Site Applicability

Guidelines and procedures for vital sign assessments and documentation are applicable to all areas where the British Columbia Pediatric Early Warning System (BC PEWS) has been implemented. This practice applies to all nurses providing care to pediatric patients in areas designated by your health authority.

Practice Level / Competencies

Conducting physical assessments, vital sign measurements and PEWS scoring are foundational level competencies of registered nurses (RN), licensed practical nurses (LPN) and registered psychiatric nurses (RPN). 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 Purpose

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

Comprehensive physical assessment, as outlined in this document, is the responsibility of all nurses. By recording and comparing measurements and 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. This document was created to be used in collaboration with BC PEWS, to support the early recognition, mitigation, notification, and response to the pediatric patient identified to be at risk of deterioration.

Definitions

Pediatric Patient:

- In emergency departments (EDs) and health authority-funded health centres: children up to their 17th birthday (16 years + 364 days); and
- In inpatient settings: children up to their 17th birthday (16 years + 364 days); and for children receiving ongoing care up to their 19th birthday (18 years + 364 days).

Pediatric Early Warning System Score: Relevant patient assessment findings including cardiovascular, respiratory, behavioural parameters as well as persistent vomiting following surgery and use of bronchodilators every 20 minutes are collected, documented, and summated into a score. The score can be used to identify patient physical deterioration at a single point in time or through trend monitoring, to optimize chances for early intervention.

Situational Awareness: Awareness of the factors associated with the risk of pediatric clinical deterioration. For PEWS this consists of 5 risk factors: Patient/Family/Caregiver Concern, Watcher Patient, Communication Breakdown, Unusual Therapy, and PEWS Score 2 or higher.

Patient/Family/Caregiver Concern: A concern voiced about a change in the patient's status or condition (e.g. concern has the potential to impact immediate patient safety, family states the patient's condition is worsening or they are not behaving as they normally would).

"Watcher" Patient: A patient that you identify as requiring increased observations (e.g. unexpected responses to treatments, child acting differently from their norm, surgical risk, abnormal lab results, abnormal neurovitals, aggressive patient, a patient admitted involuntarily under the mental health act, over/under hydration, pain, edema, "gut feeling").

Communication Breakdown: Describes clinical situations when there is lack of clarity about treatment, plan, responsibilities, conversation outcomes and language barriers.

Unusual Therapy: Unfamiliarity with a medication, protocol and/or department by the health care provider (e.g. new and/or low frequency and/or high risk medication or process). Applying the unusual therapy factor brings increased awareness to patient care, support and planning.

PEWS Score 2 or higher: A score of 2 or higher should trigger increased awareness, notification, planning, assessment, and resource review.

Patient centered and family focused approach: Patient centered approach to care means keeping the patient's needs at the center of everything you do. A family focused approach recognizes and supports families in their key role of providing ongoing care and support to children. Patient centered and family focused approaches are based on a philosophy that service delivery involves a partnership between those using and those providing services. When we are working in partnership, the patient and family is a member of the health care team. Their choices, preferences, beliefs and goals are paramount to developing a collaborative treatment plan.

SBAR: The Situation-Background-Assessment-Recommendation (SBAR) technique provides a framework for communication between members of the health care team about a patient's condition. SBAR is an easy-to-remember, concrete mechanism useful for framing any conversation, especially critical ones, requiring a clinician's immediate attention and action. It allows for an easy and focused way to set expectations for what will be communicated and how between members of the team, which is essential for developing teamwork and fostering a culture of patient safety.

Guideline Standards

1. The pediatric patient and/or caregiver should consent to vital sign assessment and measurement. A patient centred and family focused 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 caregiver(s) should be present and involved in comforting the child during the assessment
    - The pediatric patient should be positioned correctly and comfortably prior to and during the procedure
    - The healthcare provider performing the assessment should follow age-specific approaches to physical examination of pediatric patients

2. **Full physical assessments** (e.g. head-to-toe, systems) are conducted:
    - In **inpatient areas**, patients will be assessed as per health authority/agency standards
        - 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 based on clinical judgment
    - In **emergency care settings,** 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
    - Physicians/Nurse Practitioner orders
    - CTAS guidelines (in emergency care settings)
    - With transferring nurse at time of patient transfers
    - Any decline in patient status
    - Nursing clinical judgment

4. All patients will be **visually checked hourly** and this check will be documented on the BC PEWS flowsheet/ vital signs record. This check is to happen regardless of whether the patient has any drains, tubes, IV lines, feeding devices etc. and is meant to assess patient safety and patient status.

5. **Vital Signs** (Heart Rate/Pulse (HR/P), Respiratory Rate (RR), Temperature (T), Blood pressure (BP), Pain Score and PEWS Score) will be measured as per:
   - Health authority/agency standards
   - Physicians/Nurse Practitioner orders
   - CTAS guidelines (in emergency care settings)
   - Nursing care plans
   - Nursing clinical judgment
   - As required for a particular procedure or medication

   *Pediatric Vital Sign parameters will be as per **Appendix A***

6. **Frequency of Vital Sign** Measurement and Recording is as follows:
   - In **inpatient areas**, the minimum standard of vital sign, PEWS score and situational awareness factor monitoring is every 4 hours
   - In **emergency care settings,** monitor as per:
     - Health authority/agency standards
     - Physicians/Nurse Practitioner orders
     - CTAS guidelines

7. **PEWS Score** and **Situational Awareness** will be assessed with every vital signs assessment with the exception of collecting or rechecking one parameter (for example temp or HR only), or if the nurse is only documenting Heart Rate (HR) and 0xygen (O2) stats from an ongoing monitor.

8. **Sepsis Screening** is to be conducted:
   - If the patient's heart rate is a critical PEWS cardiovascular score of 3; or
   - If the PEWS score increases by 2; or
   - If patient's temperature is above 38°C or less than 36°C

   Please use the sepsis screening tool identified by your health authority/agency.

9. **Neuro Vital Signs** (NVS) will be assessed a minimum of once per shift for all inpatient care areas and as per:
   - Health authority/agency standards
   - Physicians/Nurse Practitioner orders
   - CTAS guidelines (in emergency/urgent care settings)
   - Nursing care plans
   - Nursing clinical judgment
   - Requirements for a particular procedure or medication
   - A change in patient Glasgow Coma Scale (GCS) or other neurologic indicators that might indicate a potential deterioration
   - Patient transferred/admitted to another unit

   NOTE: Nursing staff will perform a joint visual NVS assessment:
     - At shift to shift handover if patient on q2h 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
- If patient is transferred/admitted to another unit

10. Vital Sign monitoring may also include Continuous Oxygen Saturation (SpO_2), **Spinal Cord Assessments** and/or **Neurovascular Assessments if used in your agency.** Monitoring of Continuous Oxygen Saturation Spinal Cord Assessments and/or Neurovascular Assessments will be initiated as per:
    - Health authority/agency standards
    - Physicians/Nurse Practitioner orders
    - Nursing care plans
    - Nursing clinical judgment
    - As required for a particular procedure or medication

11. **Intake and Output** are to be monitored and documented a minimum every 12 hours and as per:
    - Health authority/agency standards
    - Physician/Nurse Practitioner orders
    - Nursing Care Plans
    - Nursing clinical judgment
    - As required for a particular procedure or medication
    - With any decline in patient status

12. **Weight** is to be obtained, monitored and documented in kilograms/grams:
    - On admission to inpatient unit
    - On admission to emergency care setting as per routine site standards
    - Before going to the operating room
    - Minimum once a day for admitted patients
    - As per health authority/agency standards
    - Physician/Nurse Practitioner orders
    - Nursing Care Plans
    - Nursing clinical judgment
    - As required for a particular procedure or medication

    Height or length measurement is to be obtained, measured in centimetres to the nearest 0.1 cm, and documented:
    - On admission to inpatient unit
    - On admission to emergency care settings as per routine site standards
    - If medication calculations are based on body surface area (BSA)
    - Health authority/agency standards
    - Physician/Nurse Practitioner orders
    - As required for a particular procedure or medication

13. Patients on continuous cardiorespiratory, electrocardiogram (ECG), or telemetry monitoring will have a rhythm strip printed:
    - At initiation of monitoring
    - Every 12 hours
    - As required with rhythm changes
    - With any change in patient status

- As per health authority/agency standards
- As per Physician/Nurse Practitioner orders

14. Changes in the patient's condition, vital signs, PEWS scores and/or situational awareness will be communicated, escalated, and documented as per:
    - Health authority/agency standards
    - Physicians/Nurse Practitioner orders
    - The BC PEWS escalation aid and clinical judgement of the healthcare provider

15. Communication between team members will utilize the **S**ituation **B**ackground **A**ssessment **R**esponse (**SBAR**) format.

Procedures

PROCEDURES	Rationale
1. **Respirations** ○ **COUNT** respirations for one full minute ○ **MEASURE** the Respiratory Rate 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 seven years of age ○ **OBSERVE** and **AUSCULTATE** respirations in the older child ○ **OBSERVE** pattern, effort and rate of breathing ○ **OBSERVE** chest shape and movement ○ **NOTE** any signs of respiratory distress such as: ▪ nasal flaring ▪ grunting ▪ wheezing ▪ dyspnea ▪ use of accessory or intercostal muscles	*A minute of assessment is recommended to ensure accuracy of data.* *Infants often have irregular respiratory rates.* *Infants and children up to 7 years of age are predominantly abdominal breathers.*
2. **Pulse Oximetry** ○ **SET** alarm limits as appropriate for age and patient condition for: ▪ Heart/Pulse Rate ▪ Peripheral oxygen saturation (SpO_2) ▪ **Note**: Minimum SpO_2 levels as measured by oximetry monitor should be obtained from the physician based on the patient's condition. ▪ **ENSURE parameters are set and alarm is audible** ○ **ATTACH** oximetry probe to appropriate site that has been assessed to have adequate perfusion. Ensure the probe is properly attached with the light sources and detectors opposite each other	*Pulse oximetry is the non-invasive measurement of arterial blood oxygen saturation (the percentage of hemoglobin saturated with oxygen)* *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*

Note: Use of Coban tape to hold sensor probe in place should be avoided as it increases 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 B** 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 SpO_2 readings: ▪ presence of abnormal hemoglobin ▪ 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 SpO_2 measurement with clinical condition	*the unmonitored readings ensures accuracy in recordings.*
3. **Heart/Pulse Rate** ○ **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: ▪ in any child with an irregular HR or known congenital heart disease ▪ as clinically indicated ▪ as per medication parameters **CROSS-CHECK** electronic data by auscultation or palpation of the heart/pulse rate	*A minute of assessment is recommended to ensure accuracy of data and to compensate for normal irregularities in HR.* *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.*
4. **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	*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:*

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:

a. **POSITION** patient supine
b. **LOCATE** the dorsalis pedis or posterior tibial artery
c. **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 parameters and alarms if device to be used for ongoing monitoring

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)

- *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.
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).

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. ○ **DOCUMENT** indicating: ▪ Limb used (if other than arm) ▪ Patient position using the following symbols  ○ **Document** mean arterial pressure (MAP) **Note:** monitors will display MAP or it is calculated with the following equation: $$\text{MAP} = \frac{\text{Systolic Pressure} + (2 \times \text{Diastolic Pressure})}{3}$$	
5. **Capillary Refill Time (CRT)** ○ **ASSESS** capillary refill time by pressing lightly on a: ▪ 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 ○ **Document** site used	*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.* *CRT is the rate at which blood returns to the capillary bed after it has been compressed digitally.* *CRT is best assessed in an environment that is neither hot nor cold, as cold environments may delay capillary refill.*
6. **Skin Colour** ○ **Assess** the entire skin surface for colour, texture, turgor, and temperature ▪ observe the exposed parts of the child, such as the face, arms, and legs ▪ inspect the skin for any bruising, injury, lesions, rashes, trauma, hives, or evidence of bleeding ▪ evaluate the colour/colour pattern of the skin and mucous membranes	*Skin colour and overall appearance reflects the general perfusion of blood throughout the body.* *Skin colour should be consistent over the trunk, arms, and legs. Mucous membranes, nail beds, palms of the hands, and soles of the feet should be pink and skin should be warm.*

▪ assess skin temperature by using the back of your hand ○ **Monitor** for any changes in skin colour and temperature ○ **Document** and **communicate** any changes to the MRP **Refer** to **Appendix D** Summary of Skin Colour Terminology	*By noting changes in skin colour and skin perfusion (such as pallor, cyanosis, or mottling), the provider may recognize early signs of shock.*
7. **BC PEWS Scoring** ○ **PLOT** vital sign measurements and observations for each category of the PEWS indicators (respiratory, cardiovascular, behaviour, persistent vomiting, & bronchodilator every 20 minutes) on age appropriate: ▪ BC PEWS Inpatient Flowsheet or ▪ BC PEWS ED Vital Signs Record or ▪ The electronic health record used in your agency ○ **Calculate** PEWS score subtotals for each category by taking the highest score in each category. ○ **TOTAL PEWS Score**: ▪ To obtain a total PEWS score, **ADD** the individual category scores together (respiratory + cardiovascular + behaviour + vomiting + bronchodilator = maximum achievable score of 13) ○ **IDENTIFY** any situational awareness factors present for your patient.	*The overall PEWS score is applied to determine nursing actions and the accessing of physician and emergency supports.* *Situational awareness is part of the profile of risk and should be used to capture risk beyond the score.*
8. **Temperature** ○ **SCREEN** all patients for temperature as part of routine vital sign monitoring ○ **DETERMINE** optimal route for measuring temperature based on child's age, condition and ability to cooperate ○ **Obtain** the most accurate temperature measurement in the least invasive manner ○ The **definitive** route (oral, rectal) for temperature measurement should be used in situations where: ▪ An accurate temperature is required ▪ If the screened temperature (axilla/temporal) is not consistent with the clinical assessment ○ **Rectal temperatures** are contraindicated in the following circumstances: ▪ Patients who are outside of the emergency department ▪ Patients who are neutropenic or immunosuppressed ▪ Patients with bleeding disorders or thrombocytopenia or on anticoagulant therapy ▪ Patients with perirectal bleeding, pain, infection	*Accurate measurement of body temperature is essential as alterations in temperature may indicate potentially life-threatening processes.* *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.*

▪ Patients with diarrhea or with stool present in the rectum ▪ Patients who have had rectal/anal surgery ▪ Patients who have a history of psychological trauma ○ **Temporal temperatures** are contraindicated in the following circumstances: ▪ Patients who have headwear (i.e. cultural, religious or other), that cannot be removed. ▪ Patients who are profusely diaphoretic ▪ Patients with significant facial hair that cannot be brushed away from forehead towards ear **Refer** to **Appendix E** Summary of Recommended Temperature Measurement Techniques	
9. **Neurovital Signs (NVS)** ○ **FULLY AWAKEN** patient to assess NVS, **regardless of time of day** ○ Ensure the lights in the room are turned on ○ **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: ▪ 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 **REFER to Appendix F** for the Pediatric Modified Glasgow Coma Scale	*The Glasgow Coma Scale (GCS) provides an objective measure of the child's level of consciousness.* *Potential signs of distress in an infant include a sunken, tense, or bulging fontanel when the infant is quiet.* *Primary caregiver can assist in establishing/confirming patient's typical baseline response.*
10. **Spinal Cord Assessment/Check:** ○ **CONDUCT** spinal cord checks as ordered or when clinically indicated if there is risk of spinal cord function alteration ○ Spinal cord assessment includes: ▪ Motor response ▪ Muscle Strength ▪ Colour, sensation & movement of extremities ▪ Bladder function ▪ Pain	*Early detection of change in spinal cord function is key in preventing permanent damage and disability.*

○ **PERFORM** spinal cord checks using the spinal section of the Neurovital Sign Assessment Section of the BC PEWS Inpatient Flowsheet or BC PEWS ED Pediatric Emergency Nursing Assessment Record (ENAR) 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: ▪ urinary retention or change in bladder function ▪ limb weakness ▪ change in sensation or colour of the limbs ▪ diminished pedal pulses	
11. **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 (colour, warmth, movement, sensation) assessment of limbs ○ **ASSESS** affected limb and compare to unaffected limb ▪ **ASSESS** CWMS ▪ **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	*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.* *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.*
12. **Post-Operative Vital Sign Assessment upon return to inpatient unit:** ○ Measure vital signs with initial post-operative assessment ○ If vital signs are stable, then do the following: ▪ Every 1 hour x 4 hours ▪ Every 2 hours x 2 hours	*Immediate interventions can be provided in case of post-operative deterioration in patient's condition.*

▪ Every 4 hours x 24 hours ▪ 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: ▪ Operating time greater than 6 hours ▪ significant fluid/blood loss ▪ age under one year ▪ physiological instability pre-operatively ▪ physiological instability during the recovery period	

Documentation

Vital Signs, PEWS Scores and Situational Awareness Factors are to be documented and graphed on the patient's age appropriate:

- BC PEWS Inpatient Flowsheet; or
- BC PEWS ED Pediatric Vital Signs Record; or
- The designated electronic health record used in your health authority/agency.

Vital Signs, PEWS score and situational awareness factors are to be recorded at point of care (the bedside) when possible or as soon after the care event as possible.

Assessment findings are to be documented on age appropriate:

- BC PEWS Inpatient Flowsheet; or
- BC PEWS ED Pediatric Emergency Nursing Assessment Record; or
- The designated electronic health record used in your health authority/agency; and
- Other health authority/agency specific documentation tool(s) as required

Document in nursing notes any assessment findings and/or any changes noted during the shift in greater detail. Record time of entry and use focus charting including data, action, and response (DAR) or problem, intervention, evaluation (PIE) formats.

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

** Provincial BC PEWS documents are labelled for ED as 'BC PEWS ED', for inpatients as 'BC PEWS Inpatients', or if applicable to both areas, 'BC PEWS'*

For patient documentation:

1. BC PEWS Inpatient Flowsheets/BC PEWS ED Vital Sign Records:
    - 0-3 months
    - 4-11 months
    - 1-3 years
    - 4-6 years
    - 7-11 years
    - 12 + years
2. BC PEWS ED Pediatric Emergency Nursing Assessment Record
3. BC PEWS ED Pediatric Emergency Nursing Assessment Record – Treatment (short form)

Support documents:

1. BC PEWS Clinical Decision Support Tool
2. Instructions for Using the BC PEWS Flowsheet
3. BC PEWS ED Instructions for Using the Vital Sign Record
4. BC PEWS Situational Awareness Poster
5. Child Health BC Modified Sepsis Screening Tool

Document Creation / Review

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Appendices

A. Pediatric Vital Sign Parameters by Age Group
B. Tips for Securing Oximetry Sensor Probe
C. Recommended Dimensions for BP Cuffs
D. Skin Colour Terminology
E. Summary of Recommended Temperature Measurement Techniques
F. Pediatric Modified Glasgow Coma Scale
G. Disclaimer

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Appendix A: Pediatric Vital Sign Parameters by Age Group

"Normal" range determined by using highest of low range and lowest of high range of vital sign parameters

	Age Group	CTAS 4-5	No score	Yellow (Score 1)	Gold (Score 2)	Red (Score 3)
Respiratory Rate	0-3 mos	35-51	31-60	61-70	71 or higher	30 or less
	4- 11 mos	33-44	29-53	54-63	64 or higher	28 or less
	1-3 yrs	29-30	25-39	40-49	50 or higher	24 or less
	4-6 yrs	21-22	17-31	32-41	42 or higher	16 or less
	7-11 yrs	19	15-28	29-38	39 or higher	14 or less
	12 plus yrs	16	12 - 25	26-35	36 or higher	11 or less
Heart Rate	0-3 mos	127-143	104-162		163-172	173 or higher AND 103 or less
	4- 11 mos	127-140	109-159		160-169	170 or higher AND 108 or less
	1-3 yrs	111-120	89-139		140-149	150 or higher AND 88 or less
	4-6 yrs	88-109	71-128		129-138	139 or higher AND 70 or less
	7-11 yrs	78-95	60-114		115-124	125 or higher AND 59 or less
	12 plus yrs	67-85	50-104		105-114	115 or higher AND 49 or less

Blood Pressure	Systolic (mmHg)	Diastolic (mmHg)	Mean Arterial Pressure (mmHg)
0-28 days ***	60-84	30-53	40 or higher
1-3 mos*	73-105	36-68	48 or higher
4- 11mos*	82-105	46-68	58-80
1-3 yrs†	85-109	37-67	53-81
4-6yrs†	91-114	50-74	63-87
7-11 yrs†	96-121	57-80	70-94
12 plus yrs†	105-136	62-87	76-103

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

†BP ranges modified from 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): 555-576.

** Perinatal Services BC Newborn Guideline 13 Newborn Nursing care Pathway (2013).

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

Appendix B

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)

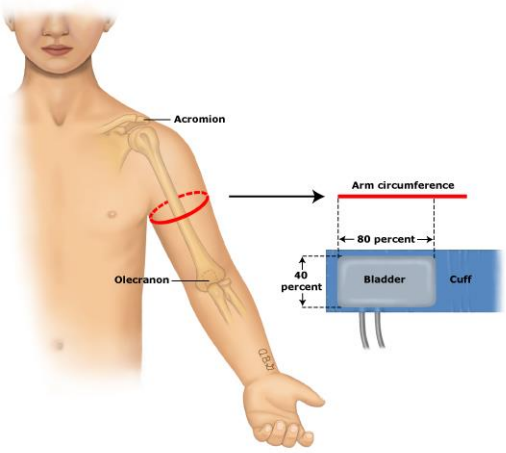
From BC Children's Hospital. (2017, February, 1). *Oximetry (Spo2) monitoring*, p. 2.

Appendix C
Recommended Dimensions for BP Cuffs

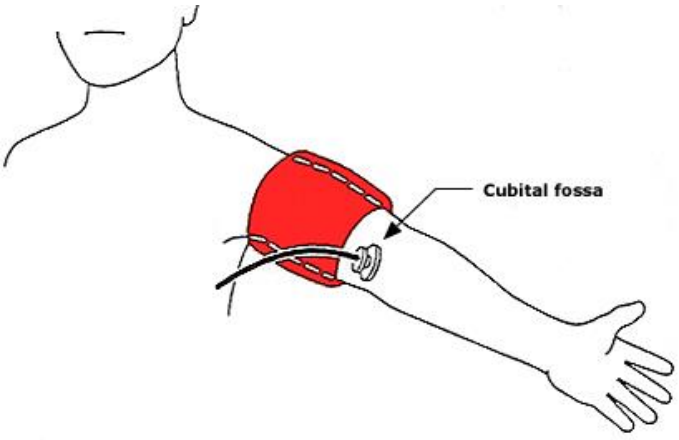
Recommended Dimensions for BP Cuff Bladders			
Age Range	Max arm circumference cm*	Bladder Width cm	Bladder Length cm
Newborn	10	4	8
Infant	15	6	12
Child	22	9	18
Small Adult	26	10	24
Adult	34	13	30
Large Adult	44	16	38
Thigh	52	20	42

* Calculated so that the largest arm would still allow the bladder to encircle arm by at least 80%.

Adapted From National High Blood Pressure Education Program Working Group on High Blood Pressure in Children and Adolescents. (2004, p.6).



"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" ©2015 UpToDate

Appendix D
Skin Colour Terminology

Skin Colour Description	Appearance in Dark Skin	Appearance in Light Skin
Normal ▪ Determine the typical skin colour for the patient ▪ Family/Caregivers can assist you with determining the patient's norm ▪ Skin should be warm and well perfused	▪ May appear various hues of black, brown, yellow, olive green and bluish tones	▪ May appear milky white, rose, to a deep hue of pink
Pallor/pale/paleness ▪ A lack of typical colour in the skin or mucous membranes	▪ May appear ashen gray colour in black skin ▪ May appear yellowish brown colour in brown skin Best detected in nail beds and mucous membranes	▪ May appear loss of rosy glow in skin, especially face
	Tip: even if the child's norm is pale the mucous membranes should be pink	
Cyanosis ▪ Bluish discolouration/tone throughout skin	▪ May appear deep blue/black, or dusky colour ▪ Lips and tongue may appear ashen gray	▪ May appear bluish tinge, visible in nail beds, earlobes, lips, oral membranes, soles of feet and palms of hand
Mottling ▪ Irregular or patchy discolouration of the skin	▪ May be difficult to assesses, check lighter areas like the palms of hands, soles of feet and the roof of the mouth	▪ Irregular skin areas are pink, whereas others may appear pale, or cyanotic ▪ May appear as: net-like pattern, violet web under the skin, or reddish stains
Erythema ▪ Redness ▪ Variable, irregular macular patches (changes in skin colour) that appear as little spots or blemishes in the skin	▪ May be difficult to assess; rely on palpation for warmth or edema ▪ often seen as deep red or violet	▪ Diffusely red, dusky red or violet ▪ Redness easily seen anywhere on body
Petechiae ▪ Tiny dots ▪ Small, distinct, pinpoint hemorrhages ≤2mm in size ▪ Will not blanch with pressure	▪ Usually invisible except in oral mucosa, conjunctiva of eyelids, and conjunctiva covering eyeball	▪ Purplish pinpoints most easily seen on buttocks, abdomen, and inner surfaces of arms or legs
Ecchymosis ▪ Large, diffuse areas, usually black and blue	▪ Very difficult to see unless in mouth or conjunctiva	▪ Purplish to yellow-green areas; may be seen anywhere on skin
Jaundice ▪ Yellow discoloration of the skin	▪ Most reliably assessed in sclerae, hard palate, palms, and soles	▪ Commonly seen in the sclerae of the eyes, skin fingernails, soles, palms, and oral mucosa

Adapted from: Carpenito-Moyet, L.J. (2008, pp.494-495); Emergency Nursing Association (2018, pp. 41-42); Hockenberry, Wilson, & Rodgers (2019, p.110); Perry, Hockenberry, Lowdwemilk/Wilson, Keen-Lindsay, & Sams (2017, p. 914); Samson, R.A. (2017, pp. 34-35, 55-57, and 63).

Appendix E
Summary of Recommended Temperature Measurement Techniques

Oral	Rectal	Axilla	Temporal
WAIT 20-30 minutes after child has finished eating or drinking.	**GLOVE** **INSERT** probe completely and firmly into a probe cover.	**INSERT** probe completely and firmly into a probe cover.	**BRUSH** hair aside from exposed forehead and away from ear.
ENSURE child is not chewing gum or candy.	**LUBRICATE** tip of rectal probe of electronic thermometer with lubricant.	**SET** thermometer to AXILLARY mode (Welch-Allyn) or MONITOR mode (Alaris-IVAC).	**PLACE** probe flush on center of forehead and **DEPRESS** button.
INSERT probe completely and firmly into a probe cover.	**POSITION** child in prone, supine or side lying with the hips flexed depending on child's present status and condition.	**PLACE** thermometer probe as high as possible in the axilla and verify that the probe tip is completely surrounded by axillary tissue.	**SLIDE** probe *slowly* across the forehead into the hairline – in a straight line.
PLACE the probe tip into the sublingual pocket where the richest blood supply is located in either the right or left posterior pocket (heat pocket) at the base of the tongue and ask child to close his/her lips around it. Remind him/her not to bite down or talk, and to relax and breathe normally through the nose.	**SEPARATE** the buttocks with thumb and forefinger of one hand and with the other hand, gently **INSERT** the lubricated rectal thermometer probe, inclined toward the child's umbilicus, through the anal sphincter into the rectum about 1.25-2.5 cm. Stop if you feel any resistance. Do not insert the thermometer more than 2.5 cm.	**FOLD** the child's arm snugly across the chest to hold the thermometer in place.	**LIFT** probe from forehead (continue to keep button depressed) and **TOUCH** probe behind ear in the soft depression behind the earlobe.
HOLD the probe in place until device indicates completion and keep the probe tip in contact with tissue at all times.	**STEADY** the thermometer with your hand and leave the probe in place until the device indicates completion.	**HOLD** the patient's arm and the probe in place until device indicates completion (Welch/Allyn) or for 5 minutes if on MONITOR mode (Alaris-IVAC).	**RELEASE** button and read temperature.
EJECT probe cover from probe and dispose.	**EJECT** probe cover from probe and dispose. **REMOVE** gloves.	**EJECT** probe cover from probe and dispose.	**NOTE:** For infants, one measurement is all that is required: either slide slowly across forehead or maintain skin contact behind ear until numbers stop. NOTE: Alternate sites may be used if forehead/ear not available: refer to training materials for instructions.

From BC Children's Hospital. (2017, December 6, p.3).

APPENDIX F
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, 304(7872), 81-84.* https://doi.org/10.1016/S0140-6736(74)91639-0

** 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(9),* 814-819. doi:10.1197/j.aem.2005.04.019

Appendix G: 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.