

PAEDIATRIC NURSING PRACTICE MANUAL  
SECTION 3

GENERAL CARE OF THE SICK CHILD

3.1 MONITORING VITAL SIGNS

3.1.7 NEUROLOGICAL OBSERVATIONS

This document is to be read in conjunction with [PNPM 3.1.1](#) General Observations, including Respiratory Assessment

**Aims**

1. To minimise further neurological insult through prompt detection and reporting of a deterioration in neurological status.<sup>1</sup>
2. To identify changes in neurological status which may influence diagnosis and treatment.<sup>1</sup>

**Key points**

1. In this Hospital a modified version of the Glasgow Coma Scale (GCS) is used to assess changes in conscious state. The modified GCS evaluates three modes of behaviour - eye opening, verbal response, and motor response.
2. Changes in a patient's vital signs are all late signs of increased intra cranial pressure.
3. The frequency of neurological observations should be determined by the patient's medical team and as clinically indicated.
4. Any deterioration or significant changes must be reported immediately to the RMO. Consider a medical review, MET call, CODE Blue as indicated by the child's clinical condition. ([PNPM 4.1](#) Code Blue (55) and Emergency Resuscitation).
5. Do not omit neurological observations if the child is sleeping, a sleeping child could be comatosed.<sup>2</sup>
6. The procedures below are not in a specific order. It may be appropriate to first assess the child's clinical signs/behaviour and/or level of consciousness eg. verbal response before physical observations.
7. Excessive urine output (>5mL/kg) may indicate Diabetes Insipidus and compression of the pituitary gland through increasing intracranial pressure.
8. Other features of that indicate the risk of intracranial damage may include nausea and vomiting, headache, irritability or altered behaviour, seizure.<sup>3</sup>

**Equipment**

Penlight torch

Thermometer

Sphygmomanometer and stethoscope or Dinamap® electronic monitor

Neurological observation chart

PROCEDURE	ADDITIONAL INFORMATION
Explain the observations to the child, whether conscious or not.	The child who is unconscious may still be able to hear.

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Neurological Observations  
Monitoring Vital Signs  
Paediatric Nursing Practice Manual (PNPM)  
Princess Margaret Hospital  
Perth, Western Australia

All protocols should be read in conjunction with the Disclaimer in the Preface of this manual

PROCEDURE	ADDITIONAL INFORMATION										
<p>Assess respiratory status (Refer to <a href="#">PNPM 3.1.1</a> General Observations, including Respiratory Assessment).</p> <p>Note the rate, quality and pattern of respirations.</p> <p>Observe for signs of cyanosis, distress, abdominal breathing, sternal recession and tracheal tug.</p>	<p>This may indicate pressure to the brain stem.<sup>4</sup></p>										
<p>Note any signs of stridor, grunting or wheezing.</p>	<p>This may indicate partial airway obstruction.<sup>5</sup></p>										
<p>Take and record the pulse.</p> <p>Note the rate, rhythm and quality.</p>	<p>The rates specified by the CEWT chart are regarded as the bench mark for normal values at Princess Margaret Hospital.</p> <table border="1"> <thead> <tr> <th>Age(CEWT Chart)</th> <th>Heart Rate</th> </tr> </thead> <tbody> <tr> <td>&lt; 1 year</td> <td>100-160</td> </tr> <tr> <td>1-4 years old</td> <td>90-140</td> </tr> <tr> <td>5-11 years old</td> <td>80-130</td> </tr> <tr> <td>≥ 12 years old</td> <td>60-120</td> </tr> </tbody> </table>	Age(CEWT Chart)	Heart Rate	< 1 year	100-160	1-4 years old	90-140	5-11 years old	80-130	≥ 12 years old	60-120
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<p>Report bradycardia or tachycardia.</p>	<p>This is usually a late sign of raised intracranial pressure, that occurs after the child's level of consciousness has deteriorated, or as a response to hypoxia/hypoxaemia in infants.<sup>5</sup></p>										
<p>Report any cardiac arrhythmias/pulse irregularity.</p>	<p>This may indicate internal bleeding or hypovolaemia. It may also be the only indication that the patient is fitting.<sup>1</sup></p>										
<p>Take and record the blood pressure</p> <p>Mark the mean arterial pressure with a cross on the chart.</p>	<p>Hypertension is common and may reflect fear, anxiety or pain, and may be associated with seizures.<sup>5</sup></p> <p>Hypertension with a widening pulse pressure is usually a late sign of raised intra cranial pressure.<sup>1</sup></p> <p>Hypotension is rarely due to cerebral injury alone; commonly associated with circulatory changes and is usually a terminal sign.<sup>1, 5, 6</sup></p> <p>Hypotension will also compromise cerebral perfusion pressure because <math>CPP = MAP - ICP</math>, maintenance or restoration of CPP is extremely important.<sup>1, 4, 5</sup></p>										
<p>Take and record the temperature.</p>	<p>Hyperthermia may be caused by damage/pressure to the brainstem or hypothalamus (temperature regulatory centre).</p>										
<p>Check the peripheral temperature.</p> <p>Report if the extremities are cool, warm or hot to touch.</p>	<p>Vasoconstriction and reduced peripheral perfusion are early signs of decreasing circulating blood volume.</p>										

PROCEDURE	ADDITIONAL INFORMATION
<p>Test eye opening response and record on coma scale.</p> <p>Note if the eyes open spontaneously or if the patient requires speech or pain to arouse.<sup>7</sup></p> <p>If no response, apply pressure to the proximal side of the nail bed.</p> <p>If the patient's eyes are closed as a result of swelling or facial fractures, record as a 'c' on the chart.</p>	<p>Assesses the patient's level of arousal within the brain stem.<sup>4,7</sup></p> <p>Speak in a loud voice to allow for deafness and use touch to establish contact.</p> <p>Use the least amount of pressure to elicit a response to avoid damage to the nail bed.</p>
<p>Record the pupil size and speed of the reaction.</p> <p>Report inequality in pupil size or a sluggish reaction.</p> <p>Note unusual eye movements, consensual light reflex and/or swelling or if the eye is closed 'c', or if there is no reaction.</p>	<p>Have the room darkened if possible, which enables more effective observation.</p> <p>A change in pupil size and reaction to light is an indication of raised ICP and compression of the optic nerve.<sup>4</sup></p> <p>This may indicate deterioration in the child's condition.</p>
<p>Assess best verbal response.</p> <p>Record on the coma scale.</p>	<p>When assessing the child's verbal response, relate this to the child's individual development using words familiar to him or her.</p>
<p>Talk to the child throughout the procedure, even if unconscious, as hearing may be unimpaired.</p>	<p>The child may respond better to their parent/carer questioning them.<sup>2</sup></p>
<p>Check the best motor response and record on the coma scale.</p>	<p>This measures the overall awareness and ability to respond (by movement) to external commands.<sup>7</sup></p>
<p>Give simple commands such as: "squeeze my hand" or "poke out your tongue."</p> <p>Allow time to respond</p>	<p>Be careful not to interpret grasp reflex or postural adjustment as a purposeful response and it is best to only accept repeated commands or stimulation.<sup>2</sup></p>
<p>If no response, apply pressure to the proximal side of the fingernail bed, if still no response, apply pressure to the centre of the sternum.<sup>7</sup></p>	<p>Painful stimuli should only be used when deemed absolutely necessary and must not become routine.</p>

PROCEDURE	ADDITIONAL INFORMATION
<p>Compare the strength of limbs on both sides Record them separately if there is a difference.</p> <p>Assess upper limb movements:</p> <ul style="list-style-type: none"> <li>Extend your hands and ask the child to squeeze as hard as possible. Compare grip and strength, and then ask the child to release his/her grip.</li> <li>Test the flexion and extension response by asking the child to push and pull against your extended arms.</li> </ul> <p>Assess lower limb movements:</p> <ul style="list-style-type: none"> <li>Ask the child to push his/her feet against your hands as hard as possible. Compare the strength.</li> <li>To test flexion and extension, ask the child to wriggle his or her toes.</li> <li>Push down and pull up toes.</li> </ul>	<p>Make sure the response is not a grasp reflex.</p> <p>If the child cannot follow instructions due to age, unconsciousness or a language barrier, observe spontaneous movements and note strength.</p> <p>If child unconscious record as 'no response.'</p> <p>Classify the movements as shown below.<sup>5</sup></p> <p>"Normal Power" – movements are appropriate to the normal muscle strength for that patient.</p> <p>"Mild Weakness" – moves with difficulty against resistance and can't fully lift against gravity.</p> <p>"Severe Weakness" – moves a limb laterally but has great difficulty can't move against resistance.</p> <p>"Spastic flexion" – the arm bends at the elbow and is very stiff.</p> <p>"Extension" – the limb straightens at the elbow or knee joint.</p> <p>If child is unconscious, record as 'no response.'<sup>5</sup></p>

### References:

- Scottish Intercollegiate Guidelines Network [SIGN]. Early Management of Patients with a Head Injury Section 7: Inpatient observation. 2000. Available from: <http://www.sign.ac.uk/guidelines/fulltext/46/index.html>. Accessed: 11 December 2009.
- Trigg E & Mohammed T. Practices in children's nursing: Guidelines for hospital and community. 2nd ed. Oxford: Elsevier; 2006.
- Rathnayake T. Head Injury: Early Management. Joanna Briggs Institute Clinical information Service: Evidence Summary 2007. Available from: <http://connect.jbiconnectplus.org/ViewDocument.aspx?0=565>. Accessed: 15 December 2010.
- Mooney GP & Comerford DM. Neurological Observations [Expert opinion]. Nursing Times.99(17):24-25; 2003.
- Rathnayake T. Observations Neurological [Levels III & IV]. Joanna Briggs Institute Clinical information Service: Evidence Summary 2009. Available from: <http://www.jbiconnect.org/connect/docs/jbi/cis/connect-gen-user-view.php?IID=689&qu=1&p=1&e=1&r=1&o=1>. Accessed: 19 February 2010.
- Wellington B. Development of a guide for neurological observations [Expert opinion]. Nursing Times.101(39):32-34; 2005.
- The Joanna Briggs Institute Clinical Information Service. Intervention; Observations: Neurological. In; 2007.

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