

HEALTHEAST MEDICAL TRANSPORTATION  
MEDICAL OPERATIONS MANUAL

**6C: NEONATAL RESUSCITATION**

**PATIENT CARE GOALS**

- Provide early identification and aggressive management of compromised airway, breathing, and perfusion in the neonate.
- Ensure patient warmth and provide other supportive care.
- Assess respiratory rate, heart rate and tone.

**EMT**

1. Determine term gestation, breathing or crying and if good tone is present.
2. Provide warmth, position (sniffing position), dry and stimulate the newborn.<sup>1</sup>
3. Clearing the airway
  - EMT: Use bulb aspirator only if unable to ventilate neonate
  - **Paramedic providers only: If meconium is present and the newborn is not vigorous<sup>2</sup> or is apneic or gasping**, suction the mouth and then the trachea using direct visualization via laryngoscope, a meconium aspirator and an endotracheal tube<sup>3</sup>. Limit total suctioning time to less than 30 seconds. If meconium is still present after 30 seconds, stop suctioning, intubate the newborn and ventilate.
4. Assess the newborn's heart rate<sup>4</sup> and respirations.
  - **If the heart rate is greater than 100 beats per minute and breathing is adequate**, continue basic supportive care. Provide free flow oxygen if oxygen saturations are low.<sup>5</sup>
  - **If the heart rate is less than 100 beats per minute or if newborn is apneic or gasping**, begin positive pressure ventilation at a rate of 40 to 60 breaths per minute. Resuscitation may begin with 21% oxygen (room air) for term babies and increased to 40% if a blender is present, based on oxygen saturation levels. Reassess the baby's heart rate after about 30 seconds of effective positive pressure ventilation.
  - **If heart rate is less than 60 beats per minute**, begin chest compressions at a rate of 3 compressions to 1 ventilation. Oxygen should be increased to 100% for positive pressure ventilation. Reassess the baby's heart rate after 45 to 60 seconds of effective positive pressure ventilation.
  - **If the heart rate is greater than 60 beats per minute** upon reassessment, discontinue chest compressions. Continue positive pressure ventilation at a rate of 40 to 60 per minute until the heart rate is greater than 100 beats per minute and until the baby begins to breathe spontaneously. Gradually slow the rate and decrease the pressure of positive pressure ventilation. Provide supplemental oxygen if oxygen saturations are low.
5. Place a pulse oximeter probe on the newborn's right hand or wrist<sup>6</sup> to measure pre-ductal saturation.
  - Using pulse oximetry, supplemental oxygen concentration should be adjusted to achieve the target values for pre-ductal saturations. Use the following time specific saturations:

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Time After Birth	Targeted Pre-Ductal SPO <sub>2</sub>
1 minute	60 to 65%
2 minutes	65 to 70%
3 minutes	70 to 75%
4 minutes	75 to 80%
5 minutes	80 to 85%
10 minutes	90 to 95%

- Low oxygen saturations and central cyanosis despite 100% oxygen delivery may require positive pressure ventilation.
6. Subsequent evaluation and decision-making are based upon respirations, heart rate and oxygenation per pulse oximeter.

## PARAMEDIC

7. Consider intubation if not done previously. Use **Handtevy Pediatric Guidelines** to guide tube size selection. There are several times that intubation may have been done earlier in the resuscitation.
8. **If the heart rate remains less than 60 beats per minute** despite 45 to 60 seconds of effective chest compressions and ventilations, administer **epinephrine (Adrenalin) 1:10,000 0.01 mg/kg rapid IV/IO push** for infants weighing greater than 2 kilograms.
- Repeat every 3 minutes times two doses if heart rate remains less than 60 beats per minute. If heart rate remains less than 60 beats per minute after two doses of 0.01 mg/kg give **epinephrine (Adrenalin) 1:10,000 0.03 mg/kg IV/IO**.
  - Endotracheal dose<sup>7</sup>: **epinephrine (Adrenalin) 1:10,000 0.05 mg/kg ET**, repeat every three minutes times two doses if the heart rate remains less than 60 bpm. If the heart rate remains less than 60 beats per minute after two doses of 0.05 mg/kg, give **epinephrine (Adrenalin) 1:10,000 0.1 mg /kg ET**.
9. **If there is evidence of hypovolemia** (pale color, weak pulses, no improvement in circulatory status despite resuscitation efforts) give:
- Normal saline **10 mL/kg IV/IO over 5 minutes**.
  - If hypovolemia persists after 5 minutes, repeat the dose.
  - **Call Medical Control if hypovolemia persists after the second dose.**
10. **Check blood glucose level.**
- If unable to obtain blood glucose level or if blood glucose is less than 50 mg/dL, administer **10% Dextrose (D10W) in 0.5 grams/kg doses IV/IO over 2 minutes**, 15 to 45 minutes apart.
  - **Contact Medical Control if the blood glucose level remains below 50 mg/dL after 3 doses of 10% Dextrose (D10W) or if the blood glucose level is greater than 180 mg/dL.**
  - Target blood glucose level is 50 to 180 mg/dL.

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- If unable to obtain a glucose level, give **10% dextrose (D10W) 0.5 grams/kg dose IV/IO over 2 minutes** and report this to the receiving facility.

### DOCUMENTATION KEY POINTS

- Estimate of the patient's weight
- Separate patient care reports for mother and infant.
- Initial and ongoing assessments, monitoring, interventions, patient response, and complications (if any) encountered.

### NOTES

- <sup>1</sup> **Heat loss** may be prevented by quickly drying the infant, wrapping the patient in a blanket, covering the head, and allowing the mother to warm the infant by skin-to-skin contact. Maintain the infant's temperature at 36.5 to 37.5 degrees Celsius (97.7 to 99.5 degrees Fahrenheit), if possible.
- <sup>2</sup> **Vigorous** infants have a normal respiratory effort, normal muscle tone and a heart rate greater than 100 beats per minute. Consider an infant to be non-vigorous if they have depressed respirations, depressed muscle tone and/or has a heart rate below 100 bpm.
- <sup>3</sup> **Suctioning** should be brief (2 to 3 seconds) and gentle. Monitor heart rate during suctioning. If bradycardia occurs, discontinue suctioning until the heart rate increases. Limit total suctioning time to less than 30 seconds. If suctioning is for meconium and meconium is still present after 30 seconds, stop suctioning, intubate the newborn and ventilate.
- <sup>4</sup> **Heart rate** is determined by precordial auscultation or by palpating the base of the umbilical cord. Count for 15 seconds and multiply by 4.
- <sup>5</sup> 5 liters per minute of oxygen via infant mask blow-by is usually adequate. Cyanosis present only in the hands and feet (acrocyanosis) usually does not require treatment with oxygen. When central cyanosis subsides, gradually decrease oxygen until the infant remains pink while breathing room air. If central cyanosis returns, maintain oxygen flow sufficient to keep the patient pink and maintain adequate SpO<sub>2</sub>.
- <sup>6</sup> If the patient has a patent ductus arteriosus, placing the SpO<sub>2</sub> probe on the patient's left hand or wrist will cause an artificially low SpO<sub>2</sub> reading.
- <sup>7</sup> Consider endotracheal route only prior to IV/IO access is obtained.

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## Neonatal Resuscitation Algorithm—2015 Update

