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## Patient Controlled (PCA)/Nurse Controlled (NCA) Analgesia

### Policy

PCA/NCA is used to manage pain and occasionally withdrawal in patients with opioid dependence. See Management of Iatrogenic Withdrawal policy and Patient Controlled (PCA) and Nurse Controlled (NCA) Analgesia Reference Tool for additional information.

**Note:** In certain circumstances, the PCA/NCA pump may be used to lock infusions of controlled substances other than opioids such as midazolam and ketamine.

ONLY the patient or nurse presses the PCA/NCA button. In rare instances there may be restricted roles for family members pushing the button. This exception is discussed with the team of health care professionals caring for the patient. Exceptions require an order from the Pain Treatment Service attending physician.

- Orders require a thoughtful review by an authorized prescriber at every change in level of care and/or change of service. Notify the Pain Treatment Service when patients are transferred with PCA/NCA orders so the orders can be reviewed and modified accordingly.
- No other sedative or opioid medications may be administered except as ordered or approved by the Pain Treatment Service

The following patients require cardio-respiratory and oxygen saturation monitoring for the duration of the opioid infusion:

- Selected patients with increased risk of respiratory depression, specifically:
  - Patients less than 6 months of age with opioid infusions and on NCA.
  - Opioid naïve patients (opioids scheduled or PRN for less than 72 hours) with continuous infusions.

**Note:** Exceptions to monitoring requirement: Cardio-respiratory and oxygen saturation monitoring may be discontinued intermittently while patient is awake and alert and a responsible adult is present.

For PCA/NCA **without** a continuous dose as part of the regimen, a carrier fluid running at a minimum of 2 mL/hr is necessary. This carrier fluid could be a plain IV fluid or other compatible IV fluid the patient may already be receiving (IV fluid requires a prescriber order).

### Medication Orders

Initial PCA/NCA orders are approved by the Pain Treatment Service prior to starting PCA/NCA pump for all medical and surgical patients.

Patients with PCA/NCA are managed in collaboration with the Pain Treatment Service.

- For non-standard concentrations of PCA/NCA, all initial orders are written by Pain Treatment Service. Subsequent changes may be written by the primary service physician in consultation with the Pain Treatment Service.
- For surgical patients, all changes in PCA or NCA are written by the Pain Treatment Service.
- For medical patients, after initial consultation, changes in parameters (e.g. increasing a bolus dose) may be written by the primary service physician in consultation with the Pain Treatment Service. The Pain Treatment Service approves major changes such as adding a continuous infusion, or change in medication (e.g. changing from Morphine to Hydromorphone) or a deviation from PCA policy or PCA orders.

Use standard concentrations of PCA solutions except in certain clinical situations such as palliative care. See PCA/NCA orderset.

## Patient Assessment

Complete the Pain Assessment Tool to assess and document the child’s pain level. The frequency of documentation is per prescriber orders, policy, unit guidelines, patient condition and clinical judgment.

Assess respiratory rate **every 1 hour**.

Assess heart rate, blood pressure, responsiveness and side effects of analgesia at least **every 4 hours** unless otherwise noted.

## Minimum Assessment of Patients with PCA/NCA

Assessment Element	Frequency
Pain assessment **	4 hours (typically)
Responsiveness Assessment**	4 hour
Respiratory rate	1 hours
Heart rate, blood pressure, temperature	4 hours
Side effects of analgesia	4 hours

\*\* Unless otherwise noted

## Programing and Documentation

The RN programs and checks pump with a second RN:

- During initial set up.
- At transfer of care (by RN relinquishing care of the patient and the RN assuming care of the patient).
- Whenever the pump is unlocked (i.e. changing PCA settings, changing medication cassettes, administering a loading does).

Documentation by both RNs is required. Per the Patient Care Manual: Independent Double-Checks for High Alert Medications two nurses verify:

- Volume remaining in cassette
- Medication name and concentration
- Settings
- Line reconciliation

## Purpose

To decrease pain while ensuring patient safety during patient or nurse controlled analgesia

## Procedure

### Definitions

The following terms, used in this document are defined in the BCH elibrary Glossary: Patient Controlled Analgesia (PCA), Nurse Controlled Analgesia (NCA), Loading/Initial Dose, Bolus/Demand Dose, Lockout or Dose/Bolus Interval, Dose Limit, and Basal/Continuous Infusion.

### Critical Alerts

#### Pain NOT Consistent with Illness or Surgery

Unexpected intense pain, particularly if sudden or associated with altered vital signs (respiratory distress, hypotension, tachycardia or fever) needs immediate evaluation by the primary service. The first priority in caring for a patient with significant pain not consistent with illness or surgery is to stabilize and treat the primary cause of the pain. For additional information, refer to the following algorithm: Safe and Effective Pain Management.

#### Respiratory Depression

The least common, but most serious side effect of opioids is respiratory depression. Risks of Respiratory depression include but are not limited to the following condition:

- Compromised airway
- Significant kidney disease
- Significant liver disease
- Somnolence
- History of respiratory depression with opioid use
- Large opioid dose for patient's weight and/or condition
- Significant lung disease in patients who are not ventilated
- Morbid obesity
- Opioid naïve (use of opioids – scheduled or PRN for less than 72 hours) and concurrent use of other medication capable of central nervous system depression (e.g. benzodiazepines)
- Muscle weakness

Monitoring the patient's responsiveness can alert the clinician to early signs of problems. For patients with significant cognitive/developmental impairment, refer to the Nursing Database Assessment the patient's cognitive/developmental baseline. See the Documentation section below for more information about documenting Responsiveness Assessment.

#### Responsiveness Assessment

- Awake and Alert.
- Easily aroused but drowsy.
- Drowsy but opens eyes when name is called several times.
- Hard to arouse, needing tactile stimuli.
- Only responds to pain.
- No response.

## Emergency Response

Opioid related respiratory depression and serious complications requiring ventilatory support are treated by emergency response (anesthesia STAT or Code Blue), and with Naloxone (Narcan) as needed. For detailed information about Naloxone (Narcan) refer to:

- Boston Children's Hospital Formulary.
- The Patient Care Manual: Parenteral Naloxone (Narcan) By Rapid Intravenous Administration.

Contact the Boston Children's Hospital (Main Campus) Pain Treatment Service and Primary Care Service **immediately** if:

- If a patient is drowsy and hard to arouse and/or needs tactile stimulation and loud voice to arouse.
- Patient has inadequate pain control or persistent opioid related side effects including itching, nausea, and/or vomiting.
- Respiratory depression requiring intervention (oxygen administration, stimulation, ventilatory support). Contact anesthesia STAT and Code Blue as needed.

## Communication

If the service in charge of pain management is unable to manage significant, acute, and unrelenting pain refer to the following algorithm: [Safe and Effective Pain Management](#).

## Resources

- PCA/NCA Pump (Call Distribution at ext 5-6222)
- PCA/NCA Tubing with one-way valve
- Emergency equipment (at bedside)
- Naloxone (Narcan) stocked in PYXIS
- Pain Treatment Service (available through Page Service 24 hours/7days)
- Red button for patients with motor disability

## Implementation

1. Before manipulating a medication cartridge for a PCA pump (e.g. when removing or replacing a cartridge), clamp the tubing or disconnect from patient.
2. When preparing a PCA opioid infusion, use PCA tubing with a one-way valve. The carrier fluid is connected to the port with a one-way valve to prevent drug reflux. For non-opioid continuous infusions WITHOUT a bolus (such as ketamine or Dexmedetomidine), Micro-bore extension tubing may be used.
3. Prime tubing with PCA medication only up to the bifurcation between PCA medication and carrier fluid. Prime remaining tubing with a compatible carrier fluid.
4. Whenever possible PCA tubing is connected to the T connector or mini-extension set at the IV insertion site. Great lengths of tubing between the bifurcation and IV insertion site increase PCA medication infusion time.
5. Document the running total hourly in milligrams or micrograms on flowsheet.
6. Document the 12 hour total. After documenting, clear the PCA/NCA pump (with a witness).
7. Manage expected side effects of opioids.
8. Change solution and tubing as per the Patient Care Manual: Medication Administration by Intravenous Route.

9. Validate with parent/family members that only the patient should press the PCA button. See the Patient-Controlled Analgesia (PCA) for Pain Relief or Nurse-Controlled Analgesia (NCA) for Pain Relief Family Education Sheet.
10. Patient on PCA/NCA does not leave the patient care unit without an RN.

## Evaluation

Evaluate effectiveness of the procedure and patient outcomes.

## Documentation

Complete patient care documentation as described in the Patient Care Manual. In addition, document specific Patient Controlled (PCA)/Nurse Controlled (NCA) Analgesia information as follows:

<b>Pain History and Initial Assessment form</b>	<ul style="list-style-type: none"> <li>• Obtain a pain history for every patient from the patient and/or family/caregivers upon admission and an Initial Pain Assessment when clinically indicated.</li> </ul>
<b>Patient Care Flow Sheet/ Electronic Documentation</b>	<ul style="list-style-type: none"> <li>• Document the selected pain tool.</li> <li>• Document pain assessment using age-appropriate Pain Assessment Tools</li> <li>• Document hourly the <b>running total</b> amount of medication infused in milligrams or micrograms on flow sheet.</li> <li>• Document respiratory rate every <b>1 hour</b>.</li> <li>• Document heart rate, blood pressure, temperature, and responsiveness at least every <b>4 hours</b> unless otherwise noted.</li> <li>• Document side effects of analgesia as they occur.</li> <li>• Document 12 hour totals.</li> </ul>
<b>Progress Notes</b>	<ul style="list-style-type: none"> <li>• Describe success, partial success, or failure of the interventions provided for pain.</li> <li>• Record all changes in pain management plan, and communication of unexpected outcomes (unsatisfactory pain relief, significant side effects, dose changes, etc.) along with response to changes.</li> </ul>

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## Document Attributes

<b>Title</b>	Patient Controlled (PCA)/ Nurse Controlled (NCA) Analgesia		
<b>Author</b>	Jean Solodiuk, RN, CPNP	<b>Date of Origin</b>	01/02
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<b>Copyright</b>	© Boston Children’s Hospital 2022	<b>Last Modified</b>	06/05/18
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