Neonatal Levels of Service Classification

Introduction

The Provincial Specialized Perinatal Services developed a Levels of Care document in 2005. The rationale for establishing a common classification system for levels of perinatal care across BC is that a common classification system:[1]

- Identifies standards for the provision of specified levels of care;
- Facilitates transfers of patients from one centre to another through a common understanding of the relative capabilities and expectations of each centre;
- Streamlines planning and allocation of resources;
- Facilitates comparisons of regional resource utilization and outcomes; and
- Supports the availability of appropriate funding and other resources for care centres.

While the Levels of Care (2005) document was meant to classify sites, it was never intended for use as a classification tool for individual neonates. Subsequently it was determined that a tool was necessary to inform and help facilitate provincial perinatal systems planning and efficient utilization of capacity. A daily Neonatal Levels of Service classification tool will help Health Authorities and the Ministry of Health Services monitor infants within the provincial perinatal system and plan for future NICU bed capacity within each Health Authority, and across the province at large.

The development of this classification tool is the result of extensive consultation with provincial stakeholders and is based on expert clinical consensus. The tool has been piloted in centres across the province followed by an evaluation that was able to provide validation for both the pilot process and the tool itself.

The level of service classifications will be utilized on a daily basis for operational discussions such as the daily NICU calls to facilitate infants being cared for in the safest and most appropriate facility closest to their home community, and will:

- Support longer-term planning by determining numbers of the level 1,2a, 2b and 3 infants requiring care in facilities across the province
- Support the matching of infant need with appropriate level of service, thereby making efficient use of provincial service capacity.
- Reduce/eliminate transfers of mothers and infants out of country/province due to appropriate capacity development within BC.

Determining Level of Service

The level of service required by an infant is based on risk to the infant and NOT on site level of care classification, actual bed assignment or available staffing or workload. Although an infant may meet criteria from several levels, he/she will be assigned according to the highest level indicated. For example, an infant may be term gestation

[1] Lee, Shoo, Canadian Pediatric Society, Fetus & Newborn Committee (2006). Levels of neonatal care. *Paediatric Child Health*11(5), 303-306.

(normal) weighing 2200g (level I) but require mechanical ventilation (level III): the highest level scored is Level III, therefore this infant would be classified as such. See tables 1 – 6 for definitions of each level of service.

Definition of variables by Level of Service required

*Please note: if older than 14 days, default to current weight

Table 1: Normal Newborn (able to be cared for in a mother/baby dyad)

Corrected Age	≥37 weeks
Weight	Birth Weight ≥ 2500 g
Respiratory Status	No support required
Cardiovascular Status	No support required
Neurological Status	Prenatal substance exposure but no medication required
Fluid and Glucose Requirements	No support required
Other	▪ Single phototherapy ▪ Healthy Post Cesarean Section ▪ N/S Lock for prophylactic antibiotics ▪ Terminal Palliative Care/no invasive interventions required

Table 2: Level I Neonate

Corrected Age	34 -36 $^{+6}$ weeks
Weight	▪ BW 1800 – 2499g ▪ CW ≥ 1500, if over 14 d*
Respiratory Status	▪ Low flow oxygen via nasal prongs ▪ SpO2 monitoring ▪ Mild acute respiratory distress (as per ACoRN - Appendix A) with FiO2 < 0.35
Cardiovascular Status	No Support required
Neurological Status	No support required
Fluid and Glucose Requirements	▪ D10%W Infusion ▪ Routine Blood glucose monitoring with stable normoglycemia ▪ Gavage feeds ≥ q3h, well tolerated
Other	▪ Double phototherapy ▪ Therapeutic IV antibiotics

Table 3: Level IIA Neonate

Corrected Age	32 – 33^{+6} weeks
Weight	▪ BW 1500 – 1799g ▪ CW ≥ 1200g, if over 14d
Respiratory Status	▪ Apnea and desaturation episodes, self resolving or requiring gentle stimulation to recover ▪ On caffeine or off within the past 4 days

Cardiovascular Status	No support required
Neurological Status	▪ HIE stage 1 ▪ Controlled seizures on therapy ▪ Prenatal substance exposure on drug therapy
Fluid and Glucose Requirements	Blood glucose monitoring for unstable glycemia
Other	Transfusion of blood products (excludes Exchange transfusion)

Table 4: Level IIB Neonate

Corrected Age	30 – 31^{+6} weeks
Weight	▪ BW 1200 – 1499g ▪ CW ≥ 1000g, if over 14d
Respiratory Status	▪ Moderate respiratory distress (ACoRN) with $Fi0_2$ <0.5 ▪ CPAP ▪ High flow via nasal prongs
Cardiovascular Status	▪ PICC/CVC/UVC access ▪ Clinically stable CHD after cardiology consultation
Neurological Status	
Fluid and Glucose Requirements	▪ On parenteral nutrition ▪ Gavage feeds < q3h or continuous ▪ Stable gastrostomy 7-10 days post-op
Other	

Table 5: Level III Neonate

Corrected Age	< 30 weeks
Weight	▪ BW <1200g ▪ CW < 1000g, if over 14d
Respiratory Status	▪ Apnea and desaturation requiring intervention (bag and mask ventilation) ▪ Mechanical ventilation or recently extubated within the past 24h ▪ Chest tube ▪ Critical airway
Cardiovascular Status	▪ Arterial access ▪ Inotropic support ▪ Volume resuscitation
Neurological Status	▪ HIE stage 2 or 3 ▪ Uncontrolled seizures
Fluid and Glucose Requirements	▪ > D10W infusion ▪ Gastrostomy, < 7-10 days jejunostomy, jejunal tube
Other	▪ Exchange transfusion, and 24h post exchange transfusion ▪ Day of surgery and up to 48h after surgery ▪ Day of diagnostic imaging**

** Please note: refers to advanced diagnostic imaging, usually in radiology department ± anesthesia/sedation (excludes non-contrast radiology and ultrasound)

Table 6: Level III+ Neonate

Corrected Age	Any age
Weight	Any weight
Respiratory Status	▪ Inhaled nitric oxide ▪ High frequency ventilation ▪ ECMO
Cardiovascular Status	▪ Unstable CHD ▪ Unstable arrhythmia
Neurological Status	No specific indicators
Fluid and Glucose Requirements	No specific indicators
Other	▪ Tracheostomy ▪ Intestinal failure ▪ Acute NEC ▪ Active ROP $\geq$ stage III

Glossary of Terms

BW	**Birth weight**
CW	**Current weight**
RA	**Room air (21% FiO2)**
CPAP	**Continuous Positive Airway Pressure**
Critical Airway	**Potential for obstructed airway (genetic/structural abnormality)**
HIE	**Hypoxic Ischemic Encephalopathy**
PICC	**Peripheral Inserted Central Catheter**
UAC	**Umbilical Artery Catheter**
UVC	**Umbilical Venous Catheter**
CVC	**Central Venous Catheter**
CHD	**Congenital Heart Defect**
ECMO	**Extra Corporeal Membrane Oxygenation**
N/S	**Normal Saline**
ABx	**Antibiotics**
Dx	**Diagnostic/diagnosis**
NEC	**Necrotizing Enterocolitis**

Appendix A

The ACoRN Respiratory Score
Judging the severity of respiratory distress is a skill acquired with experience. The Respiratory Scale assists the clinician to recognize the components that need assessment. The Score is utilized in babies who are breathing spontaneously, including those being treated with CPAP. It is not utilized in babies who are receiving ventilation assistance.

The Table lists the 6 components of respiratory assessment and their descriptors. The first 5 components help quantify the degree of respiratory distress. The degree of prematurity has been included in the score as it is the main modifier of the baby's ability to cope with a given degree of respiratory distress.
Each component is scored from 0 to 2.

To calculate the ACoRN Respiratory Score, take the sum of the following six individual variables.

Score	**0**	**1**	**2**
Respiratory rate	40 to 60/minute	60 to 80/minute	>80/minute
Oxygen requirement[1]	None	≤ 50%	> 50%
Retractions	None	Mild to moderate	Severe
Grunting	None	With stimulation	Continuous at rest
Breath sounds on auscultation	Easily heard throughout	Decreased	Barely heard
Prematurity	> 34 weeks	30 to 34 weeks	< 30 weeks
[1] A baby receiving oxygen prior to the setup of an oxygen analyzer should be assigned a score of "1"			

Adapted from Downes JJ, Vidyasagar D, Boggs TR Jr, Morrow GM 3rd. Respiratory distress syndrome of newborn infants. I. New clinical scoring system (RDS score) with acid-base and blood-gas correlations. Clin Pediatr 1970; 9(6): 325-31.

As per page 3-7 of the ACoRN text:

1) Mild respiratory distress is an ACoRN score of less than 5
2) Moderate is 5 – 8
3) Severe distress is a score above 8

References

ACoRN Neonatal Society (2006). ACoRN – Acute Care of at-Risk Newborns (1st Ed.). ACoRN Neonatal Society, Vancouver, BC

Lee, Shoo, Canadian Pediatric Society, Fetus & Newborn Committee Statement, *Levels of Neonatal Care* (Draft), 2004

Lee, Shoo, Canadian Pediatric Society – Fetus and Newborn Committee (2006). Levels of neonatal care. *Paediatric Child Health*11(5), 303 – 306.

Provincial Specialized Perinatal Services (PSPS) Levels of Care document (2005): http://www.bcphp.ca//sites/bcrcp/files/psps/Levels_of_Perinatal_Care_May_6_2005.pdf

SOGC Guidelines for the Management of Pregnancy at 41+0 to 42+0 Weeks: http://www.sogc.org/guidelines/documents/gui214CPG0809.pdf