1
Version (current as of April 23, 2012)

This table serves as a general guide to opioid conversion. Utilization of a direct conversion without a detailed patient and medication assessment is not recommended and may result in over-or under-dosing. Values are based on single-dose adult studies. Duration of action may be shorter in children due to faster elimination (in general) compared to adults. The pharmacokinetics of opioids in children and infants >6 months of age are similar to adults, but infants <6 months of age, especially those who are premature or physically compromised, may demonstrate decreased clearance and are at risk of apnea.

<table>
<thead>
<tr>
<th>Drug</th>
<th>Onset (min)</th>
<th>Duration (h)</th>
<th>Equianalgesic I.M. Dose (mg)</th>
<th>Equianalgesic P.O. Dose (mg)</th>
<th>Parenteral Oral Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>FentaNYL</td>
<td>I.M.: 7-15</td>
<td>I.M.: 1-2</td>
<td>0.1</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>I.V.:</td>
<td>I.V.: 0.5-1</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>HYDRO-codone</td>
<td>P.O: 10-20</td>
<td>3-6</td>
<td>---</td>
<td>30-45</td>
<td>---</td>
</tr>
<tr>
<td>HYDRO-morphone</td>
<td>P.O.: 15-30</td>
<td>4-5</td>
<td>1.5</td>
<td>7.5</td>
<td>1/5</td>
</tr>
<tr>
<td>Methadone¹</td>
<td>P.O.: 30-60</td>
<td>Acute: 4-6</td>
<td>Pediatrics: Acute; 10</td>
<td>Pediatrics: Acute; 20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I.V.: 10-20</td>
<td>Chronic: &gt;8</td>
<td>Chronic²: Not established</td>
<td>Chronic: Not established</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Adults³: See Guidelines for</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Conversion to Oral Methadone</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>in Adults</td>
<td></td>
</tr>
<tr>
<td>Morphine</td>
<td>P.O. (immediate release): 15-60</td>
<td>P.O. (immediate release), I.V., I.M., SubQ: 3-5</td>
<td>10</td>
<td>30</td>
<td>1/6; ratio decreases to 1/1.5-2.5 upon chronic dosing</td>
</tr>
<tr>
<td></td>
<td>I.V.: ≤ 5</td>
<td>Extended release tablets: 8-12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oxy-CODONE</td>
<td>P.O. (immediate release); 15-30</td>
<td>P.O.: Immediate release: 4-5 Controlled release: 12</td>
<td>---</td>
<td>20</td>
<td>---</td>
</tr>
</tbody>
</table>

¹. Conversion to methadone requires close observation for delayed sedation which may occur 3 – 5 days post conversion. Dosing interval needs to be increased after the initial 1-2 days of treatment to avoid late sedation.
A conversion factor for pediatric patients receiving chronic opioids has not been identified; doses lower than those listed for acute opioid administration would be recommended based on adult data. Some experts recommend against the use of an “equianalgesic” dosage of methadone (to prevent or treat opioid withdrawal) because calculated methadone doses may be unnecessarily high for this indication (Lugo, 2001).

Conversion of higher doses may be guided by the following (consult a pain or palliative care specialist if unfamiliar with methadone prescribing): As the total daily dose of morphine increases, the equianalgesic dose ratio (methadone:morphine) changes in adults (American Pain Society, 2008). Total daily dose should be divided by 3 and administered every 8 hours. Methadone is significantly more potent with repetitive dosing. Begin methadone at lower doses and gradually titrate. Use these conversions only in adult patients; do not sue in pediatric patients; applicability to pediatric patients is unknown and may be dangerous or potentially lethal.

REFERENCES


Figure 1. Factors influencing the undermanagement of children’s pain

Olmstead, Scott & Austin (2010)
APPENDIX 3
STOLLERY CHILDREN’S HOSPITAL PAIN MANAGEMENT ALGORITHM

ASSESS and DOCUMENT PAIN
When? On admission, at least once a shift
Pre, during and post invasive procedures.
How? Use developmentally appropriate tools.

FLACC: Infants, toddlers, all non-verbal children
Faces 4 – 9 years
Numeric Rating Scale 7 years and older

Pain at rest and / or activity

PAIN INTERVENTIONS:
Pharmacological: * Document on MAR
• give analgesics regularly (acetaminophen, NSAID, opioid)
• topical anesthetic (EMLA® or Maxilene®) for IV’s and blood work
• sucrose for infants (procedural pain)
Comfort / Coping Measures: * Document in chart
• warm or cold packs (as appropriate)
• repositioning
• cuddling / soother for infants
• reassurance
• relaxation
• distraction
• child life assistance

Reassess and document pain within one hour

Pain
• attempt different intervention
• Consider reasons for pain despite intervention e.g. compartment syndrome
If still in pain after all available interventions tried contact appropriate service 24/7. Document.

No Pain
Reassess pain within 4 hours

Key Point
1 – 3 = Mild pain
4 – 6 = Moderate pain
7 – 10 = Severe pain
Moderate or severe pain (>4/10) requires pain intervention

Document all pain assessments on the Vital Sign record. Document all pharmacological interventions on MAR and all coping/comfort measures in narrative notes.

Developed by Pediatric Pain Team:
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March 2011