Neonatal Resuscitation

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INTRO

- This presentation gives you a refresher and supports the ARC guidelines and BHS CPG for neonatal resuscitation.

- For more information – please check these

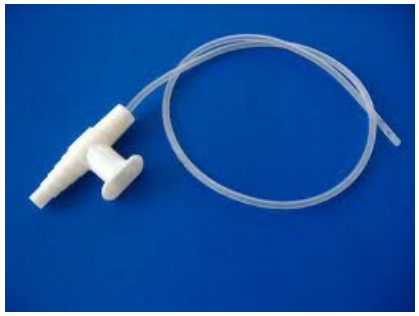
WHAT EQUIPMENT WILL YOU NEED TO PREPARE FOR A NEONATAL RESUS?

Check equipment

- Heater
- Light
- Clock
- Warm dry towels
- Air, O2, neopuff with masks in different size/Bag and mask

- *DO I NEED ADDITIONAL ASSISTANCE?*

- Suction, with different sized suction catheters
- Laryngoscope +/- ETT
- +/- other airway adjuncts eg LMA, guedel
- Saturation monitor (place on right hand as PRE ductal)



Neopuff

What are the recommended settings for the Neopuff?

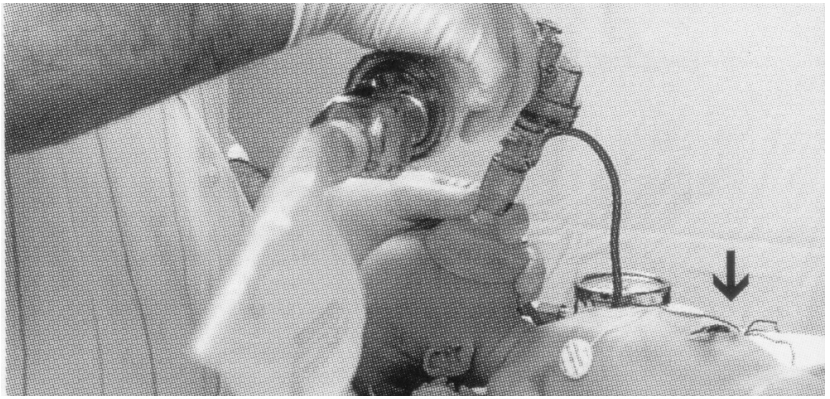
Recommended Neopuff settings

- Gas flow at 10 L/min (8L/min if using cylinders)
- Maximum pressure valve set at 50 cm H2O
- PIP at 30 cm H2O
- PEEP 5 cm H20
- Ventilate 60 breaths/min with an inspiratory time of 0.5 seconds expiratory 0.5 second

- What alternatives are there to the neopuff?

- What are their advantages?

Laerdal bag and mask



- Does not require gas supply
- Cannot use passively, even with O2 connected

First evaluation

- Determines if intervention is required, is based upon the newborn's
  - Breathing
  - Muscle tone
- If these are normal then colour and response are likely to be normal
  - Colour
  - Response to stimulation

First evaluation

- Newborn infants can take up to ten minutes of post natal age to look "pink"
- Look at the colour of the lips to judge central cyanosis
- Blue hands/feet is not a concern

Assessment

- If baby is breathing, heart rate is > 100/min and beginning to look pink then give routine care and observations appropriate for gestation

- *Do a brief examination – to ensure no missed ambiguous genitalia, normal limbs, mouth etc*

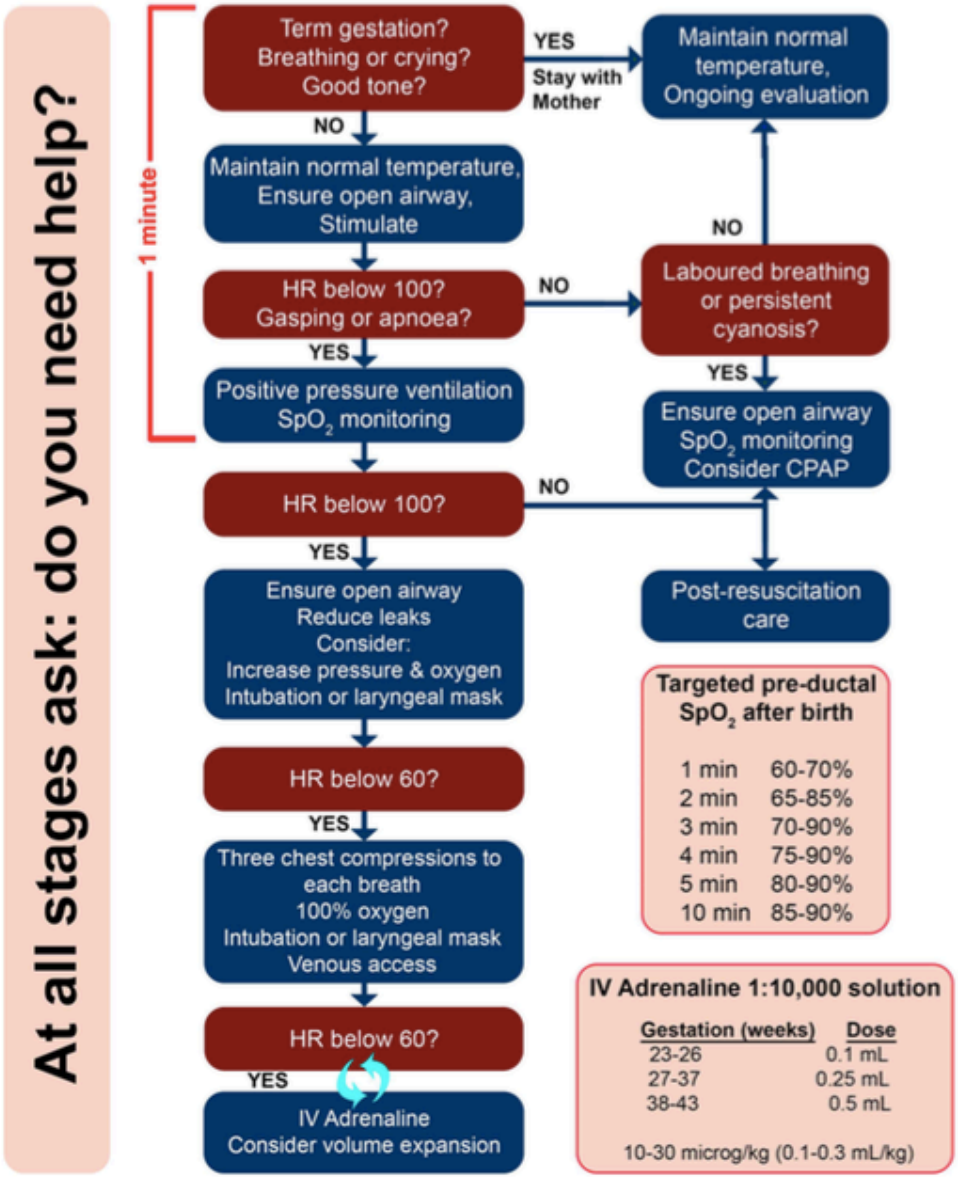
If not breathing…

Resuscitation needed…

- Start clock
- Place the infant supine on the warm resuscitaire
- Head towards you, in a neutral position
- Dry & remove wet wraps
- Provide warmth *eg hat/ warm towels*
- Think ABC

1 – 10 % of hospital born infants

Newborn Life Support



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+ A B C

- A = Dry and Airway
- B = Breathing
- C = Circulation

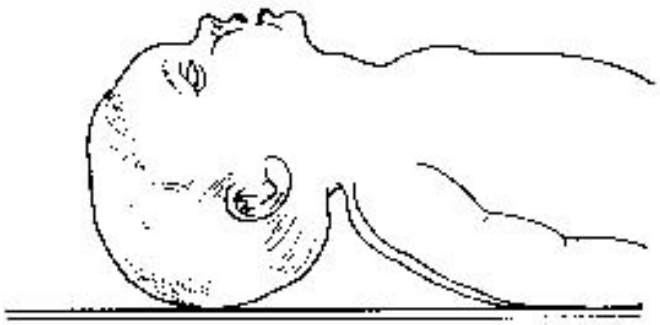
The initial priority in neonatal resuscitation is to ventilate the lungs with air/oxygen

A = Airway

- Establish and maintain an airway
- Position to maintain patency (so called 'neutral' position)
- Suctioning the mouth first and then the nares under vision only if indicated (eg blood)
- Suction should not be extended past the oro/naso pharynx

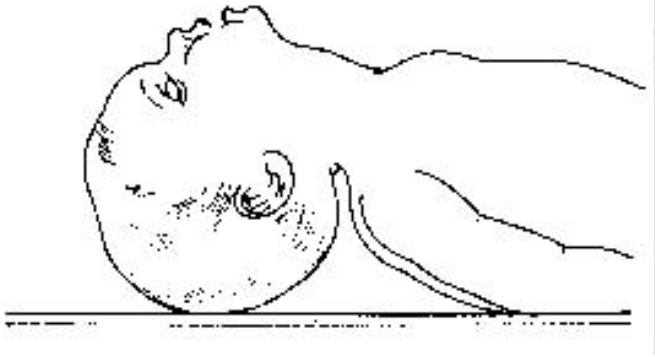
- *risk of bradycardia*
- *- risk of trauma*

Correct

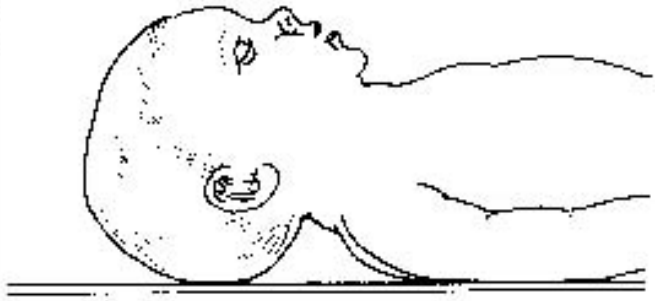


Neck Slightly Extended

Incorrect



Neck Hyperextended



Neck Underextended

B = Breathing

- Stimulate to breathe – firm, but gentle tactile stimulation
- Assess respirations
  - Is there breathing?
  - Is there gasping?
  - Is there work of breathing?
- Provide PIP (positive inspiratory pressure – also known as PPV) if:
  - the infant is not breathing
  - &/or the heart rate is < 100 bmp

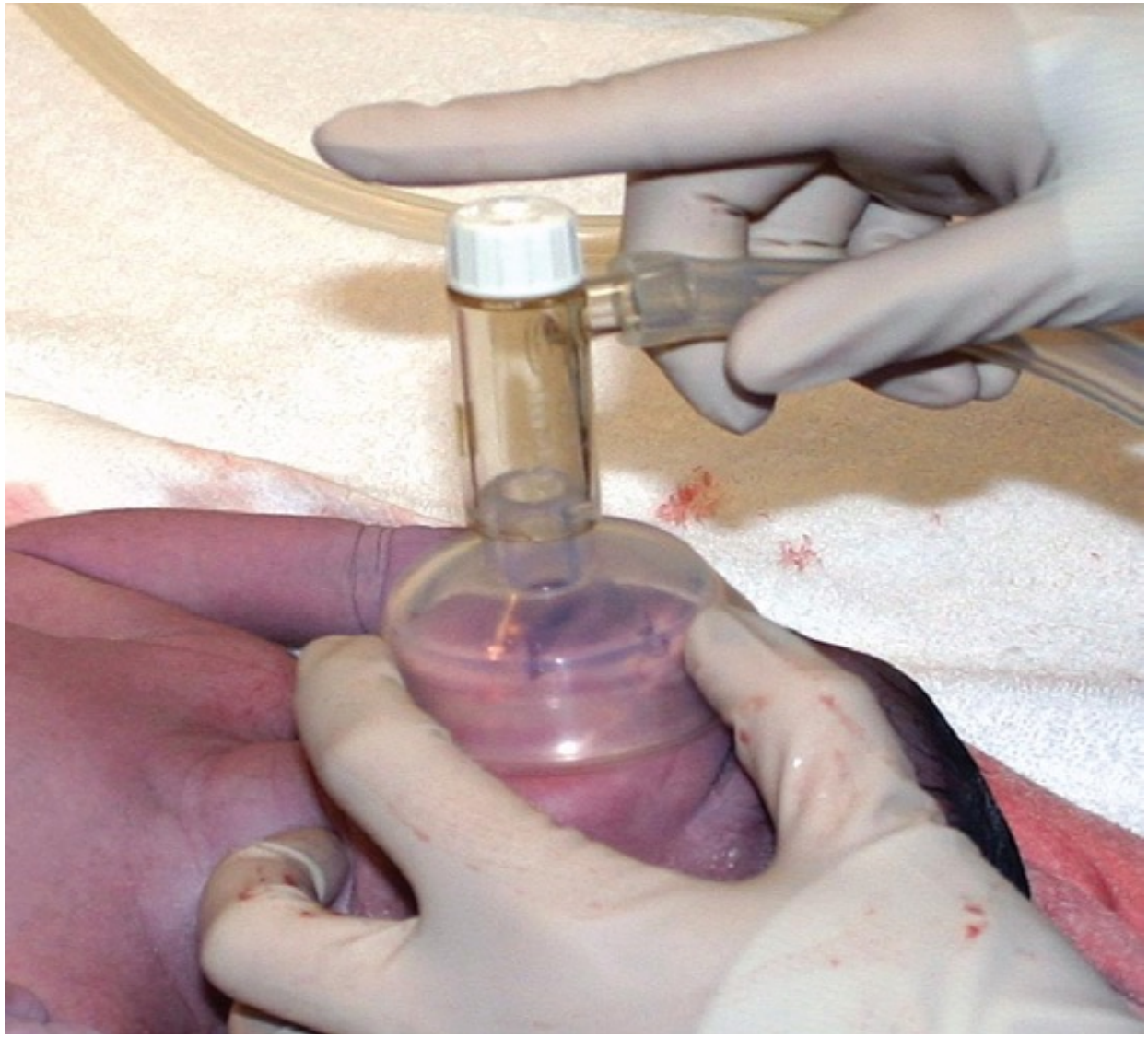
Ventilation

- Maintain airway
- Appropriate facemask
- Commence ventilation with medical **air** at flow 10 litre/min
- Review every 30 seconds
  - Are you getting chest rise with PIP and is it adequate?
  - If poor chest rise:
  - recheck mask seal, consider increasing PIP
  - Do you need to administer oxygen?

Ventilation

- Ventilate at a rate of 40 - 60 inflations per minute

- Count: "breathe- two- three, breathe- two- three", inflating the lungs as you say "breathe" and allowing the infant to exhale on the "two - three"



Effective ventilation

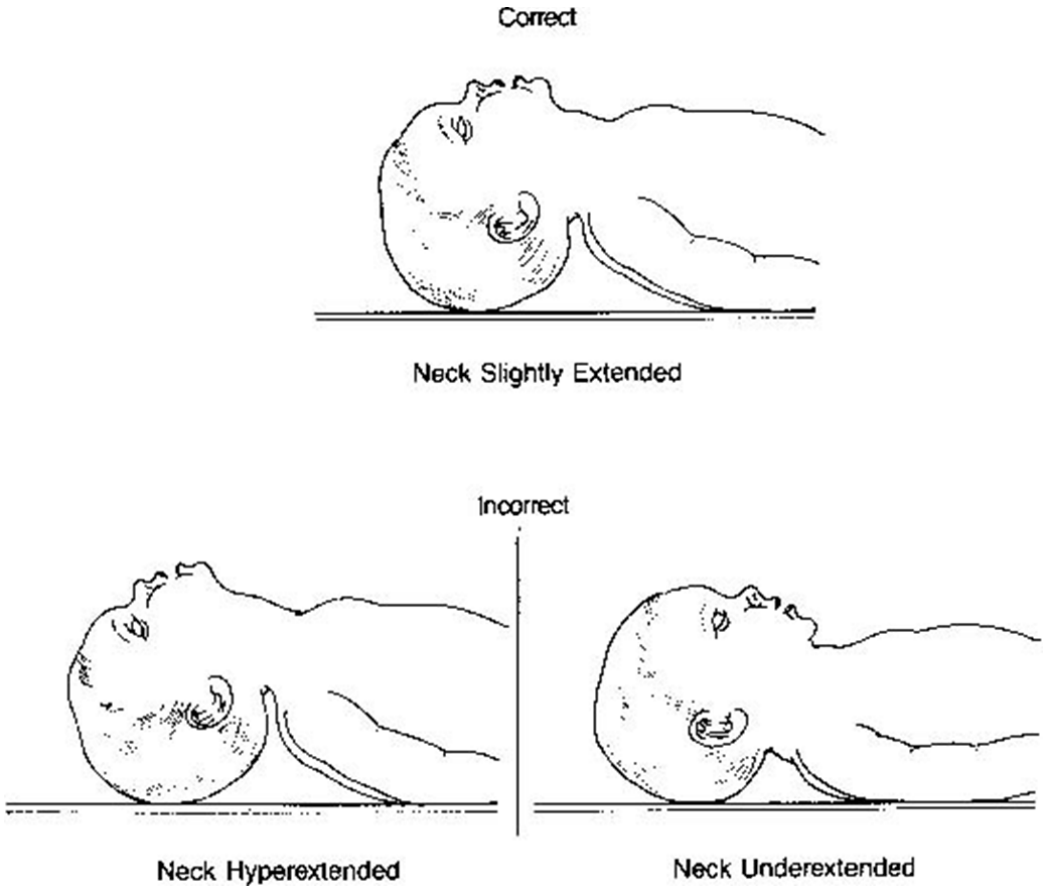
- The heart rate improves and increases to above 100 bpm
- The chest and upper abdomen rise with each inflation
- If these signs are not seen, then the technique of mask ventilation needs to be reassessed

“When performed properly, positive pressure ventilation alone is effective for resuscitating almost all apnoeic or bradycardic newborn infants” (ILCOR, 2016)

If response not satisfactory: **Summon Help**

- Call for additional help
- Activate hospital protocol
- Notify switchboard 94444
- State: neonatal code blue, location

If chest movement is not satisfactory: **Ensure airway position**



If chest movement is not satisfactory: **Ensure a good seal**

The stem hold

The two point top hold

The OK rim hold

If chest movement is not satisfactory:

- Higher inflation pressures
- PIP (> 30 cmH2O) may be needed for the first few inflations, especially in a pre-term infant who has never made any respiratory effort
- Reduce again once effective chest rise is seen

C = Circulation

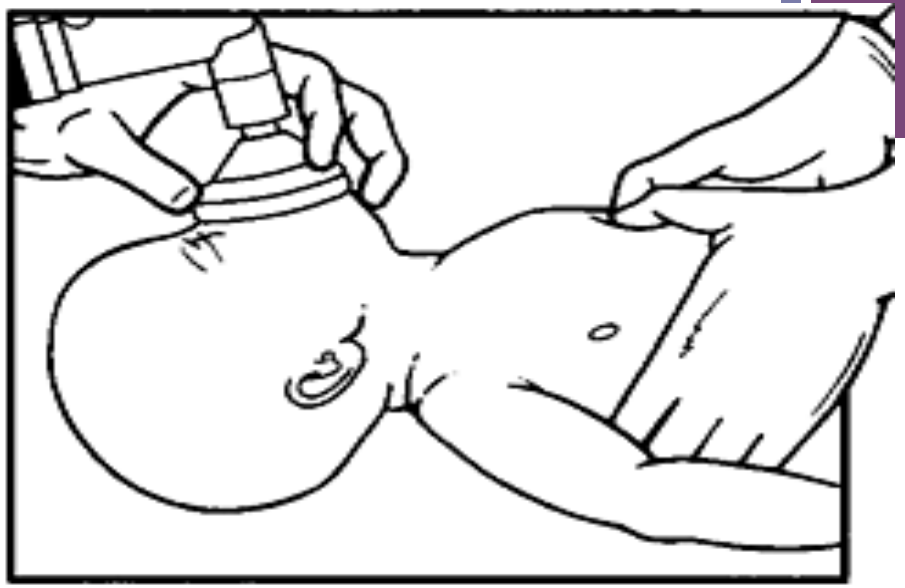
- Assess heart rate and color
- Chest compressions are indicated:

If heart rate remains below 60 bmp despite 30 seconds of EFFECTIVE positive pressure ventilation

- 3 compression to 1 breath
- Rate 2 a second 120/min

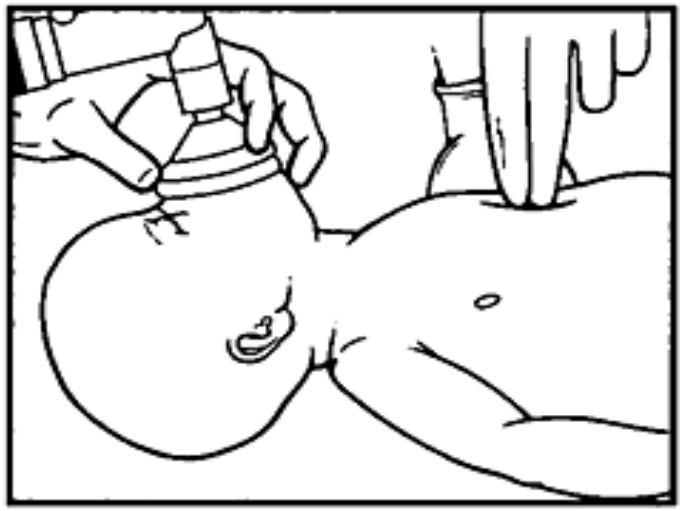
Cardiac compressions

- Place hands symmetrically around the neonates chest.
- Place one thumb on top of the other on the lower half of the sternum (just below the nipple line)
- Fingers encircle the chest and rest on the boney structure of the scapular



Compress 1/3 chest wall

Reassess every 30 seconds



- Place two fingers onto the lower third of the sternum, using the pads of the second and middle finger to compress the chest for the single rescuer

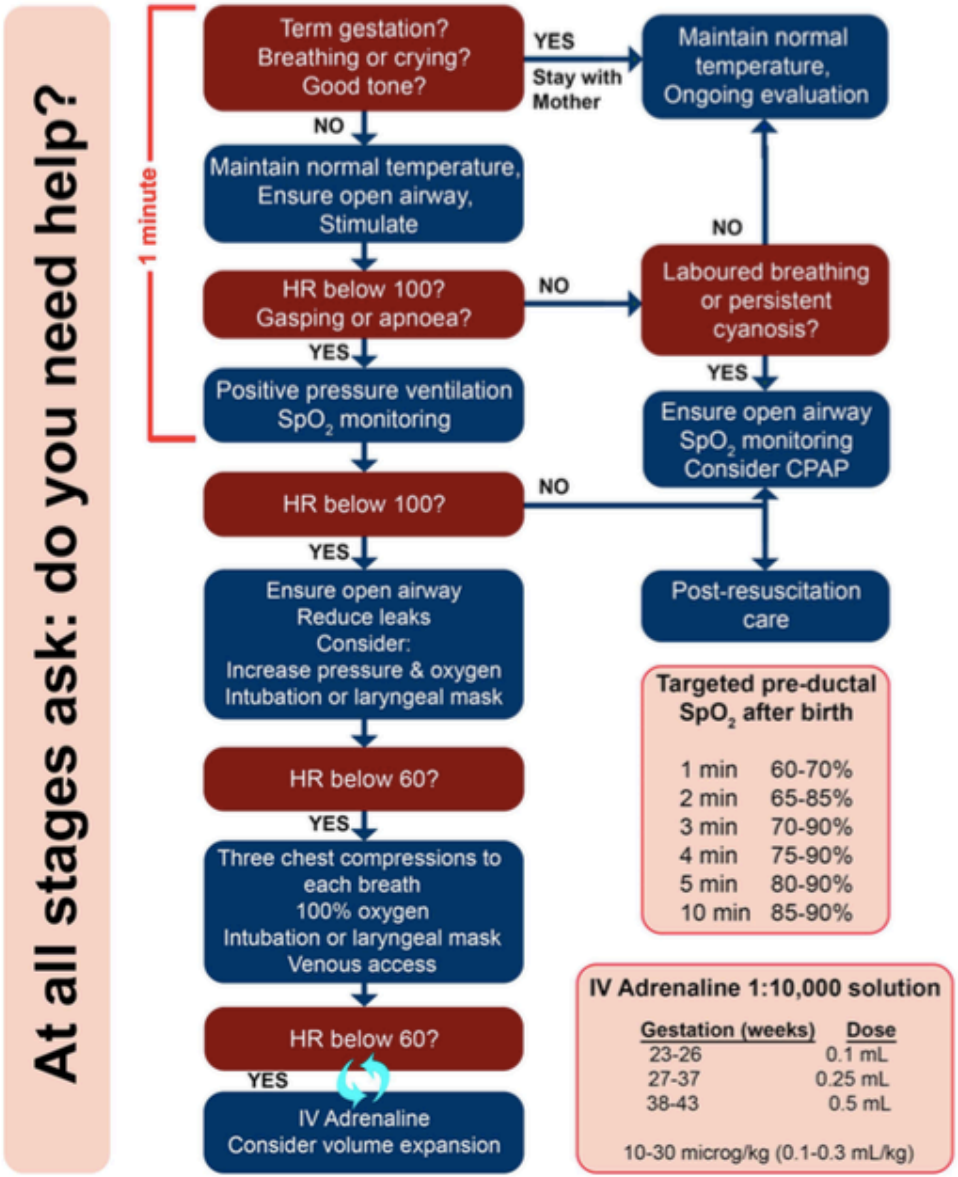
- Difficult to maintain good CPR with this method.

Compressions

- The person providing the chest compressions should verbalize (out loud):

  "One - and - two - and - three - and - breathe, one - and - two - and - three - and - breathe" and so on.

Newborn Life Support



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The most important and effective action in neonatal resuscitation is to ventilate the infant's lungs with air/ oxygen.

Air or O2?

- Air (21%) should be used initially
    - *As good if not better outcomes than O2 (re: free radicals)*
    - *Newborns starting sats are approx 50%*
- Switch to oxygen if the infant's condition does not improve within the first minutes of resuscitation
- Aim to reduce supplementary O2 as infant improves

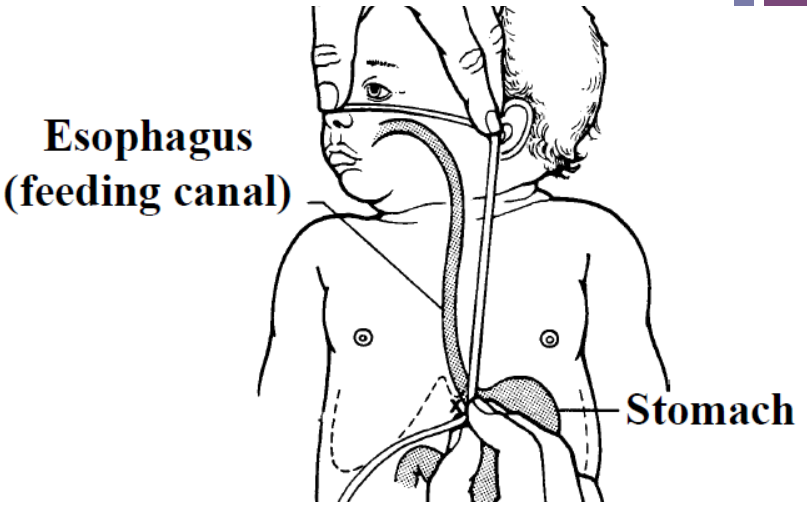
+

What are the normal saturations for a newborn infant?

Time from birth	Target saturations for newborn infants during resuscitation
1 min	60-70
2 min	65-85
3 min	70-90
4 min	75-90
5 min	80-90
10 min	85-90

Consider deflating the stomach

- During ventilation gas enters both the trachea and esophagus. Gas forced into the stomach interferes with ventilation



- Mask ventilation for several minutes will usually require an orogastric tube to be inserted to deflate the stomach.

- What special measures must be undertaken for premature infants less than 28 gestation?

< 28 weeks

- Plastic bag (maintain humidity and heat)
- More likely to need respiratory support
- Need lower PIP (20-25)
- Need senior support

Neonatal resuscitation

- <1 in 10 live births
- Equipment
- Assess and reassess
- Dry and Stimulate
- ABC
- Ventilation is often all that is required

Neonatal Resuscitation

- Dry, stimulate and keep warm
- Airway and assessment

  Pulse (<100 b/min?)

  Breathing?
- Ventilate with oximetry

  30 sec mask IPPV in air

  Saturation targets for age
- Chest compressions if pulse <60 b/min

  3:1 with ventilation in 100% O2

If CPR commenced – **early iv access** (ideally umbilical) with drugs – adrenaline, saline, dextrose and blood as considered treatments

Further information and resources:

- Neoresus

https://resus.org.au