Bronchopulmonary Dysplasia (BPD) BUNDLE – Infants <29 weeks GA		
Domain	**Comments**	**Recommendation**
Threatened preterm labour	Antenatal steroid administration	1a (good evidence of improving survival, no evidence that this improves BPD)
Delivery room management of spontaneously breathing neonate	Trial of continuous positive airway pressure (CPAP) of 5-8 cm H_2O.	1b (Schmolzer et al, 2013)
	Initiate resuscitation using FIO2 0.21-0.30 and titrate O_2 to achieve pre-ductal saturation of >85% by 7- 10 minutes of age	1b
Surfactant administration **Revised!**	Preterm infants with clinical or radiological evidence of RDS who require **intubation** for initial stabilization or early in the neonatal period should be given surfactant Preterm infants with RDS who are managed with non-invasive respiratory support as an initial mode should receive early selective surfactant at a FiO_2 threshold of greater than 0.3 and no later than 0.5. Clinical considerations such as the work of breathing, radiologic evidence of RDS and the non-invasive mean airway pressure used may justify an earlier threshold for surfactant therapy.	1a 2b
Methods of Surfactant Administration **New!**	Minimally Invasive Surfactant Therapy (MIST) or Less Invasive Surfactant Administration (LISA) is the preferred mode of surfactant administration for spontaneously breathing babies on non-invasive respiratory who are greater than or equal to 26 weeks gestation, provided that clinicians are experienced with this technique. Preterm infants who cannot be treated with MIST/LISA and require intubation solely for surfactant administration should be evaluated for rapid extubation back to non-invasive respiratory support (Intubate, surfactant, Extubate-INSURE) as opposed to routine mechanical ventilation to reduce duration of	1b 1b

	invasive mechanical ventilation.	
Repeat Doses of Surfactant **New!**	Infants with evidence of RDS on chest x-ray and who have persistent or recurrent oxygen (>30%) and ventilatory requirements within the first 72h of life should have repeated doses of surfactant.	1 b (CPS)
Use of Macrolides **New!**	Routine prophylaxis with macrolides for BPD prevention in preterm infants is not recommended. However, select high risk populations/Ureaplasma positive patients may benefit – especially with early treatment with azithromycin/clarithromycin. Currently, optimal dosing remains unknown.	1a
Systemic Steroids **New!**	Clinicians may consider prescribing a course of low-dose hydrocortisone (physiologic replacement dose) beginning in the first 24-48h after birth, for 10 days, to selected infants at the highest risk of BPD (e.g. < 28 weeks GA, exposure to chorioamnionitis). There may be an increased risk of late-onset sepsis associated with this practice. Hydrocortisone should not be combined with indomethacin prophylaxis. (Level 1 evidence, good quality) Dexamethasone in the first week of life to prevent BPD should not be given. (Level 1 evidence, good quality) The routine use of dexamethasone for all infants who require assisted ventilation after seven days of age to treat evolving BPD is not recommended. (Level 1 evidence) The benefits of late (after day 7 of life) dexamethasone therapy appear to outweigh the adverse effects for infants who are at high risk of BPD. In these circumstances, low-dose dexamethasone (initial dose 0.15 mg/kg/day to 0.2 mg/ kg/day) should be used in most circumstances in tapering doses over a short course (seven to 10 days). (Level 1 evidence) Hydrocortisone to treat infants at high risk of BPD, after the first week of life, or infants	1a 1a 1 1 1

	with prolonged ventilator dependence is not recommended. (Level 1 evidence)	
Inhaled Steroids **New!**	The routine use of inhaled corticosteroids to prevent BPD is not recommended. (Level 1 evidence)	1
Use of distending pressure post resuscitation	Maintain consistent CPAP to prevent lung de-recruitment	1c
	Continue use of appropriate distending pressure to maintain Functional Residual Capacity (FRC)	No evidence, clinical and physiological sense
Mode of Mechanical Ventilation and Tidal Volume Targets **Revised!**	Volume targeted ventilation is recommended over pressure limited ventilation to minimize risk of BPD Tidal Volume Targets • **Birth weight less than 800g: VT = 4.5 – 5.5 ml/kg** with the higher VT for smaller infants (fixed flow sensor dead space). • **Larger preterms: VT = 4 - 5 ml/kg** • **Preterms with evolving BPD (2+ weeks old): 5.5 - 6.0 ml/kg** (increased anatomical and alveolar dead space).	1b 4C 4C, BPD rates were not reported with this strategy.
	Appropriate use of High Frequency Ventilation (HFV) – criteria to be developed locally	
Avoid lung de-recruitment	Use in-line suction No routine suctioning, suction only as clinically indicated Avoid ventilator disconnects	No evidence, physiological sense
Extubation **Revised!**	Daily assessment of infants eligible for extubation: criteria to be developed locally. Extubate as early as clinically appropriate to minimize duration of invasive ventilation.	 1b
Immediate post-extubation management **Revised!**	Non-invasive positive pressure ventilation (NIPPV) or CPAP should be used as post extubation support to reduce risk of re-intubation in preterm infants If using CPAP as primary post extubation support; use higher CPAP levels (greater than	1b 1b

	6cmH20) with escalation to NIPPV (via a ventilator) as rescue therapy to reduce risk of re-intubation.	
	Do not use high flow nasal cannula (HFNC) in the immediate post extubation period, insufficient evidence on use in infants less than 28 weeks gestation	Wilkinson et al, 2016
Oxygen therapy (oxygen is a DRUG)	Always use blenders when on oxygen therapy	1b
	Use daily histogram to guide respiratory support and oxygen therapy to aim for maintaining SpO2 within alarm limits for greater than 70% of time	2C, physiological plausibility
	Enforce high alarm setting on monitor when infant is receiving oxygen	1b
	Oxygen saturation alarm limits	No absolute recommendations can be given at this time for BPD prevention
Medical Therapy	Caffeine for apnea of prematurity	1a
	Early caffeine	1b
	Monitor weight change closely in first 7 days to optimize fluid and sodium intake	2b, physiological sense
	Vitamin A	1b; however, availability is an issue in Canada
Optimizing Early Nutrition	TPN within 4 hours of life if < 1500 g	1b
Prevention of Unplanned Extubation **New!**	Implement standardized practices to reduce unplanned extubation.	Patient Safety
Patient Care Plans	Daily discussion regarding respiratory management and O2 therapy status	No evidence, clinical sense
	Multidisciplinary discussions regarding respiratory management of difficult patients	No evidence, clinical sense

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