

NEWBORN RESUSCITATION WORKSHOP

By FMH Neonatology



NEONATAL RESUSCITATION WORKSHOP



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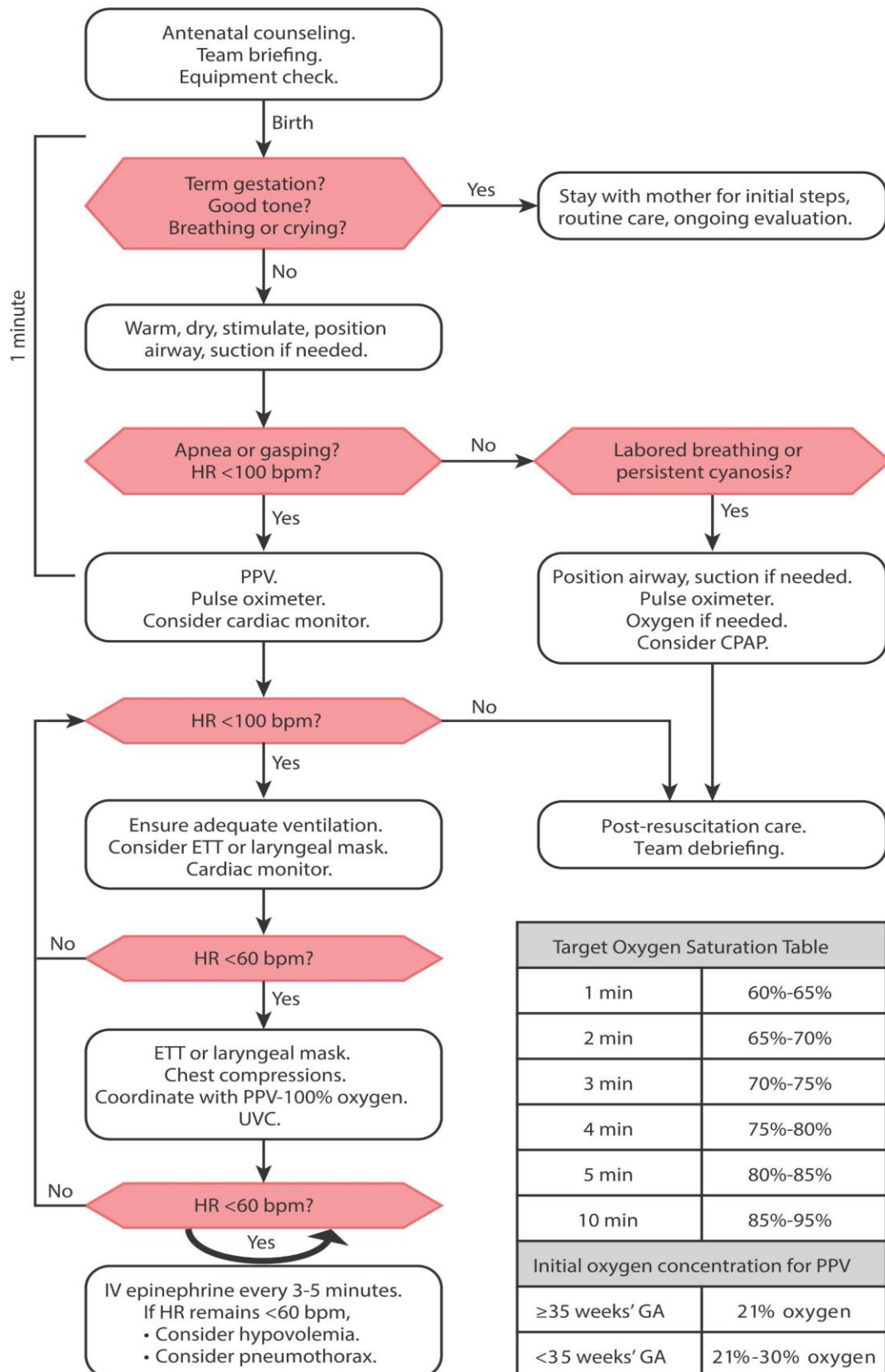
Adopted from Neonatal Resuscitation program – AAP US

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Neonatal Resuscitation Program® 8th Edition Algorithm



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Introduction

- Most newborns make the transition to extrauterine life without intervention.
- Before birth, pulmonary blood vessels in the fetal lungs are tightly constricted, and the alveoli are filled with fluid, not air.
- Newborn resuscitation is usually needed because of respiratory failure.
- The most important and effective step in neonatal resuscitation is to ventilate the baby's lungs.
- Very few newborns will require chest compressions or medication.
- Teamwork, leadership, and communication are critical to successful resuscitation of the newborn.

Planning

- Assess Risk Factors (by asking the obstetrician 4 questions)
 1. What is the expected gestational age?
 2. Is the amniotic fluid clear?
 3. Are there any additional risk factors? Including twins/triplets etc.
 4. What is our umbilical cord management plan?
 - Some newborns without any apparent risk factors may require resuscitation.
 - Every birth should be attended by at least 1 qualified individual who can initiate resuscitation and manage the newly born baby.
 - If risk factors are present, at least 2 qualified individuals should be present.
- Identify team leader.
 - Anticipate potential complications and plan a team response.
 - Delegate tasks.
 - Identify who will document events as they occur.
 - Determine who supplies and what equipment will be needed.
 - Identify how to call for additional help.
- Prepare Equipment

Initial Evaluation immediately after BIRTH

- All newborns require a rapid evaluation. ASK/CHECK
 - If the baby is full-term?
 - Has good muscle tone?
 - Is breathing or crying?
- If yes to all – its vigorous baby – delay clamping of the umbilical cord for 30 to 60 seconds.
- If the answer is "NO" to any of these, shift the newborn to the radiant warmer.

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On Warmer – 5 Steps

1. Provide Warmth to the baby
2. Position Head and Neck to open airway



Figure 3.7. Correct sniffing position



Figure 3.8. Optional shoulder roll for maintaining the sniffing position

3. Clear secretions from airway if needed
4. Dry and
5. Stimulate

Assess the Baby

1. Breathing – regular OR irregular / gasping / apnea
 - a. If breathing not regular – start PPV
 - b. If regular, then assess
2. Heart Rate – by stethoscope or monitor - bradycardia (<100/min), normal (100-160 /min)
 - a. If bradycardia – start PPV
 - b. If normal assess colour
3. Colour – pink / peripheral cyanosis / central cyanosis – pulse oximetry
 - a. If cyanosis – start oxygen inhalation
 - b. If Pink, assess tone
4. Tone – vigorous / lethargic, floppy
 - a. If floppy – monitor
 - b. If vigorous – shift with mother

Note: If meconium-stained fluid is present and the baby is not vigorous, perform the initial steps. Routine laryngoscopy with or without intubation for tracheal suction is not suggested.

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Positive Pressure Ventilation (PPV)

- “Golden Minute”: Initiation of ventilation of newborn lung either by itself or by means of PPV
- Indications of positive-pressure ventilation
 - Apnea (not breathing)
 - Gasping
 - Heart rate < 100/bpm
- PPV devices
 - Self-inflating bags
 - Flow-inflating
 - T-piece resuscitators
- Person providing PPV should be at head end of newborn
- Newborn should be in sniffing position
- Resuscitation mask
 - Two types: i. round ii. anatomical
 - It should cover the chin mouth lower half of nose and never eyes
 - Holding technique
 - One hand hold
 - Two hand hold with jaw thrust
- PPV administration initial settings
 - Oxygen concentration i. 21% (>35 weeks) ii. 21-30% (<35weeks)
 - Gas flow 10L/min
 - Rate 40 – 60 bpm
 - Pressures: PIP – 20 – 25 cmH₂O, PEEP 5 cmH₂O
- Continuous positive airway pressure: breath, two, three; breath, two, three.
- First assessment for heart rate:
 - Increasing: continue PPV, access heart rate after 30 sec
 - Not increasing: is chest moving?
 - Yes: Continue PPV, access heart rate after 30 sec of effective PPV
 - NO: Ventilation corrective steps “MR. SOPA” (see table below)
- Second assessment for heart rate – after 30 second of effective ventilation
 - ≥100: Continue PPV, monitor chest movements, heart rate and respiratory effort
 - 60 – 99:
 - Heart rate improving continue PPV, adjust FiO₂
 - Heart rate not improving: Ventilation corrective steps, ETT, adjust FiO₂
 - <60: Ventilation corrective steps, ETT, adjust FiO₂ increase to 100%, cardiac compression

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- When to stop PPV: Heart rate > 100, spontaneous breathing
- Laboured breathing or low oxygen saturation despite free-flow oxygen: Oxygen, CPAP

	Corrective steps	Actions
M	Mask adjustment	Reapply mask & lift the jaw forward. Consider the 2-hand hold
R	Reposition the head & neck	Place head neutral or slightly extended
Give breaths and assess chest movement. If no chest movement, do the next step		
S	Suction mouth & nose	Use a bulb syringe or suction catheter
O	Open the mouth	Use a finger to gently open the mouth
Give breaths and assess chest movement. If no chest movement, do the next step		
P	Pressure increase	Increase in 5-10cm H ₂ O increments to maximum recommended pressures (Max 40 cm H ₂ O term & Max 30 cm H ₂ O Preterm)
Give breaths and assess chest movement. If no chest movement, do the next step		
A	Alternate airways	Insert a laryngeal mask or endotracheal tube
Try PPV and assess chest movements and breath sounds		

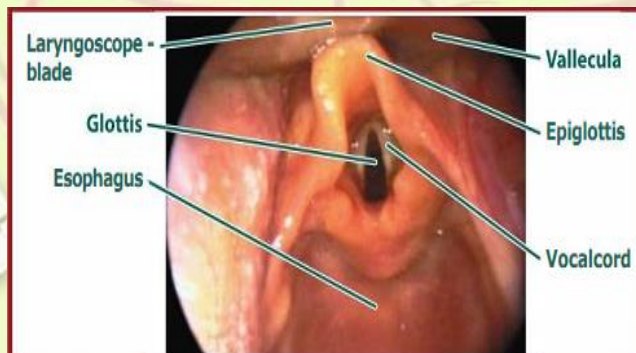
Endotracheal Intubation

- When to Pass ETT
 1. If heart rate remains less than 100 bpm despite PPV with face mask or laryngeal mask.
 2. If PPV is prolonged
 3. If starting chest compressions.
 4. If needs direct tracheal suction (thick secretions) or surfactant or suspected diaphragmatic hernia.
- A person with intubation skills should be in present.
- Correct laryngoscope blade (straight – Muller)
 - For Full term – size No. 1
 - For a preterm - size No. 0
 - For extreme preterm - size No. 00
- Non-Cuffed Endotracheal Tube Size Calculator
 - Weight <1 kg or <28 weeks gestation - 2.5mm
 - Weight 1-2 kg or 28-32 weeks gestation - 3.0 mm
 - Weight >2 kg or >34-week gestation - 3.5 mm

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- Endotracheal tube insertion depth should be estimated using the nasal-tragus length (**NTL+1 cm**) or the baby's gestational age.
- To confirm endotracheal tube insertion within the trachea.
 - Rapidly increasing heart rate
 - By Auscultating bilaterally equal breath sounds
 - Demonstrating exhaled carbon dioxide
 - Chest x-ray for final confirmation.
- Fix Properly
- If a baby's condition worsens after endotracheal intubation, **(DOPE mnemonic)**
 - The tube may be displaced
 - The tube may be obstructed
 - Pneumothorax
 - PPV equipment failure. .
- Effective teamwork is required to perform this procedure quickly.
 - The intubation procedure ideally should be completed within 30 seconds
 - Avoid repeated unsuccessful attempts at endotracheal intubation.
- If baby weighs more than 2 kg, a laryngeal mask may be used, if PPV with face mask fails.



Chest Compressions

Indications:

- If heart rate < 60 bpm after at least 30 seconds of PPV that inflates the lungs as evidenced by chest movements.

Technique:

- Thumbs at the lower third of sternum just below the imaginary line connecting nipples.
- Hands encircling the chest, fingers under the baby's back to provide support.
- Thumbs should remain in contact with the chest during both compression and release.
- About one third of AP diameter of chest

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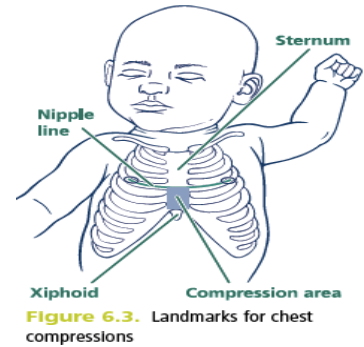
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- Keep O₂ concentration to 100%

Rhythm:

- Give 3 rapid compressions followed by one ventilation in each 2 seconds cycle.
- Practice saying 'one – and- two- and- three- and- breath- and-



Reassess:

- After 60 seconds of coordinated ventilations and compressions.

Medications

Adrenaline

Indication:

- Heart rate < 60 bpm **after** 30 seconds of PPV that inflates the lungs **and** another 60 seconds of coordinated PPV and compressions using 100% oxygen.

Preparation:

- Commercially available preparation 1mg/ml (1:1000)
- Required Concentration 0.1mg/ml (1:10,000)
 - o So dilute 1ml adrenaline injection with 9ml Normal saline in a syringe.
- Dose
 - o Intravenous adrenaline 0.01 to 0.03 mg/kg (0.1 to 0.3 mL/kg) Administration:
 - Give rapidly followed 3ml saline flush
 - Repeat: 3-5min
 - o Endotracheal adrenaline: 0.05 to 0.1 mg/kg (0.5-1ml/kg)
 - No flush needed, Use PPV to push down the tube
 - Repeat: For repeat administration use IV route with IV dosage

Volume expanders

- a) Crystalloid solution of 0.9% saline
- b) Red blood cells (in emergency non-cross-matched group O-Negative PRBCS)

Preparation: 30-60ml syringe, labelled

Dose: 10ml/kg once over 5 to 10minutes

Route: Intravenous UVC or intraosseous

Caution: Use with caution in preterm (<32 weeks gestation)