



Chapter 26

NEONATAL RESUSCITATION

Introduction

Not all infants require resuscitation

The infant who is vigorous at birth, immediately shows good respiratory effort, cries and becomes pink, should be placed on mother's abdomen, dried, receive initial care and assessed immediately at birth and, thereafter, placed skin to skin with mom or wrapped warmly in the arms of a parent at parents request. Cord clamping should be delayed for at least 1 minute in infants who do not require resuscitation. The healthy newborn who breathes well and cries immediately **DOES NOT REQUIRE ROUTINE SUCTION, ON THE PERINEUM, OR FOLLOWING BIRTH.**

Personnel

1. Every birth area should have a list of maternal/fetal conditions for:
 - Prenatal transfer to a perinatal referral centre
 - Summoning extra personnel with neonatal resuscitation skills to attend the birth, eg.
 - Malpresentation
 - Operative birth
 - Prematurity
 - Intrauterine growth restriction
 - Meconium stained fluid
 - Fetal distress
2. Personnel skilled in neonatal resuscitation and able to function as a team should be present for every birth. At least one of these people should have the baby as their primary responsibility.
3. A regular education program with annual reviews should be required for personnel responsible for care of the newborn.
4. Roles for resuscitation team members should be written and agreed upon.
5. Regular team rehearsals are recommended.
6. When a distressed infant is anticipated, where possible, at least two persons should have management of the infant as their only responsibility.

Equipment

1. Equipment should be checked for availability and working order daily, and before and after each birth.
2. Equipment should be standardized to avoid confusion.
3. Equipment should be kept in an orderly fashion for easy access when needed.
4. Recommended basic equipment includes:
 - Preheated radiant warmer with servo control probe
 - Prewarmed blankets, towels, and infant hats
 - Disposable gloves
 - Suction bottle and manometer
 - Suction tubing
 - Suction catheters 6, 8, 10, 14 fr
 - O2 tubing
 - Infant resuscitation bag (≤ 750 ml) with in-line pressure manometer or pop-off valve and reservoir
 - T piece resuscitator
 - Laryngeal mask airway
 - Cushioned infant size masks (0,1,2)
 - Oral airways (sizes - 000,00, 0, 1)
 - Neonatal stethoscope
 - Air supply and oxygen-air blender
 - Straight (miller) laryngoscope blades (00, 0, 1)
 - 16.5 cm neonatal magill forceps (6½ in)
 - Laryngoscope handle
 - Extra batteries and bulbs
 - Sterile et tubes (sizes 2; 2.5; 3.0; 3.5 mm) with connectors
 - Plasticized wire stylets (sterile, single use)
 - Meconium aspirators
 - 1.2 cm (1/2 in) tape
 - Scissors
 - Gastric tubes (sizes 5, 8, fr)
 - 20 ml syringe
 - Umbilical catheters (sizes 3.5,5 fr)
 - 3-way stopcocks
 - Sterile umbilical catheterization/small vessel cut-down tray

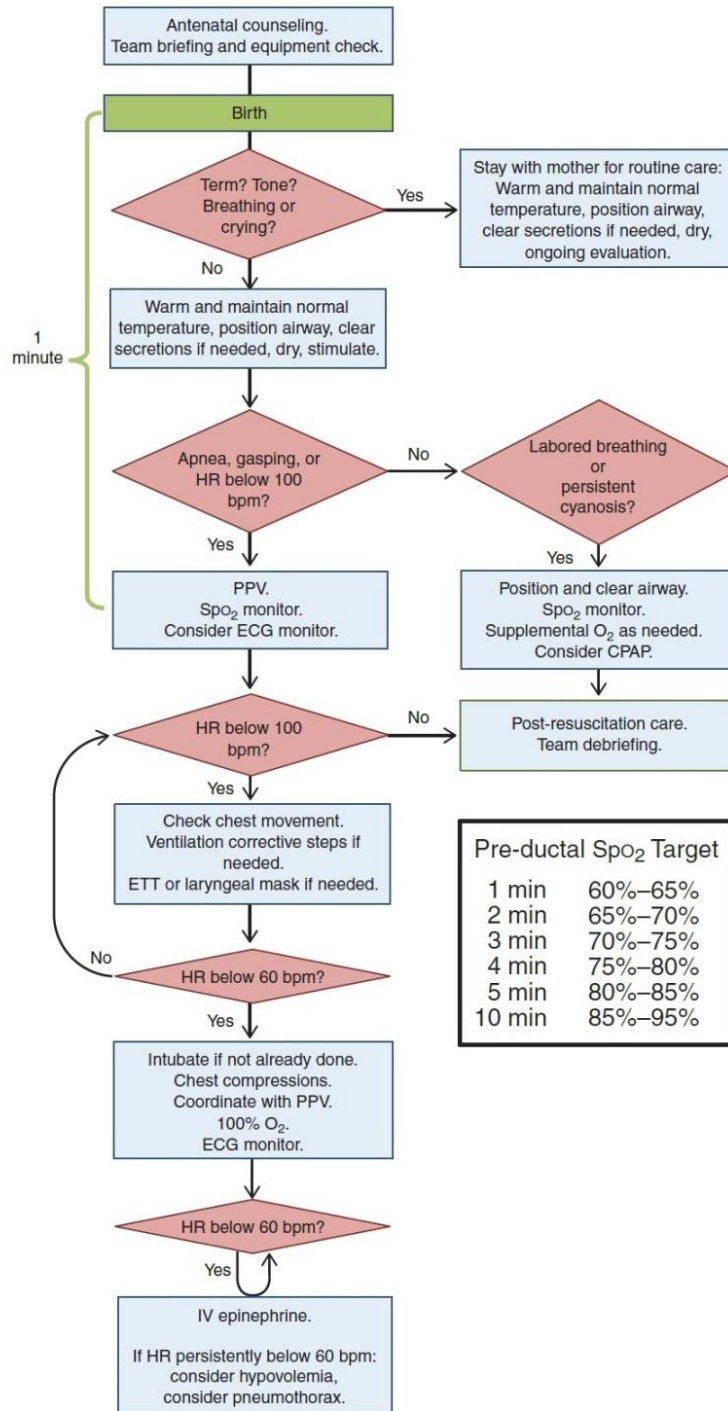
- Umbilical tape
- Fluid administration set
- Needles and syringes
- Chlorhex swabs
- Epinephrine 1:10,000
- Non-invasive bp monitoring
- Volume expanders
 - Normal saline
 - Access to blood, plasma substitute
- Glucometer for rapid assessment of blood glucose
- D10w for infusion
- Oxygen saturation monitor
- Cardiac monitor if available

***Neonatal medication is kept separate from maternal medication**

5. An emergency pneumothorax aspiration set consisting of an 18 gauge plastic cannula, connected with extension tubing to a 3-way stopcock, 20 ml syringe and under water seal, should be available.
6. Every hospital offering obstetrical care should have available Neonatal Resuscitation Records, which are signed at the end of the procedure by those participating. This record is part of the baby's chart.

References

1. Health Canada, National Guidelines for Neonatal Resuscitation, Canadian Institute of Child Health, Ottawa, 1994.
2. “Part 13: Neonatal Resuscitation Guidelines”, *Circulation*, 2015; S543:S560; published Nov. 3, 2015 doi: 10.1161/CIR.0000000000000267. Avail online [http://circ.ahajournals.org/content/132/18_suppl_S543]. 2005; 112:IV 188-IV-195; originally published online Nov. 28, 2005; DOI: 10.1161/CIRCULATIONAHA.105.166574. Available online [http://circ.ahajournals.org/cgi/reprint/112/24_suppl/IV-188].
3. “Summary of Major Changes to the 2005 AAP/AHA Emergency Cardiovascular Care Guidelines for Neonatal Resuscitation: Translating Evidence Based Guidelines to the NRP”, *American Academy of Pediatrics*, vol. 15, No. 2, /Fall/Winter 2005. Available online [<http://www.aap.org/nrp/pdf/nrp-summary.pdf>]
4. Kattwinkel, John MD, et al “Textbook of Neonatal Resuscitation, 7th Edition” , NRP algorithm Canadian Paediatric Society, 2017
5. Solimano, Alfonso, MD, FRCPC, et al “Acute Care of at-Risk Newborns”, McCallum Printing Group, August 2012



Pre-ductal SpO ₂ Target	
1 min	60%–65%
2 min	65%–70%
3 min	70%–75%
4 min	75%–80%
5 min	80%–85%
10 min	85%–95%

Disclaimer

The Southwestern Ontario Maternal, Newborn, Child & Youth Network (MNCYN) has used practical experience and relevant legislation to develop this manual chapter. We recommend that this chapter only be used as a reference document at other facilities. We accept no responsibility for interpretation of the information or results of decisions made based on the information in the chapter(s)



2016 Medications for Neonatal Resuscitation Program Canadian Adaptation

Medication	Concentration	Preparation	Dose/Route	Weight/Dose	Rate
Epinephrine ET	0.1 mg/mL ¹ (1:10,000)	Draw up in a 3 mL syringe and label "for ET"	0.1 mg/kg (1 mL/kg) ² via ET Maximum 0.3 mg (3 mL) per dose	1kg = 0.1 mg (1 mL) 2kg = 0.2 mg (2 mL) ≥ 3kg = 0.3 mg (3 mL)	Rapidly Do not follow with a flush <i>First dose may be given via ET while UVC inserted</i>
Epinephrine UVC*/ IV/ IO ³ *preferred route	0.1 mg/mL ¹ (1:10,000)	Draw up in a 1 mL syringe and label "for IV/UVC"	0.01 mg/kg (0.1 mL/kg) via IV ²	1kg = 0.01 mg (0.1 mL) 2kg = 0.02 mg (0.2 mL) 3kg = 0.03 mg (0.3 mL) 4kg = 0.04 mg (0.4 mL)	Rapidly Follow with up to 0.5-1 mL 0.9% NaCl flush
Volume Expanders ⁴	0.9% NaCl (<i>normal saline</i>) O-negative PRBC	40 mL (Prepare 2 x 20 mL syringes and label)	10 mL/kg by IV/IO route	1kg = 10 mL 2kg = 20 mL 3kg = 30 mL 4kg = 40 mL	Over 5 to 10 minutes
Naloxone	No longer recommended	" There is insufficient evidence to evaluate the safety and efficacy of this practice" (NRP textbook, 7 th edition – pg. 257)			
Sodium Bicarbonate	No longer recommended	"There is currently no evidence to support this routine practice" (NRP textbook, 7 th edition – pg. 221)			

¹ As of May 2016, the Institute for Safe Medication Practices (ISMP) Canada has eliminated the epinephrine ratio: [https://www.ismp-](https://www.ismp-canada.org/download/safetybulletins/2016/ISMPCSB2016-02_ChangesInExpressionStrength.pdf)

[canada.org/download/safetybulletins/2016/ISMPCSB2016-02_ChangesInExpressionStrength.pdf](https://www.ismp-canada.org/download/safetybulletins/2016/ISMPCSB2016-02_ChangesInExpressionStrength.pdf)

² As of September 22, 2016 the ISMP warned against volumetric dosing for epinephrine <http://www.ismp.org/newsletters/acutecare/showarticle.aspx?id=1148>

³UVC continues to be the preferred route of emergency vascular access, but Intraosseous(IO) access can be used as an alternative if UVC insertion is not possible

⁴Ringers Lactate is no longer included in the 7th edition

For use in Canada

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Weiner, G. M., & Zaichkin, J. (2016). *Textbook of neonatal resuscitation*. Elk Grove Village, IL: American Academy of Pediatrics.