1. **BACKGROUND**
   - Blood pressure (BP) measurement is an important vital sign to monitor in infants admitted to neonatal intensive care units (NICU).
   - Unfortunately there are only a few small studies on the practical and predictive applicability of BP measurements in preterm infants.1-7,12,15
   - BP monitoring is only part of the assessment of adequate circulation and tissue perfusion in the newborn. There is often a poor relationship between BP & either cardiac output or blood volume in preterm infants.9
   - BP increases steadily in the first week of life in very premature neonates. Preterm infants generally stabilize their BP after 14 days of life, and at this time they have a BP similar to that of term infants.1,15

2. **CLINICAL PRACTICE**
   Following categories need blood pressure measurement:
   - All neonates admitted to Newborn Care Centre (NCC)
   - Level 3 Area:
     - Infants with specific conditions (see below under Any area in NCC) and with an intra-arterial line in situ need BP monitored by continuous intra-arterial blood pressure monitoring and hourly documentation of BP on the Observation Charts.
     - Hourly to 4 hourly non-invasive BP measurements according to clinical needs. For example, infants on inotropic or vasoactive medications but no indwelling intra-arterial catheters need non-invasive BP monitoring at least every 4 hrs.
     - Less frequent monitoring to 6-12 hourly may be justified when condition is stabilised.
   - Any area in NCC:
     - Infants who have become moderately unwell or unstable for any reason (signs of clinical changes eg: lethargy, perfusion changes or unstable respiratory conditions, clinical sepsis or proven sepsis) need regular BP monitoring at least 4hrly until their condition stabilises.
     - Post-operative or post-anaesthetic babies: Initial post-operative infants returning to NCC from theatres: 15-30 minutes for 2 hours. For stable infants, monitor BP 4hrly for the first 24hrs as minimum. Increase the frequency or duration of observations if clinical condition warrants it.
     - Infants with renal problems: monitor BP 4-6 hourly or as prescribed by the medical consultant.
     - Infants with cardiac problems: monitor BP 4-6 hourly or as prescribed by the medical consultant.

3. **STAFF**
   - Medical Staff
   - Neonatal Nurses

4. **EQUIPMENT**
   - SpaceLab Monitor in Level 3 for continuous intra-arterial measurement in infants with indwelling arterial catheters via transducer of the monitor.
   - Oscillometric method: Non-invasive blood pressure machine.
   - Limitation with this method is that values tend to be too high for smaller infants and may be too low for larger infants.
   - Continuous Intra-arterial measurement: See NCC Procedure on:
     - Blood sampling from arterial line
     - Arterial line set-up
   - Oscillometric method:
     - Apply inflatable cuff to infant’s upper limb.
     - Connect inflatable cuff hose to the BP monitor hose.
     - Press “start” button.
BLOOD PRESSURE MEASUREMENT IN NEWBORN CARE CENTRE  cont’d

5. DOCUMENTATION
- Neonatal care plan
- Observation chart
- Nursing notes

6. EDUCATIONAL NOTES

Normal BP range
- The normal physiologic BP range ensuring appropriate organ perfusion in the neonate is unknown.\(^1\)
- Hegyi et al\(^15\) reported that the maximum and minimum systolic and diastolic BP during the first 7 days of life in premature infants with birthweight less than 2000 gm increased daily for the first 7 days of life.

They derived the following formula for normal BP range during the first week of life:
  - Minimum Systolic (mmHg) = 1.8(DAY)+43
  - Maximum Systolic (mmHg) = 2.6(DAY)+57
  - Minimum Diastolic(mmHg) = 1.3(DAY)+24
  - Maximum Diastolic(mmHg) = 2.0(DAY)+36

Hypotension
- Agreement on the definition of hypotension in preterm infants is still lacking.
- For very low birth weight (VLBW) infants, a good rule of thumb is to aim for the baby’s gestational age in weeks as the desired minimum mean BP.\(^14\,16\) For example, for a 24 weeks gestation infant, aim for a mean arterial pressure of 24 in the first few days of life.
- A postal questionnaire sent to all 120 NICUs in Canada, which had a 79% return rate (95 replies), found that 25.8% relied on BP values as the sole criteria for intervention. A BP less than gestational age in weeks was the most common trigger for treatment.\(^13\,14\)
- There is controversy over how active to be in treating a low BP in an otherwise stable premature infant. Decision to treat hypotension should be based on the general condition of the infant, not on the mean arterial BP alone.

Hypertension
- Hypertension in the term infant has been defined as a systolic BP > 90mmHg or a diastolic > 60mmHg. In preterm infants a systolic pressure > 80mmHg or a diastolic BP > 50mmHg has been used.\(^8\,10\)

7. RELATED POLICIES/ PROCEDURES
- NCC’s Clinical Policy and Procedure Manual
8. REFERENCES