

Site Applicability

Guidelines and procedures for vital signs, assessment and documentation are applicable to areas where the Pediatric Early Warning System (PEWS) has been implemented. This practice applies to all nurses in pediatric patient care areas that have been designated by your health authority.

Guideline Purpose

The purpose of this document is to outline assessment standards for pediatric patients seen throughout the province of British Columbia. Components of an assessment, including physical assessment, vital sign measurement, and PEWS scoring, are described.

Comprehensive physical assessment, as outlined in this document, is the responsibility of all nurses. By recording and comparing physical observations, a nurse is able to identify problems early and reduce the likelihood of an adverse event. Due to the rapid onset of complications in the pediatric patient, frequent observations and focused assessments are necessary.

Practice Level / Competencies

Conducting physical assessments, vital sign measurements and Pediatric Early Warning Scoring are foundational level competencies of registered nurses (RN) and licensed practical nurses (LPN).

In areas where various levels of care providers (LPN, Care Aide, student nurses, employed student nurses) are assigned to patients, care of a deteriorating patient will be assumed by the RN.

Guideline Standards

1. The pediatric patient and/or caregiver should consent to vital sign assessment and measurement. A family and patient centred care approach should be used. If vital sign assessment and measurement is refused, it should be documented **and** communicated to the most responsible practitioner (MRP) and health care team in a timely manner.
 - Where appropriate, the pediatric patient/caregiver(s) should assist the nurse in performing vital sign assessment and measurement
 - The pediatric patient should be positioned correctly and comfortably prior to and during the procedure
2. Full **physical assessments** (e.g. head-to-toe, systems) are conducted:
 - On all **admitted patients**:
 - Upon admission
 - Following transfer to the unit
 - At the beginning of each shift
 - When assuming patient assignment mid-shift from another care provider
 - At the discretion of the nurse

In **critical care areas** patients will be assessed as per Health Authority/agency standards

3. **“Focused”** physical assessments are conducted on all patients:
 - As per Health Authority/agency standards
 - As per CTAS guidelines (emergency/urgent care settings)
 - With transferring nurse at time of patient transfers
 - With any decline in patient status
 - At the discretion of the nurse

4. **Vital Signs** {Heart/Pulse Rate (HR/P), Respiratory Rate (RR), Temperature (T), Blood pressure (BP), Pain Score and PEWS Score } will be measured as per PEWS and:
 - Health Authority/agency standards
 - Physicians orders (if different from minimum standard)
 - CTAS guidelines (emergency/urgent care settings)
 - Nursing care plans
 - Nursing clinical judgment
 - As required for a particular procedure or medication
 - Provincial Vital Sign parameters will be as per **Appendix A**

5. **Frequency of Vital Sign** Measurement and Recording is as follows:
 - The minimum standard of Vital Sign and PEWS score monitoring is every 4 hours for patients in **non-critical in-patient care areas**
 - In **critical care areas** monitor as per CTAS, PEWS, physician’s orders, nursing care plan and Health Authority/agency standards.

6. **Pediatric Early Warning System (PEWS) Score** will be assessed in conjunction with Vital Signs.

7. **Sepsis Screening** is to be conducted if the PEWS score increases by 2 or meets sepsis critical heart rates and/or temperature. The Provincial Sepsis Screening Tool is available for use in Emergency/Urgent Care settings. For non-critical in-patient care areas please use the screening tool identified by your Health Authority/agency.

8. **Neuro Vital Signs (NVS)** will be assessed as per:
 - Physician order
 - Nursing Care Plans
 - Nursing clinical judgment
 - As required for a particular procedure or medication
 - If patient shows a change in GCS or other neurologic indicators that might indicate a potential deterioration
 - When patient is transferred/admitted to another unit
 - At minimum of once per shift for **all inpatients**

NOTE: Nursing staff will perform a joint visual NVS assessment:

 - At shift to shift handover if patient on every 2 hours or more frequent NVS assessment
 - At shift to shift handover if patient on 1:1 or 2:1 nursing care
 - If patient is difficult to assess due to age or other factors
 - If patient requires a set of NVS done by a nurse other than the primary nurse caring for the patient that shift

9. Vital Sign monitoring may also include **Oxygen Saturation** (SpO₂), **Spinal Cord Assessments** and/or **Neurovascular Assessments if used in your agency.**

Monitoring of Oxygen Saturation, Spinal Cord Assessments and/or Neurovascular Assessments will be initiated as per:

- Physician order
- Nursing Care Plans
- Nursing clinical judgment
- As required for a particular procedure or medication

10. **Intake and Output** are to be monitored and documented per:

- Minimum every 12 hours
- Physicians orders (if different from minimum standard)
- Nursing Care Plans
- Nursing clinical judgment
- As required for a particular procedure or medication
- With any decline in patient status
- At the discretion of the nurse

11. Patients weight is to be obtained and recorded:

- As per Health Authority/agency standards
- On admission to emergency/urgent care as per routine site standards
- Minimum once a day for admitted patients

Patient weight is to be monitored and documented per:

- Physicians orders
- Nursing Care Plans
- Nursing clinical judgment
- As required for a particular procedure or medication

12. Patients on ECG monitoring/telemetry will have a rhythm strip printed at initiation of monitoring, every 12 hours and prn with rhythm changes or change in patient status as per Health Authority/agency standards or at discretion of provider.

13. Changes in the patient's condition, Vital Signs and/or PEWS scores will be communicated, documented, and escalated per the PEWS escalation aid recommendations, reassessment and clinical judgement.

14. Communication between team members will utilize the **Situation Background Assessment Response (SBAR)** format.

PROCEDURES	Rationale
<p>1. Respirations</p> <ul style="list-style-type: none"> ○ COUNT respirations for one full minute ○ MEASURE the RR in an infant or young child by auscultating the chest for one full minute ○ In addition to auscultation, COUNT abdominal movements in infants and children less than six to seven years of age ○ OBSERVE and AUSCULTATE respirations in the older child ○ OBSERVE pattern, effort and rate of breathing ○ NOTE any signs of respiratory distress such as: <ul style="list-style-type: none"> ▪ nasal flaring ▪ grunting ▪ wheezing ▪ dyspnea ▪ use of accessory or intercostal muscles ▪ chest shape and movement 	<p><i>A minute of assessment is recommended to ensure accuracy of data.</i></p> <p><i>Infants often have irregular respiratory rates.</i></p> <p><i>Infants and children up to 6-7 years of age are predominantly abdominal breathers.</i></p>
<p>2. Heart/Pulse Rate</p> <ul style="list-style-type: none"> ○ COUNT heart/pulse rate for one full minute ○ USE a stethoscope to auscultate the apical heart rate of children less than two years of age or: <ul style="list-style-type: none"> ▪ in any child with an irregular HR or known congenital heart disease ▪ as clinically indicated ▪ as per medication parameters <p>CROSS-CHECK electronic data by auscultation or palpation of the heart/pulse rate and document.</p>	<p><i>A minute of assessment is recommended to ensure accuracy of data and to compensate for normal irregularities in HR.</i></p> <p><i>The apical pulse is the best site for auscultation of the HR in an infant and young child. The radial pulse is appropriate to use in the child older than 2 years.</i></p>
<p>3. PEWS Scoring</p> <ul style="list-style-type: none"> ○ PLOT vital sign measurements and observations on age appropriate Provincial PEWS flowsheet/vital sign record for each category of the PEWS indicators (respiratory, cardiovascular, behaviour, persistent vomiting, & bronchodilator every 20 minutes) ○ Calculate Category PEWS score ○ TOTAL PEDIATRIC EARLY WARNING SYSTEM (PEWS) SCORE: <ul style="list-style-type: none"> ▪ To obtain a total PEWS score, ADD the category scores together (respiratory + cardiovascular + behaviour + vomiting + bronchodilator = maximum achievable score of 13) 	<p><i>The overall PEWS score is applied to determine Nursing Actions and the accessing of physician and emergency supports</i></p>

4. Temperature

- **SCREEN** all patients for temperature as part of routine VS monitoring
- **DETERMINE** optimal route for measuring temperature based on child’s age, condition and ability to cooperate
- The **definitive** route (oral, rectal) for temperature measurement should be used in situations where body temperature needs to be measured with precision unless contraindicated, or
- When an accurate temperature is required, or
- If the screened temperature (axilla) is not consistent with the clinical assessment

Do not obtain rectal temperatures for infants under the age of 30 days, any patient who has had rectal surgery, is on anticoagulant therapy, has a known or suspected bleeding disorder, is immune compromised, or is neutropenic

Refer to Appendix B Summary of Recommended Temperature Measurement Techniques

- **ASSEMBLE** equipment. **SELECT** appropriate probe (oral/axilla/rectal)
- The thermometer should be left in position long enough to gain an accurate reading, according to manufacturer’s instructions

Temperature is an objective and reliable indicator of illness and measuring temperature is an integral part of assessing children.

A consistent route is important to ensure accurate trending of the patient’s temperature.

Oral and rectal routes are more reliable and are the recommended routes for obtaining definitive temperatures.

*Do not obtain rectal temperatures for infants under the age of 30 days to avoid injuring the rectal mucosa. **Note:** The exception to this is a patient who requires a definitive temperature (For example sepsis)*

5. Blood Pressure (BP)

- **SELECT** appropriate sized cuff. **Refer to Appendix C** for Recommended Dimensions for BP Cuffs. If a cuff is too small, the next largest cuff should be used, even if it appears large
- The arm is the site of choice for BP measurement
- Avoid any constricting device on limbs with a midline venous catheter, fistula or graft. If possible also avoid limb with an IV

For Arm BP measurement:

- a. **POSITION** the arm so that the antecubital fossa (ACF) is at heart level. Support the arm throughout measurement. If patient is lying down, support the arm with a pillow so that the ACF is at heart level
- b. **LOCATE** the brachial artery by palpation
- c. **Apply** the cuff positioning the middle of the bladder, indicated by the manufacturer’s marker, over the palpated brachial artery, 2-3 cm above the antecubital fossa

For Calf BP measurement:

- **POSITION** patient supine
- **LOCATE** the dorsalis pedis or posterior tibial artery
- **APPLY** the cuff positioning the middle of the bladder, indicated by the manufacturer’s marker, over the palpated artery, approximately 2.5 cm above the inner ankle bone

For Thigh BP measurement:

- a. **POSITION** patient prone. If the patient cannot be placed in the prone position, position the patient supine with knee slightly bent
- b. **Locate** the popliteal artery found just behind the knee
- c. **Apply** the cuff just above the knee with the bladder over the popliteal artery

For Oscillometric (automatic BP monitor) measurement:

- a. Ensure device is functioning correctly
- b. Connect cuff to BP monitor tubing
- c. Ensure tubing is free of kinks
- d. Select the correct patient mode (adult, pediatric, neonate) if required
- e. Stabilize limb as movement causes artifact
- f. Press start to obtain reading
- g. Set and activate appropriate alarms if device to be used for ongoing monitoring

Blood Pressure alterations may indicate particular diseases, response to illness and outcomes of treatment.

A too small cuff will give significantly higher readings; a too large cuff will give significantly lower readings.

The right arm is preferred in children because:

- *Standardized BP tables reflect right arm readings*

Note: *Calf and/or thigh BP measurements can be taken when ordered i.e. Four Limb BP*

Arm position can have a major influence on BP. If the upper arm is below the right atrium, the readings will be too high. If the arm is above the right atrium, the readings will be too low.

Leg and arm BP measurements are not interchangeable.

For Auscultator (manual BP) measurement:

- a. Place stethoscope over palpated artery
- b. Palpate the radial pulse and inflate cuff to 20-30 mmHg above the point where radial pulse disappears
- c. Partially open valve and deflate the bladder at 2-3 mm/sec while listening for Korotkoff sounds
- d. As pressure in cuff decreases, note the reading on the sphygmomanometer for first appearance of tapping (systolic reading) to when tapping sounds muffle and disappear (diastolic reading)

For Orthostatic or Postural Hypotension measurement:

- a. Measure BP and HR after the patient has been lying supine for 5-10 minutes
- b. Measure BP and HR after the patient has been sitting on side of bed for 2-3 minutes
- c. Assist patient to standing position. Wait 2-3 minutes and measure BP and HR.

Note: Take the standing or sitting BP (in the same arm as the initial readings) and determine the heart rate at 1 and 3 minutes after the position change.

Do not leave the patient alone during this procedure, as they may experience dizziness, feel lightheaded or faint. Additional support may be required to help move the patient safely from lying to a standing position.

- o **DOCUMENT** BP on the Provincial PEWS flowsheet/Vital Sign Record or electronic health record **used in your agency indicating:**

- Limb used (if other than arm)
- Patient position using the following symbols



- o **Document** mean arterial pressure (MAP) on the Provincial PEWS flowsheet/Vital Sign Record or electronic health record **used in your agency**

Note: monitors will display MAP or it is calculated with the following equation:

$$\text{MAP} = \frac{\text{Systolic Pressure} + (2 \times \text{Diastolic Pressure})}{3}$$

Lying and standing BPs may be ordered in patients with suspected orthostatic/postural hypotension.

MAP should be documented numerically and is defined as the average pressure in a patient's arteries during one cardiac cycle. It is considered a better indicator of perfusion to vital organs than systolic blood pressure (SBP).

6. **Oxygen Saturation (SpO₂)**

- **SET** alarm limits as appropriate for age and patient condition for
 - Pulse Rate
 - SpO₂

Note: Minimum SpO₂ levels as measured by oximetry monitor should be obtained from the physician based on the patient's condition.

ENSURE alarm is audible

- **ATTACH** oximetry probe to appropriate site that has been assessed to have adequate perfusion ensuring that the probe is properly attached with the light sources and detectors opposite each other

Note: Use of Coban tape to hold sensor probe in place should be avoided as it increases the risk of injury with extended use

- The sensor probe site must be changed at least every 4 hours, or more frequently as needed to:
 - assess site for adequate perfusion
 - ensure skin remains intact
 - to prevent possible injury to site

Refer to **Appendix D** Tips for Securing Oximetry Sensor Probe

Placement of the sensor on the same extremity as a blood pressure cuff or arterial line can cause erroneous readings and should be avoided

- **ASSESS** patient for factors that could cause inaccurate SpO₂ readings:
 - presence of abnormal hemoglobins
 - hypoperfusion
 - hypothermia
 - severe anemia
 - venous congestion
 - presence of nail polish
- **ENSURE** good signal and measurement by observing the following:
 - strong signal indicator
 - correlating pulse rate (PR) with palpated pulse and auscultated heart rate
 - correlating SpO₂ measurement with clinical condition

Allows early identification and prompt intervention for adverse events.

Setting appropriate parameters for alarm limits reduces nuisance alarms.

Good perfusion is essential for proper detection of oxygen saturation levels.

Gathering a baseline comparison between the monitor readings, clinical condition and the unmonitored readings ensures accuracy in recordings.

<p>7. Neurovital Signs (NVS)</p> <ul style="list-style-type: none"> ○ FULLY AWAKEN patient to assess NVS, regardless of time of day ○ INCLUDE the primary caregiver, when appropriate, in the NVS assessment ○ ESTABLISH an understanding of each patient’s ‘best response’ baseline in order to determine any subtle downward trends in function ○ COMPLETE NVS assessment utilizing the Pediatric Modified Glasgow Coma Scale as well as assessment of muscle strength and pupillary size and response. Components of the Pediatric Modified Glasgow Coma Scale include: <ul style="list-style-type: none"> ▪ Best Eye Response ▪ Best Verbal Response ▪ Best Motor Response ○ ASSESS Best Verbal and Best Motor Response based on child’s age and verbal/developmental ability ○ ASSESS pupil size and response (1-8 mm and brisk, sluggish or fixed) ○ ASSESS the fontanel in an infant to determine if it is soft and flat while he/she is quiet <p>REFER to Appendix E for the Pediatric Modified Glasgow Coma Scale</p>	<p><i>The Glasgow Coma Scale provides an objective measure of the child's level of consciousness.</i></p> <p><i>Potential signs of distress in an infant include a sunken, tense, or bulging fontanel when the infant is quiet.</i></p> <p><i>Primary caregiver can assist in establishing/confirming patient's normal baseline response.</i></p>
<p>8. Spinal Cord Assessment/Check:</p> <ul style="list-style-type: none"> ○ CONDUCT spinal cord checks as ordered or when clinically indicated if there is risk of spinal cord function alteration ○ Spinal cord assessment includes: <ul style="list-style-type: none"> ▪ Motor response ▪ Muscle Strength ▪ Colour, sensation & movement of extremities ▪ Bladder function ▪ Pain ○ PERFORM spinal cord checks using the Spinal section of the Neurovital Sign Assessment Section of the Provincial PEWS Flowsheet/Vital Sign Record or per the electronic health record used in your agency ○ COMPARE assessment findings to previous findings to track any changes in assessment data ○ NOTIFY (MRP) immediately of any change indicative of deterioration such as: <ul style="list-style-type: none"> ▪ urinary retention or change in bladder function ▪ limb weakness ▪ change in sensation or colour of the limbs ▪ diminished pedal pulses 	<p><i>Early detection of change in spinal cord function is key in preventing permanent damage and disability.</i></p>

9. **Neurovascular Assessment:**

- **CONDUCT** neurovascular assessments:
 - as ordered
 - post-operatively when there is a risk of neurovascular compromise (i.e. orthopedic surgery)
 - for patients in traction
 - for any patient requiring CWMS assessment of limbs
- **ASSESS** affected limb and compare to unaffected limb
 - **ASSESS** CWMS (colour, warmth, movement, sensation)
 - **ASSESS** for presence and quality of peripheral pulses
 - **NOTE** presence of edema
 - **ASSESS** for pain and pain with passive range of motion (ROM)
 - **ASSESS** capillary refill time
- **DOCUMENT** neurovascular assessment per the neurovascular assessment section of the Provincial PEWS Flowsheet/Vital Sign Record or electronic health record **used in your agency**

Neurovascular assessment involves the evaluation of the neurological and vascular integrity of a limb.

Prompt recognition of any neurovascular deficits will lead to appropriate treatment and minimize complications such as compartment syndrome which can lead to irreversible damage to tissues and nerves.

Colour and warmth are provided by a healthy blood supply. A cool pale limb may indicate reduced arterial supply, while a dusky, blue or cyanotic limb is likely to be poor venous return. Warmth in combination with other signs may indicate poor venous return.

The most reliable and consistent sign of compartment syndrome is pain during movement as ischemic muscles are highly sensitive to stretching. Pain tends to be poorly localized, persistent, progressive and often not relieved by analgesia.

A pulseless limb is a late and unreliable sign as arterial flow may continue even though peripheral perfusion may be compromised.

Capillary refill is a significant part of neurovascular assessment as it assesses peripheral perfusion and cardiac output.

<p>10. Capillary Refill Time (CRT)</p> <ul style="list-style-type: none"> ○ ASSESS capillary refill time by pressing lightly on a: <ul style="list-style-type: none"> ▪ peripheral site such as a nail ▪ central site such as the forehead or sternum ○ Where fingers are used, ELEVATE the hand to the level of the heart ○ APPLY pressure sufficient to blanch site ○ MAINTAIN pressure for five seconds, then RELEASE quickly ○ COUNT in seconds how long it takes for skin to return to its normal colour ○ RECORD site used 	<p><i>CRT is one of the physiological assessments of peripheral perfusion in combination with other markers such as heart rate, respiratory rate and level of consciousness.</i></p> <p><i>CRT is the rate at which blood returns to the capillary bed after it has been compressed digitally.</i></p>
<p>11. Post-Operative Vital Sign Assessment Upon Return to inpatient unit:</p> <ul style="list-style-type: none"> ○ Measure vital signs with initial post-operative assessment ○ If vital signs are stable, then do the following: <ul style="list-style-type: none"> ▪ Every 1 hour x 4 ▪ Every 2 hours x 2 ▪ Every 4 hours x 24 hrs., THEN ▪ As per orders thereafter ○ Following complex procedures – in addition to above measurements, consider continuous cardio-respiratory monitoring and pulse oximetry for a minimum of four hours, in the following circumstances: <ul style="list-style-type: none"> ▪ OR time greater than six hours ▪ significant fluid/blood loss ▪ age under one year ▪ physiological instability pre-operatively ▪ physiological instability during the recovery period 	<p><i>Immediate interventions can be provided in case of post-operative deterioration in patient's condition.</i></p>

Documentation

Vital Signs are to be documented and graphed on the patient's age appropriate Provincial PEWS Flowsheet/Vital Sign Record (paper or electronic format **if used in your agency**). Vital Signs are to be recorded at the point of care (the bedside) when possible or as soon after the care event as possible.

Document assessment findings and any changes noted during the shift on age appropriate Provincial PEWS Flowsheet/Vital Sign Record/ENAR/Nursing Notes and other agency specific documentation tool(s) **OR** in the designated electronic health record **if used in your agency**.

Affix ECG/telemetry rhythm strips to nurse's notes/flowsheet and document interpretation including rate, rhythm, appearance of P wave, PR interval, QRS interval **if used in your agency**.

Related Documents

1. PEWS Flow sheets/Provincial PEWS Vital Sign Record
 - 0-3 months
 - 4-11 months
 - 1-3 years
 - 4-6 years
 - 7-11 years
 - 12 + years
2. Provincial PEWS Clinical Decision Support Tool
3. Instructions For Use Of The Provincial Pediatric Patient Flowsheet
4. Instructions For Use Of The Provincial Pediatric Early Warning System Vital Sign Record (emergency/urgent care)

Document Creation / Review

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Appendix A: Provincial Vital Sign Parameters

Age	Heart Rate Beats per minute	Respiratory Rate Breaths per minute	Systolic / Diastolic BP	Mean Arterial Pressure MAP (mmHg)
0 – 28 days *	104 – 162	31 – 60	60 – 80 / 30 – 53	40 or higher
1 – 3 months *	104 – 162	31 – 60	73 – 105 / 36 – 68	48 or higher
4 – 11 months *	109 – 159	29 – 53	82 – 105 / 46 – 68	58-80
1 – 3 years †	89 – 139	25 – 39	85 – 109 / 37 – 67	53-81
4 – 6 years †	71 – 128	16 – 31	91 – 114 / 50 – 74	63-87
7 – 11 years †	60 – 114	15 – 28	96 – 121 / 57 – 80	70-94
12 plus years †	50 – 104	12 – 25	105 – 136 / 62 – 87	76-103
Temperature °C	Oral: 35.5 – 37.5, Rectal: 36.6 – 38.0, Axilla: 34.7 – 37.3			

HR, RR, and temperature ranges: CTAS 2013

BP ranges:

*Modified from American Heart Association (2012). *Pediatric emergency assessment, recognition, and stabilization (PEARS) provider manual.*

† National Heart, Lung and Blood Pressure Institute (2004). The fourth report on the diagnosis, evaluation, and treatment of high blood pressure in children and adolescents. *Pediatrics*, 114(2), 555-556.

Appendix B: Summary of Recommended Temperature Measurement Techniques

Age	Recommended Technique
Birth to 2 years*	<ol style="list-style-type: none"> 1. Rectal (definitive) 2. Axilla (screening low risk children)
Over 2 years to 5 years	<ol style="list-style-type: none"> 1. Rectal (definitive) 2. Axilla, Tympanic or Temporal Artery (screening low risk children)
Older than 5 years	<ol style="list-style-type: none"> 1. Oral (definitive) 2. Axillary Tympanic or Temporal Artery (screening low risk children)

* Do not obtain rectal temperatures for infants under the age of 30 days to avoid injuring the rectal mucosa.

Note: The exception to this is patient who require a definitive temperature (For example sepsis)

(Fraser Health Authority, 2015; The Hospital for Sick Children, 2011)

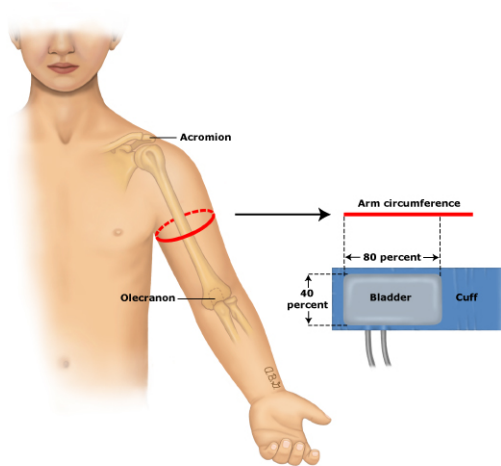
Temperature Measurement Technique	Key Points
Oral Route	<p>The tip of the temperature probe must be placed in the left or right posterior sublingual pocket.</p> <p>Have child keep mouth closed without biting on thermometer</p>
Axilla Route	<p>Place under arm with tip in centre of axilla and kept close to skin, not clothing; hold child's arm firmly against side.</p>
Temporal Artery	<p>Keeping the activation button depressed at all times, gently stroke the thermometer across the forehead beginning in the center and ending at the hairline; then lift and place on skin directly behind ear lobe and release button</p>
Rectal Route	<p>May place child in side lying, supine with knees up ("frog leg") or prone position. A small child may be placed prone across a parent's lap.</p> <p>Separate the buttock with thumb and forefinger of one hand and with the other gently insert the lubricated rectal thermometer probe, inclined toward the child's umbilicus, through the anal sphincter into the rectum (1.25-2.5 cm). STOP if you feel any resistance. Hold it in place with your fingers.</p> <p>Ensure the thermometer probe is grasped close to the patient with the hand resting against the patient's buttocks for stabilization, to ensure the probe does not inadvertently advance (increasing risk of perforation).</p>

(Canadian Paediatric Society, 2015)

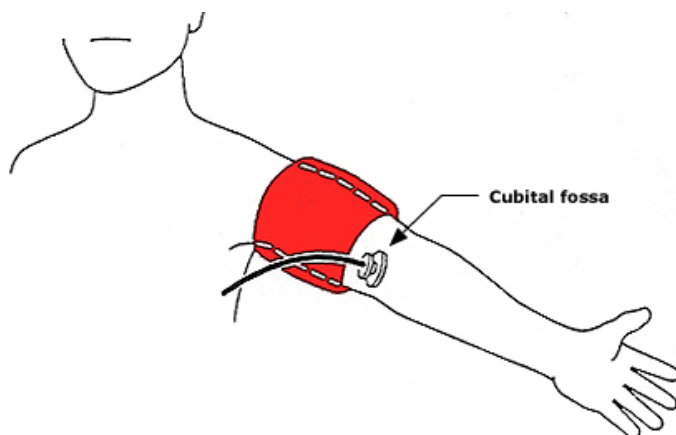
Appendix C: Recommended Dimensions for BP Cuffs

Recommended Dimensions for BP Cuff Bladders			
Age Range	Max arm circumference cm*	Bladder Width cm	Bladder Length cm
Newborn	10	4	8
Infant	15	6	12
Child	22	9	18
Small Adult	26	10	24
Adult	34	13	30
Large Adult	44	16	38
Thigh	52	20	42

* Calculated so that the largest arm would still allow the bladder to encircle arm by at least 80%.
(National High Blood Pressure Education Program Working Group on High Blood Pressure in Children and Adolescents, 2004)



“The width of the bladder of the blood pressure cuff should be approximately 40 percent of the circumference of the upper arm midway between the olecranon and the acromion. The length of the bladder of the cuff should encircle 80 to 100 percent of the circumference of the upper arm at the same position.” ©2015 UpToDate



“The blood pressure should be measured with the arm supported and the cubital fossa at the level of the heart. The stethoscope bell is placed over the brachial artery pulse below the bottom edge of the cuff, which should be about 2 cm above the cubital

APPENDIX D: Tips for Securing Oximetry Sensor Probe

The following tips may help keep the oximetry sensor probe safely secure in place:

- use a "posy wrap" to help secure the probe in place and minimize bright light which may interfere with readings
- if using a finger site, the sensor can be applied on the ring finger instead of the index finger to enhance finger-thumb mobility and because it is less prone to movement than the index finger
- avoid placing the sensor on the same extremity being used for blood pressure monitoring as cuff inflation may interfere with blood flow
- place a transparent "sticky dot" over each window of the sensor before reapplying the probe to the patient. When the adhesive on the dots is no longer sticky, a second set may be applied. Up to 3 dots may be applied to each window, one on top of another (the extra dots come in the package with the sensor)

(BC Children's Hospital, 2014).

APPENDIX E: Pediatric Modified Glasgow Coma Scale

	Child-Adult (Verbal)* (usually >2yrs)	Infant (Pre-Verbal)** (usually <2yrs)	Score
Eye opening	Spontaneous	Spontaneous	4
	To verbal stimuli	To sound	3
	To pain only	To pain only	2
	No response	No response	1
Verbal Response	Orientated, appropriate	Age-appropriate vocalization, smile, or orientation to sound, interacts (coos and babbles), follows objects	5
	Confused, disoriented	Cries, irritable	4
	Inappropriate words	Cries to pain	3
	Incomprehensible words Or non-specific sounds	Moans to pain	2
	No response	No response	1
Motor Response	Obeys commands	Moves spontaneously & purposefully	6
	Localizes painful stimulus	Withdraws to touch	5
	Withdraws in response to pain	Withdraws in response to pain	4
	Abnormal flexion in response to pain	Abnormal flexion posture to pain (decorticate posture)	3
	Abnormal extension in response to pain	Abnormal extension posture in response to pain (decerebrate posture)	2
	No response	No response	1

The GCS is scored between 3 and 15, 3 being the worst, and 15 the best. It is composed of three parameters: best eye response (E), best verbal response (V), and best motor response (M). The components of the GCS are recorded individually; for example, E2V3M4 results in a GCS of 9.

* Data from: Teasdale, G. and Jennett, B. (1974). Assessment of coma and impaired consciousness. A practical scale. *Lancet*. 2:81.

** Data from: Holmes, J.F., Palchak, M.J., MacFarlane, T. and Kuppermann, N. (2005). Performance of the pediatric Glasgow coma scale in children with blunt head trauma. *Academy of Emergency Medicine*. 12:814.

Appendix F: Disclaimer

Child Health BC develops evidence-based clinical support documents that include recommendations for the care of children and youth across British Columbia. These documents are intended to give an understanding of a clinical problem, and outline one or more preferred approaches to the investigation and management of the problem. These documents are for guidance only and not intended as a substitute for the advice or professional judgment of a health care professional, nor are they intended to be the only approach to the management of a clinical problem. Healthcare professionals should continue to use their own judgment and take into consideration context, resources and other relevant factors. Neither Provincial Health Services Authority nor Child Health BC assume any responsibility or liability from reliance on or use of the documents.