Neonatal Resuscitation Program

7th Edition

TEXTBOOK OF

Neonatal Resuscitation®

7th Edition

American Heart Association®

life is why™

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN®

Which Babies Require Resuscitation?

- Most newly born babies are vigorous
- Only about 4-10% of newborns will require PPV
- Only 1-3% need major resuscitative measures (intubation, chest compressions, and/or medications) to survive

Newborn Resuscitation vs. Adults

- In adults, cardiac arrest is due to trauma or existing heart disease resulting in arrhythmia, which decreases blood flow to the brain. Chest compressions is the first line of intervention to maintain circulation
- Most newborns have healthy hearts and most problems that lead to need for resuscitation are caused by inadequate gas exchange, thus the focus of NRP is **effective ventilation of the lungs**

Fetal Physiology

In the fetus:

- Alveoli filled with lung fluid
- In utero, fetus dependent on placenta for gas exchange

Placental Respiratory Function

- Prior to birth, the placenta serves to providing oxygen and removing CO2
- Placental respiratory failure results in decreased activity, loss of HR variability and decelerations
- If failure persists you will see fetal apnea and bradycardia, resulting in a series of gasps followed by apnea and bradycardia

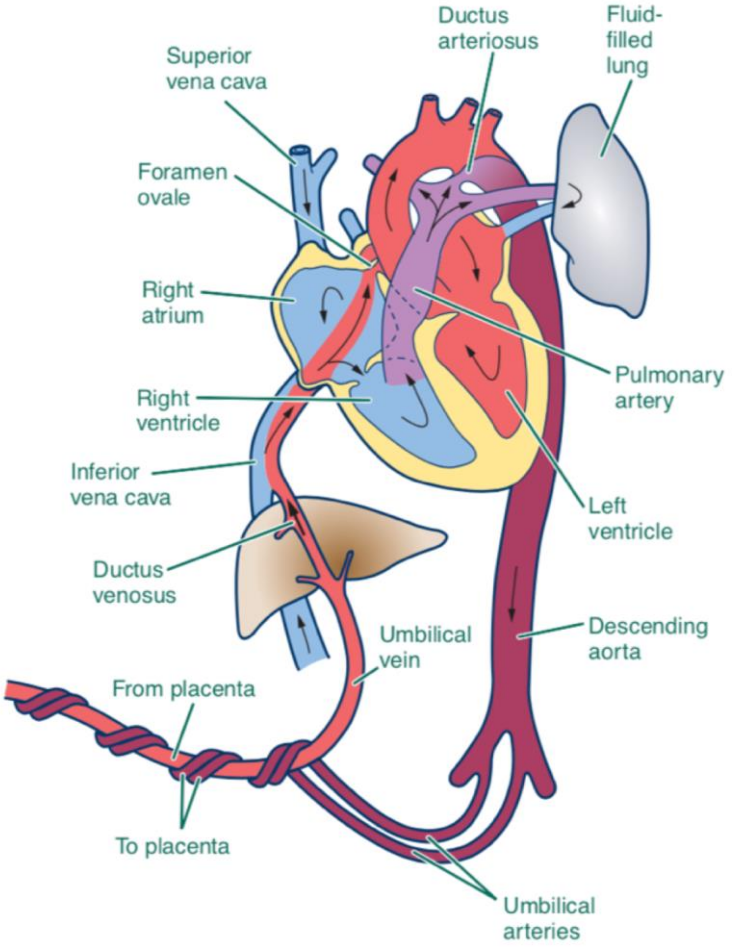
Placental Respiratory Failure

- Birth during **early phase**, tactile stimulation may be sufficient to initiate spontaneous breathing and recovery
- Birth during **later phase**, stimulation will not be sufficient and assisted ventilation will be required
- In either phase the primary problem is lack of gas exchange thus effective ventilation is needed

Fetal Physiology

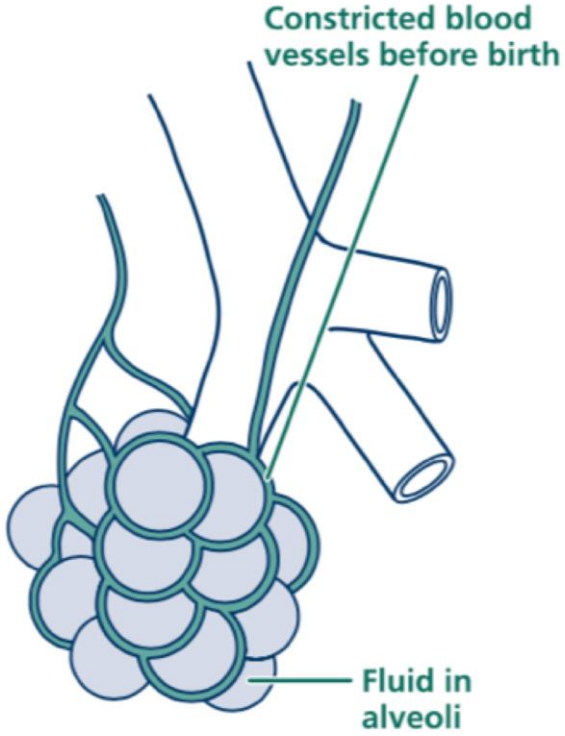
In the fetus

- Pulmonary arterioles constricted
- Pulmonary blood flow diminished
- Blood flow diverted across ductus arteriosus



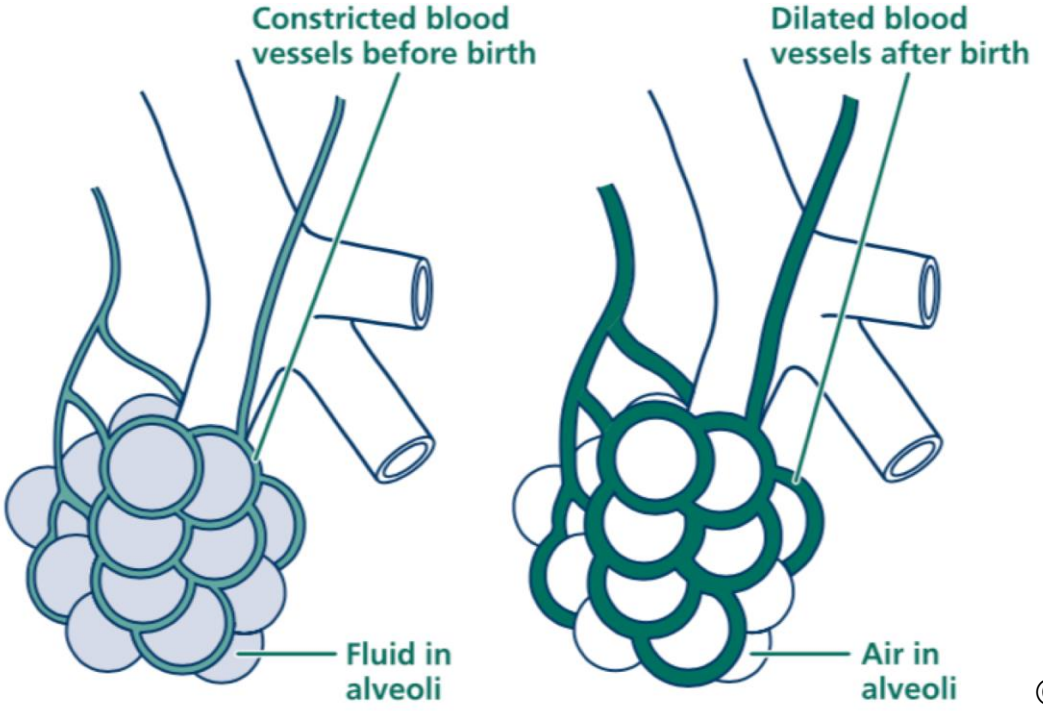
Lungs and Circulation After Delivery

- Lungs expand with air
- Fetal lung fluid leaves alveoli



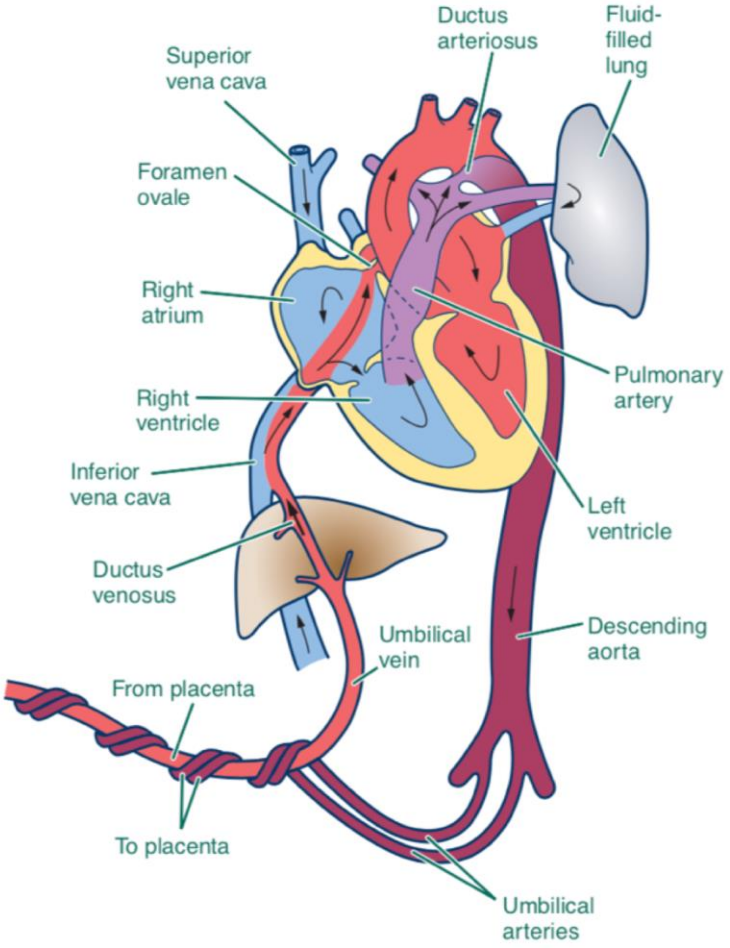
Lungs and Circulation

- Pulmonary arterioles dilate
- Pulmonary blood flow increases



Lungs and Circulatio

- Blood oxygen levels rise
- Ductus arteriosus constricts
- Blood flows through lungs to pick up oxygen



Transition from Fetal to Neonatal Respiration

At Birth:

- The baby breaths
- The umbilical cord isclamped
- The newborn uses lungs instead of the placenta for gas exchange

During Normal Transition

There are three major changes taking place:

1. Fluid in alveoli absorbed
2. Umbilical arteries and vein constrict thus increasing blood pressure
3. Blood vessels in lung relax

What Can Go Wrong During Transition

- Lack of ventilation of the newborn's lungs results in sustained constriction of the pulmonary arterioles, preventing systemic arterial blood from being oxygenated
- Prolonged lack of adequate perfusion and oxygenation to the baby's organs can lead to brain damage, damage to other organs, or death

Signs of a Compromised Newborn

- Poor muscle tone
- Depressed respiratory drive
- Bradycardia
- Low blood pressure
- Tachypnea
- Low oxygen saturation

NRP flow diagram

- Describes the steps to follow as you evaluate and resuscitate a newborn:
  - Initial assessment
  - Airway
  - Breathing
  - Circulation
  - Drugs

Team Work and Preparation

Pre-resuscitation team briefing

Identify a team leader
Assess perinatal risk factors
Delegate tasks
Identify who will document events

Team leader

Provide clear direction
Situation awareness

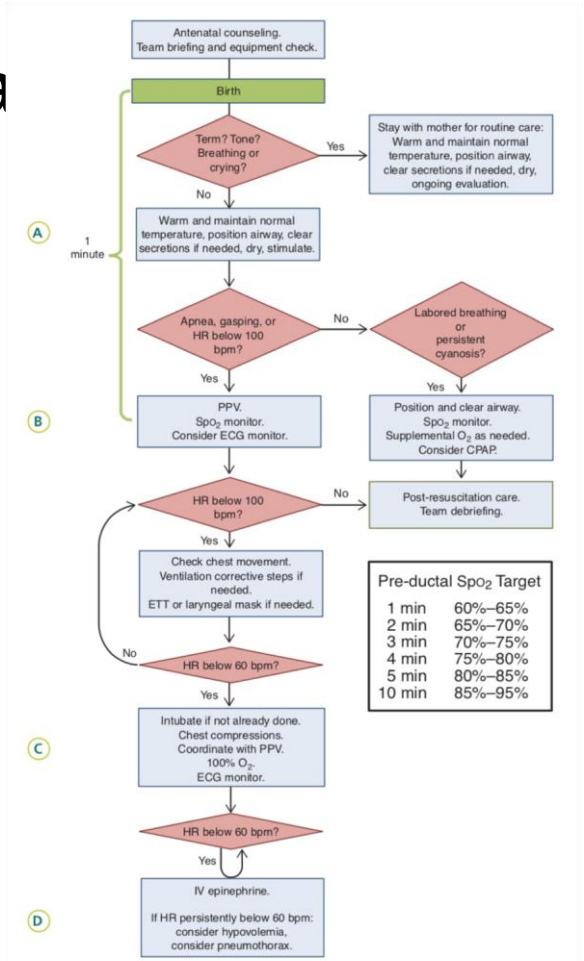
Effective communication

Closed-loop communication

Documentation

Post-resuscitation team debriefing

NRP Flow Diagra



Preparing for birth

- Before every birth review antepartum and intrapartum risk factors
- Ask the following 4 questions:
  - What is the expected gestational age?
  - Is the amniotic fluid clear?
  - How many babies are expected?
  - Are there any additional risk factors?

Perinatal Risk Factors Increasing the Likelihood of Neonatal Resuscitation

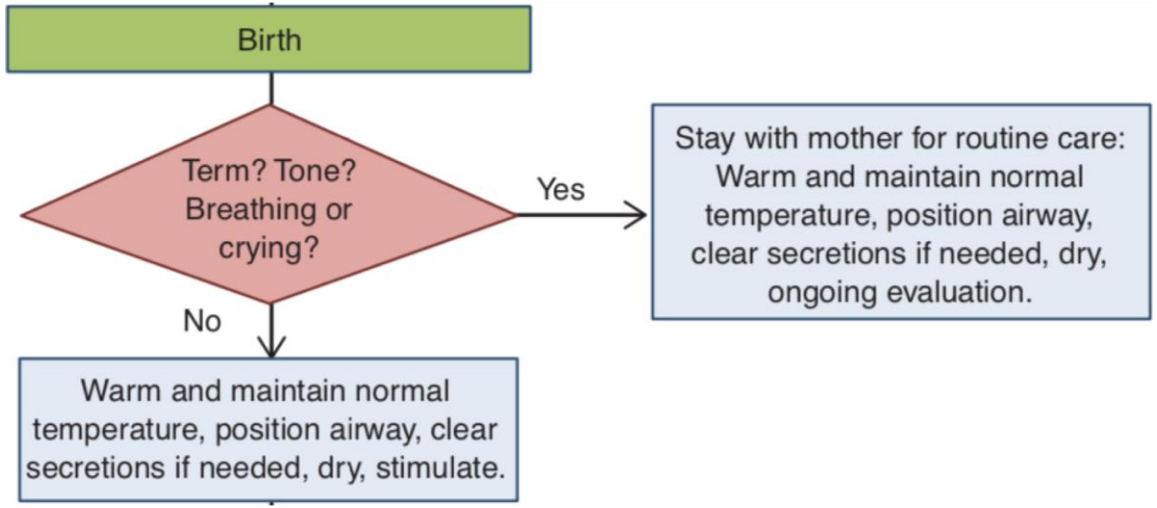
Antepartum Risk Factors	Intrapartum Risk Factors
Gestational age <36 0/7 weeks	Emergency cesarean delivery
Gestational age ≥41 0/7 weeks	Forceps or vacuum-assisted delivery
Preeclampsia or eclampsia	Breech or other abnormal presentation
Maternal hypertension	Category II or III fetal heart rate pattern*
Multiple gestation	Maternal general anesthesia
Fetal anemia	Maternal magnesium therapy
Polyhydramnios	Placental abruption
Oligohydramnios	Intrapartum bleeding
Fetal hydrops	Chorioamnionitis
Fetal macrosomia	Narcotics administered to mother within 4 hours of delivery
Intrauterine growth restriction	Shoulder dystocia
Significant fetal malformations or anomalies	Meconium-stained amniotic fluid
No prenatal care	Prolapsed umbilical cord

Preparation for Resuscitation: Personnel and Equipment

- *Every* delivery should be attended by at least 1 person whose only responsibility is the baby and who is capable of initiating resuscitation.
- When resuscitation is anticipated, additional personnel should be present in the delivery room before the delivery occurs
- Prepare necessary equipment
  - Turn on radiant warmer
  - Check resuscitation equipment

Initial Evaluation

- Term
- Tone
- Breathing or crying



What to do with a vigorous term newborn

- Provide Warmth
- Position the head and neck
- Clear secretions, ifneeded
- Dry
- Stimulate

What to do with a non-vigorous and preterm newborn

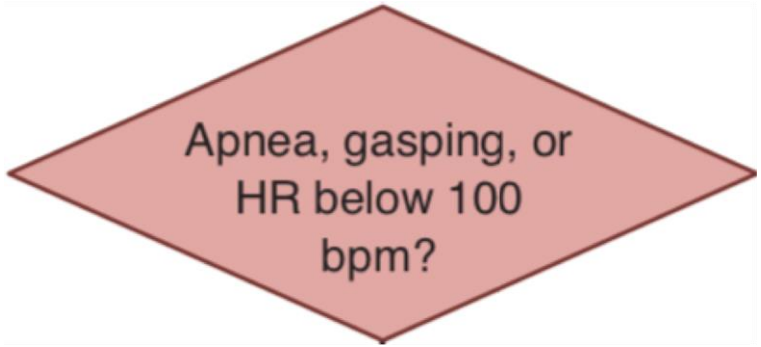
- **Provide Warmth-36.5-37.5c**
  - Place baby under radiant warmer, allow baby to remain uncovered for visualization and radiant heat to reach baby
- **Position the head and neck**
  - Neck in neutral position and head in sniffing position to allow unrestricted air entry
- **Clear secretions if:**
  - Baby is not breathing, gasping, poor tone, secretions (clear or meconium stained) obstructing airway, or anticipate PPV
- **Dry**
- **Stimulate**

Potentially Hazardous Forms of Stimulation

- Slapping back or buttocks
- Squeezing rib cage
- Forcing thighs onto abdomen
- Dilating anal sphincter
- Hot or cold compresses or baths
- Shaking

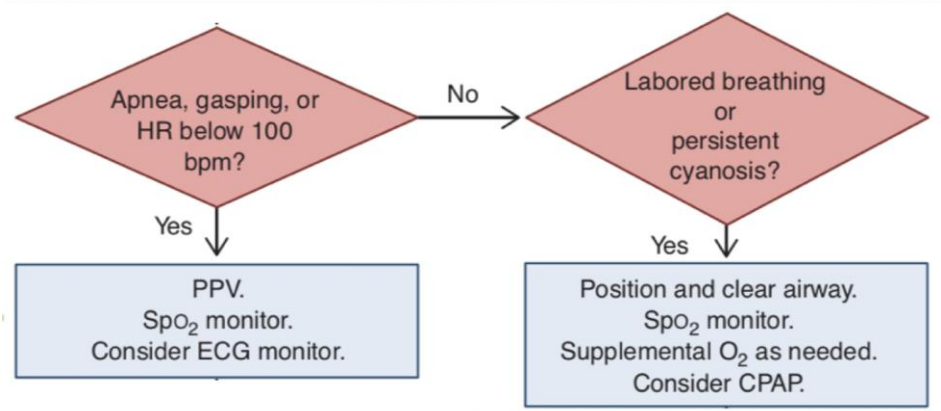
Evaluation

- How do you assess the newborns response to the Initial steps?:
  - **Respirations**
    - Is baby breathing/crying
    - Is baby gasping?
  - **Heart rate**
    - Is HR > 100 bpm
  - **Ventilation** of babies lungs is the most effective action



What do you do if the baby is not breathing or HR is low

- Start PPV if:
  - Baby not breathing(apnea) or gasping
  - If breathing but HR <100 bpm
- Place SpO2 monitor
- Call for additional help if you are alone



What to do with a baby that is breathing, HR > 100, and Cyanotic

- **Acrocyanosis**-bluish hue of hands and feet-normal finding in newborns
- **Central Cyanosis**-bluish hue of lips, tongue, and torso
- Place pulse ox and provide supplemental oxygen

Central Cyanosis and Acrocyanosis

Indications for Pulse Ox

- When resuscitation is suspected
- To confirm perception of central cyanosis
- When supplemental oxygen is administered
- When PPV is required

Target Pre-ductal SpO2 after Birth

1 min	60%-65%
2 min	65%-70%
3 min	70%-75%
4 min	75%-80%
5 min	80%-85%
10 min	85%-95%

Free-Flow Oxygen Given Via Flow-Inflating Bag and Mask

Free-Flow Oxygen Given Via Oxygen Tubing

Free–Flow Oxygen Given Via Oxygen Mask

Meconium

- Indicates fetal distress and increases the risk for resuscitation
- MSAF and vigorous-clear secretions from mouth and nose and allow to stay with mother if good respiratory effort and muscle tone
- MSAF and non-vigorous, bring baby to warmer and perform initial steps of resuscitation

Types of Positive-Pressure Devices

Flow-inflating bag

T-piece resuscitator

Self-inflating bag

Self-inflating Bags With Pressure-Release Valve

Self-inflating Bag

Advantages:

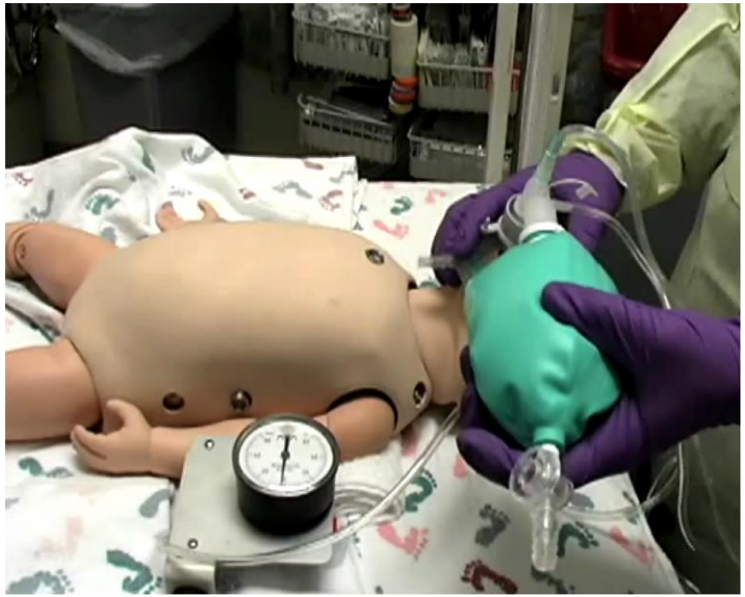
- Always refills after being squeezed
- Is always inflated
- Pressure release (pop-off) valve makes over-inflation less likely

Self-inflating Bag

Disadvantages:

- Bag will work without a gas source; ensure that oxygen is connected
- Requires tight face-mask seal to inflate the lungs
- Requires oxygen reservoir to provide high concentration of oxygen
- Cannot give free-flow oxygen through the mask
- Cannot be used for CPAP. No PEEP without special valve

Flow-inflating Bag



Flow-inflating Bag

Advantages:

- Delivers 21% to 100% oxygen, depending on the source
- Easy to assess seal on the baby’s face
- Can be used to give free-flow oxygen through the mask
- Delivers 21% to 100% oxygen, depending on the source
- Easy to assess seal on the baby’s face
- Can be used to give free-flow oxygen through the mask

Flow-inflating Bag

Disadvantages:

- Requires a compressed gas source
- Requires a tight face-mask seal to remain inflated
- Requires a gas source to inflate. If empty, looks like deflated balloon
- Usually does not have a safety pop-off valve
- Uses a flow-control valve to regulate pressure/inflation

T-piece Resuscitator

T-piece Resuscitator

Advantages:

- Consistent delivery of continuous pressure
- Reliable control of peak inspiratory and positive end-expiratory pressure
- Reliable delivery of 100% oxygen and desired pressure
- No fatigue from bagging

T-piece Resuscitator

Disadvantages:

- Requires compressed gas source
- Must have tight face-mask seal to inflate lungs
- Compliance of the lung cannot be “felt”
- Requires pressure to be set prior to use
- Changing pressures during use is more difficult

Indications for Positive-Pressure Ventilation

- Apnea
- Gasping
- HR < than 100 bpm

Ventilation of the lungs is the single most important and most effective step in cardiopulmonary resuscitation of the compromised infant

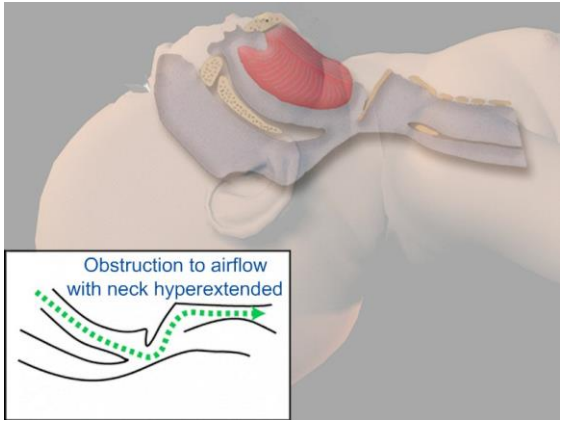
Before beginning positive-pressure ventilation

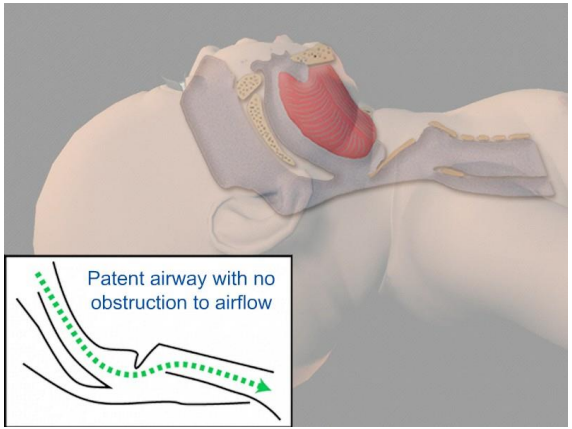
- Select appropriate-sized mask
- Be sure airway is clear
- Position baby's head
- Position yourself at baby's side or head
- Confirm to are attached to oxygen source or that reservoir is removed

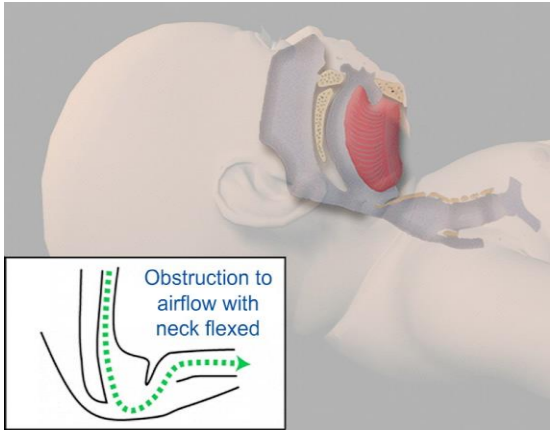
Clear Airway:

- Suction mouth first, then nose
- “M” before “N”

Opening the Airway







Bag and Mask: Equipment Masks

- Rims
  - Cushioned
  - Non-cushioned
- Shape
  - Round
  - Anatomically shaped
- Size
  - Small
  - Large

Bag and Mask: Equipment

Mask should cover:

- Tip of Chin
- Mouth
- Nose

Mask Placement

Starting ventilation

- How much oxygen?
  - >35 weeks gestation begin with 21%
  - <35 weeks begin with 21-30%
- What is the ventilationrate?
- Breaths should be give an 40-60 bpm
- How much pressure?
  - Neopuff/Neotee
    - PIP at 20-25 cm H2O
    - PEEP at 5 cm H2O

Signs of Effective Ventilation

Signs of adequate ventilation:

- Improved heart rate, color, muscle tone

Signs of improvement in newborn:

- Improved heart rate, color, breathing, tone, and saturation

Causes and Solutions for Inadequate Chest Expansion

Condition	Actions
Inadequate seal	Reapply mask to face and lift jaw forward
Blocked airway	Reposition the head Check for secretions; suction if present Ventilate with the newborn's mouth slightly open
Not enough pressure	Increase pressure until there is a perceptible chest movement Consider endotracheal intubation

Signs of Effective PPV

The most important sign of effective ventilation is rising heart rate

There are two separate assessments of HR in response to PPV:

1. First assessment determines if HR is increasing with PPV after 15 seconds
2. Second assessment after 30 seconds of PPV

Use of Orogastric Tube during Resuscitation

- After several minutes of CPAP or PPV with a mask, gas enters the stomach and may interfere with ventilation or cause regurgitation and aspiration
- Place OG tube and leave uncapped to act as a vent for the stomach

Insertion of Orogastric Tube

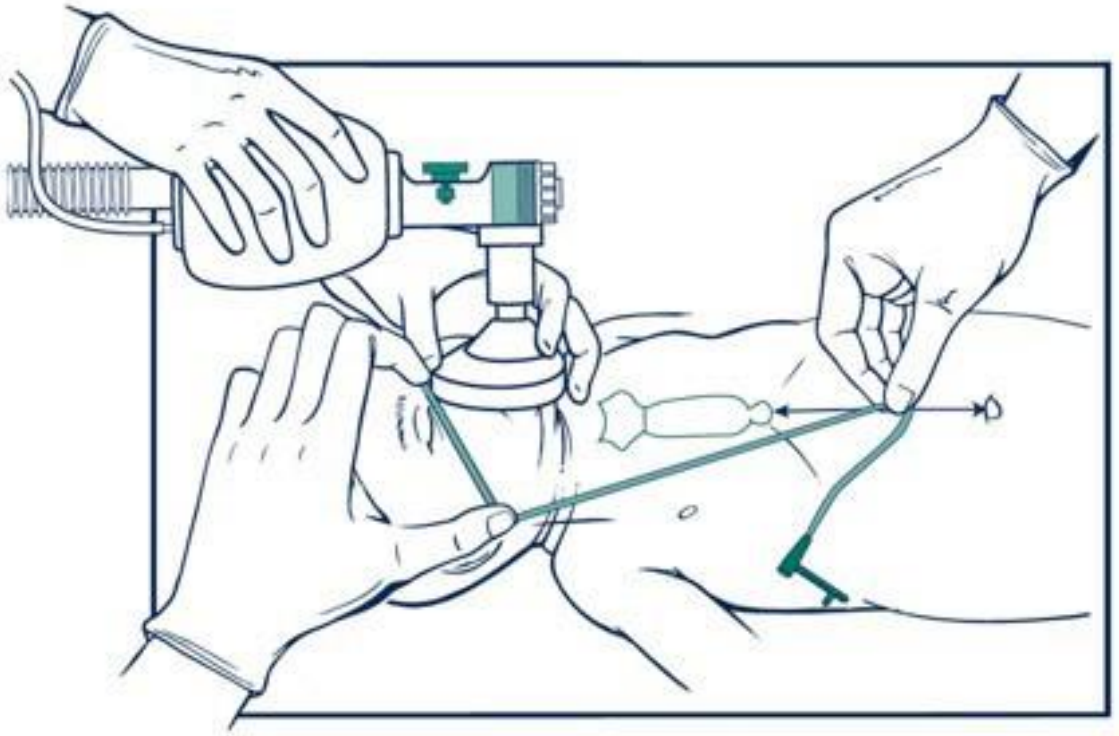
Equipment

- 8F feeding tube
- Large syringe (20-ml)
- Tape

Insertion of Orogastric Tube

Measuring

correct length



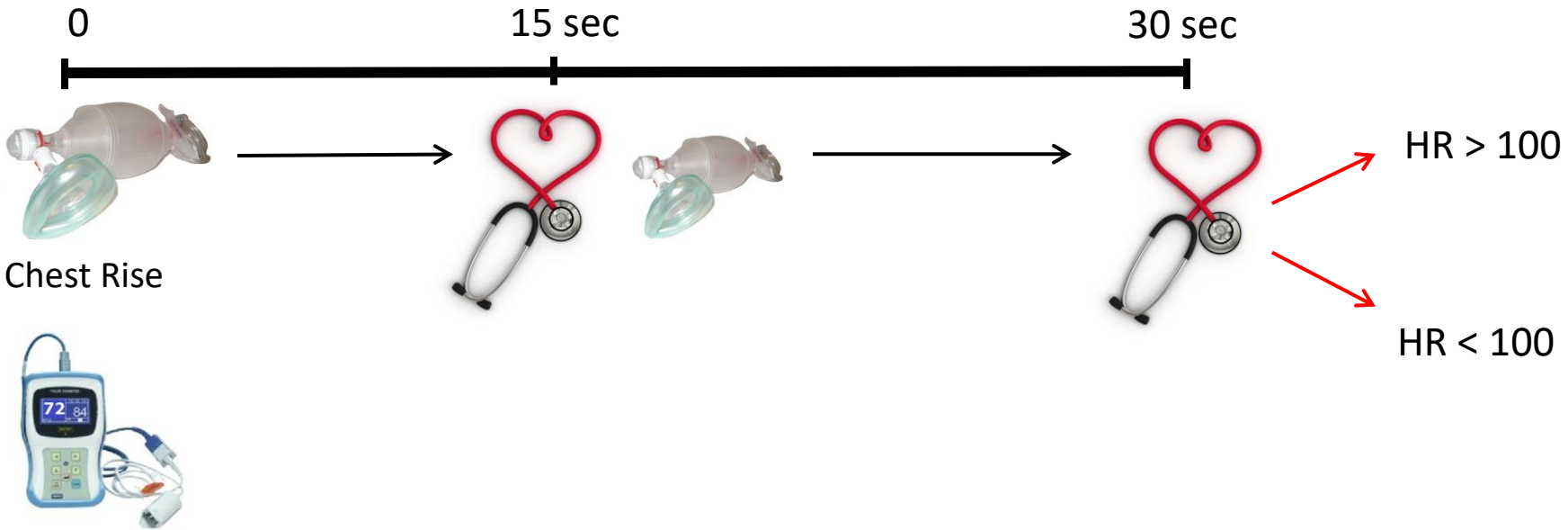
First heart rate check

- **The heart rate is increasing**:
  - Assistant should announce “HR increasing”
- **The heart rate is not increasing**:
  - Assistant should announce “HR not increasing”
    - Chest is moving
    - Chest is NOT moving

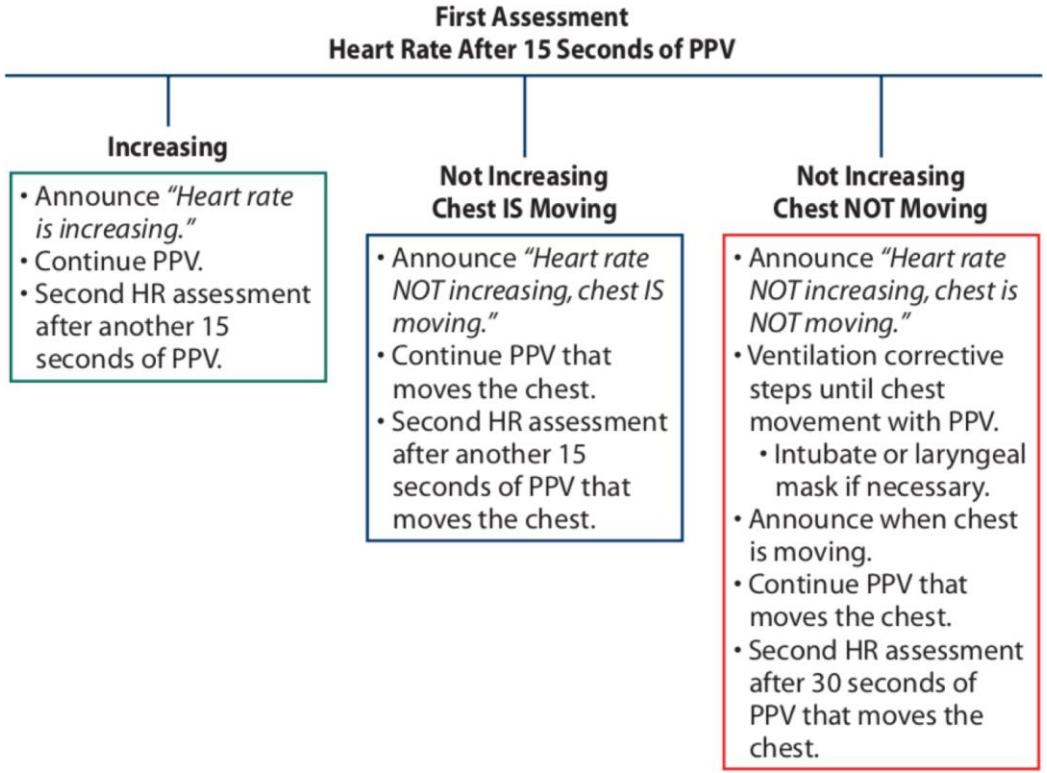
Mr. SOPA

	Corrective Steps	Actions
M	Mask adjustment	Reapply the mask. Consider the 2-hand technique.
R	Reposition airway	Place head neutral or slightly extended.
Try PPV and reassess chest movement.		
S	Suction mouth and nose	Use a bulb syringe or suction catheter.
O	Open mouth	Open the mouth and lift the jaw forward.
Try PPV and reassess chest movement.		
P	Pressure increase	Increase pressure in 5 to 10 cm H_2O increments, maximum 40 cm H_2O.
Try PPV and reassess chest movement.		
A	Alternative airway	Place an endotracheal tube or laryngeal mask.
Try PPV and assess chest movement and breath sounds.		

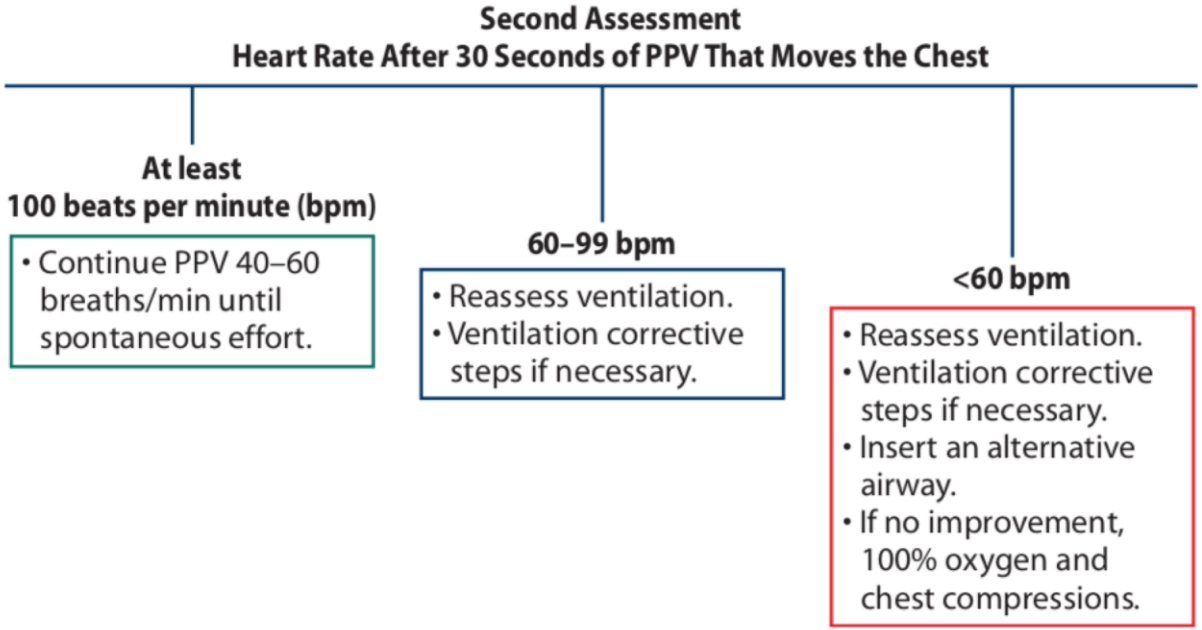
Checking Heart Rate after Starting PPV



First Assessment (Heart after 15 seconds of PPV)



Second Assessment (Heart after 30 seconds of PPV)



Endotracheal Intubation: Indications

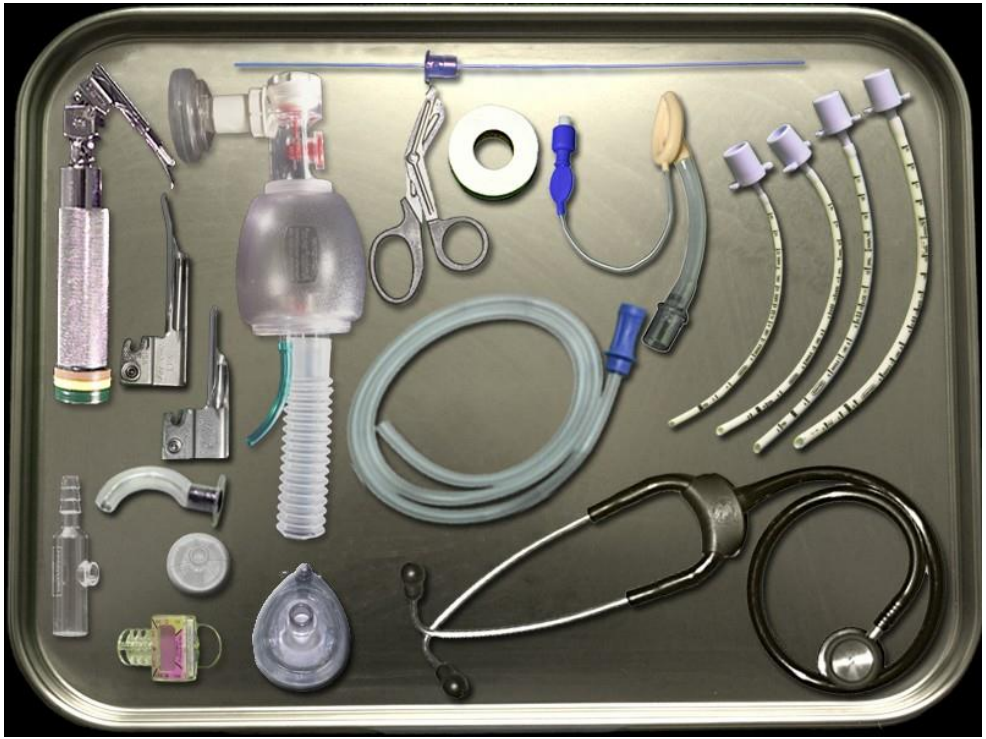
- To improve ventilation after several minutes ineffective bag-and-mask ventilation
- To facilitate coordination of chest compressions and ventilation
- To administer epinephrine while establishing IV access

Special Indications

- Extreme Prematurity
- Surfactant Administration
- Suspected Diaphragmatic Hernia

Equipment and Supplies

- Equipment should be clean, protected from contamination



Endotracheal Tube Size

- Select tube size based on weight and gestational age
- Stylet to provide additional rigidity and curvature(optional)

Weight (g)	Gestational Age (wks)	Endotracheal Tube Size (mm ID)
Below 1,000	Below 28	2.5
1,000-2,000	28-34	3.0
Greater than 2,000	Greater than 34	3.5

Preparation for Intubation

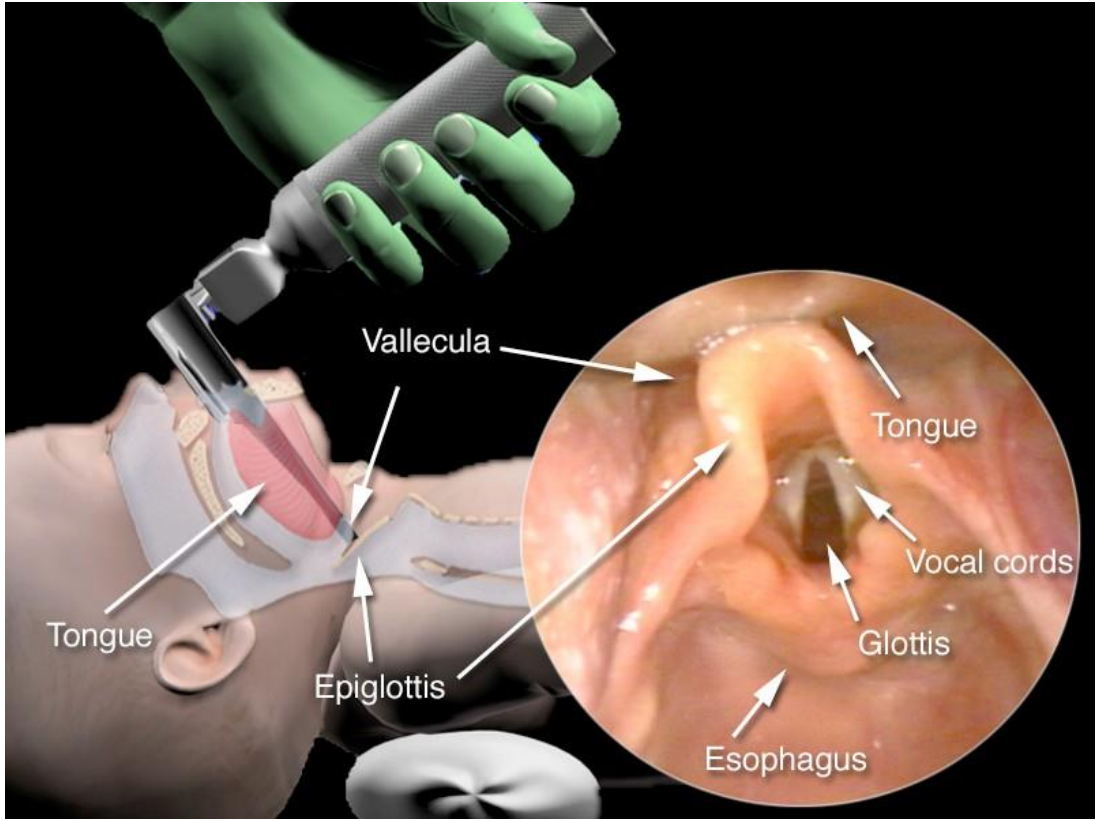
- **Laryngoscope blade:**
  - No.00 for extreme prematures
  - No. 0 for pretermnewborns
  - No. 1for termnewborns
- **Laryngoscope:**
  - Check blade and handle compatible
  - Check functioning light
- **Suction source:**
  - Set suction at 80-100 mm Hg
  - Large suction catheter(10F or larger) for mouth/pharynx
  - Small catheter for suctioning endotracheal tube(5 or 6 F)

Assisting During Intubation

The assistant for the procedure should:

- Provide positive-pressure ventilation between attempts
- Connect endotracheal tube to resuscitation device
- Connect CO_2 detector
- Auscultate heart rate to assess improvement
- Note CO_2 detector color change
- Auscultate equal breath sounds and observe chest movement
- Help tape tube

Anatomic Landmarks



Step 1: Preparation for Insertion

- Stabilize the newborn's head in the "sniffing" position
- Deliver free-flow oxygen during the procedure

Step 2: Insert Laryngoscope

- Slide the laryngoscope over right side of the tongue
- Push tongue to left side of mouth
- Advance blade until the tip lies just beyond the base of the tongue

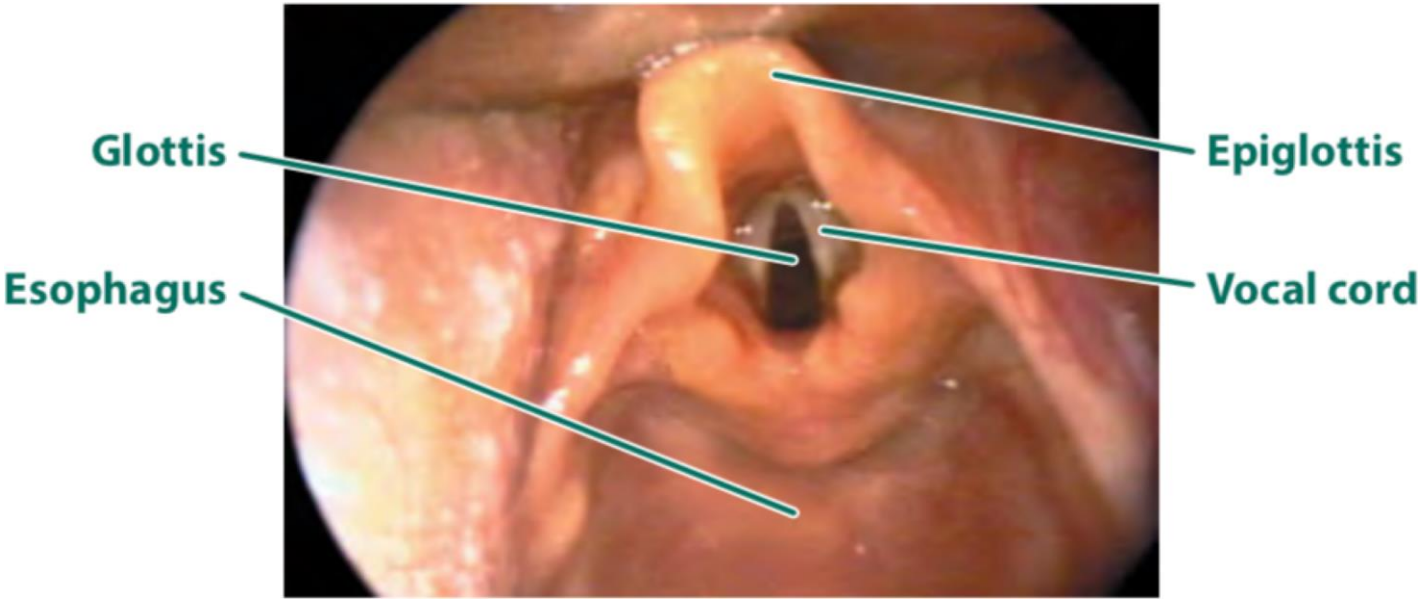
Step 3: Lift Blade

- Lift the blade slightly on angle to ceiling
- Raise the entire blade, not just the tip
- Visualize pharyngeal area
- Do not use rocking motion

Step 4: Visualize Landmarks

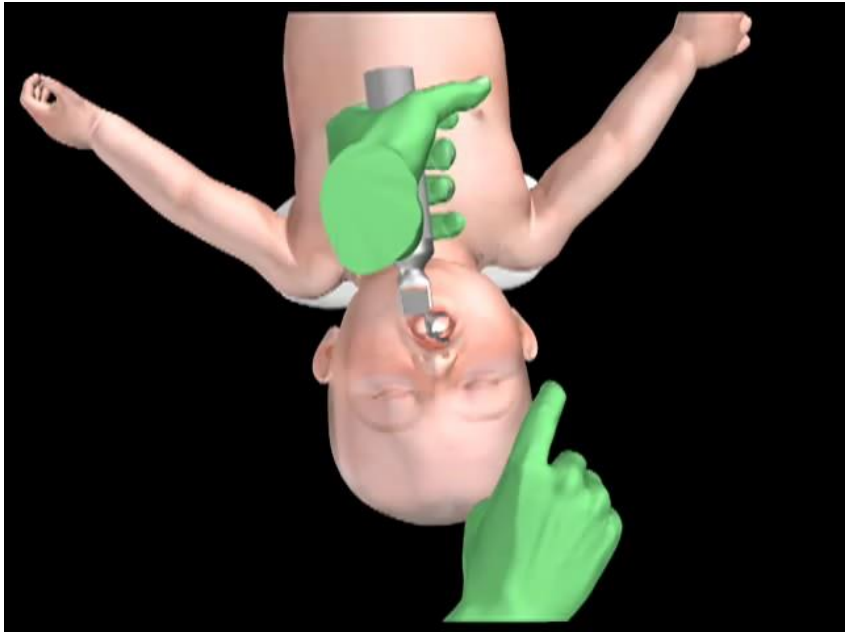
- Look for landmarks. Vocal cords should appear as vertical stripes on each side of the glottis or as an inverted letter “V”
- Applying downward pressure on cricoid may help bring glottis into view
- Suction, if necessary, for visualization

Step 4: Visualize Landmarks

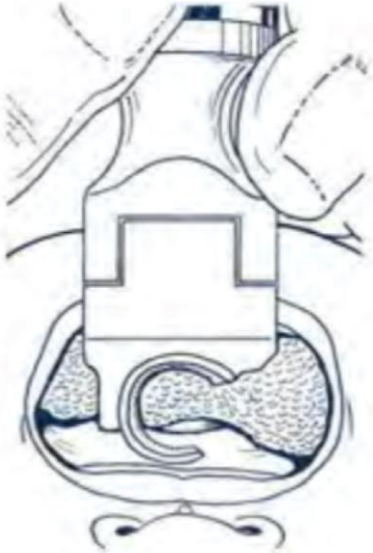


Step 5: Inserting Tube

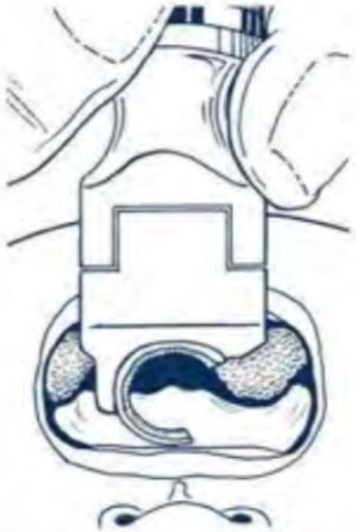
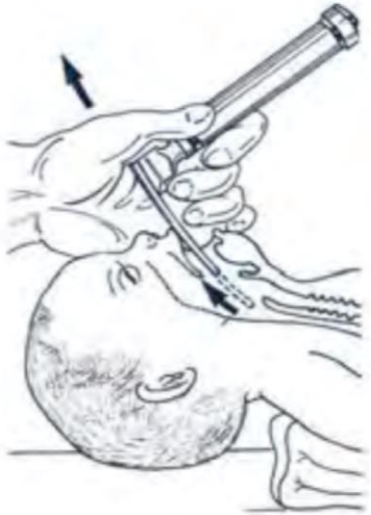
- Insert the tube into the right side of the mouth with the curve of the tube lying in the horizontal plane
- If the cords are closed, wait for them to open
- Insert the tip of the endotracheal tube until the vocal cord guide is at the level of the cords
- Limit attempts to 30 seconds



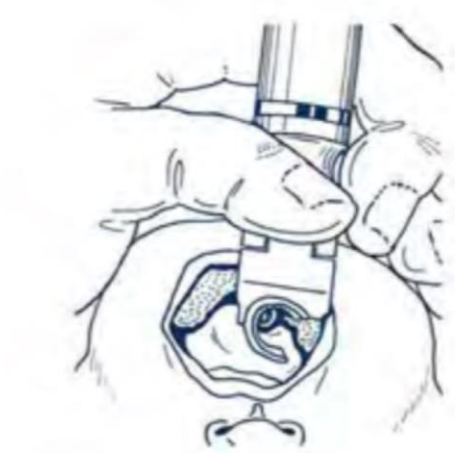
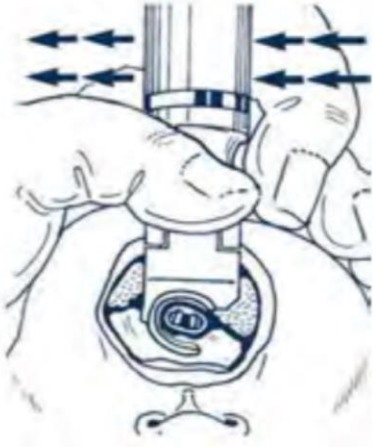
Corrective actions for poor visualization of the larynx during laryngoscopy: Not inserted far enough

Problem	Landmarks	Corrective Action
		
Laryngoscope not inserted far enough.	You see the tongue surrounding the blade.	Advance the blade farther.

Corrective actions for poor visualization of the larynx during laryngoscopy: Inserted too far

Problem	Landmarks	Corrective Action
		
Laryngoscope inserted too far.	You see the walls of the esophagus surrounding the blade.	Withdraw the blade slowly until the epiglottis and glottis are seen.

Corrective actions for poor visualization of the larynx during laryngoscopy: Inserted off to one side

Problem	Landmarks	Corrective Action
		
Laryngoscope inserted off to one side.	You see part of the glottis off to one side of the blade.	Gently move the blade back to the midline. Then advance or retreat according to landmarks seen.

Endotracheal Intubation: Tube Location in Trachea

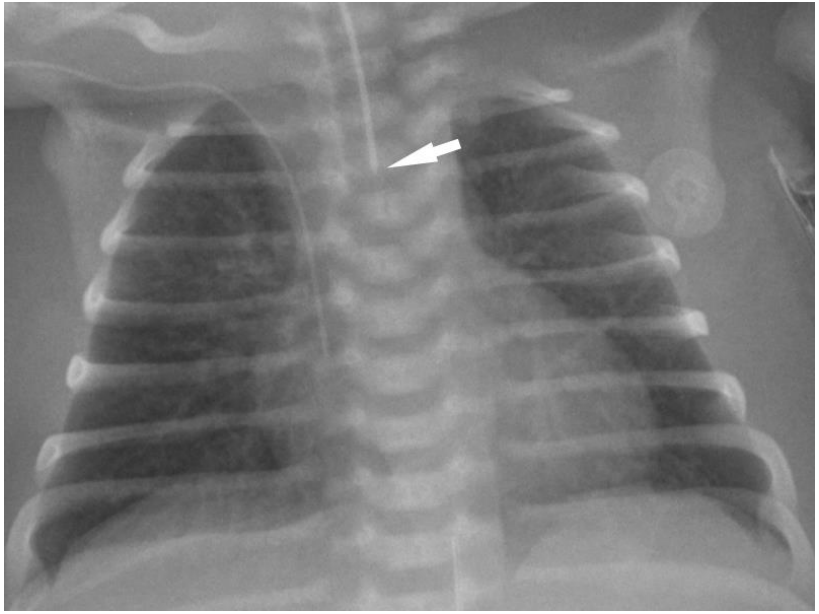
Tip-to-Lip measurements	
Weight (kg)	Depth of Insertion (cm from upper lip)
1*	7
2	8
3	9
4	10
*Babies weighing less than 750 g may require only 6 cm insertion	

Confirmation of ETT placement

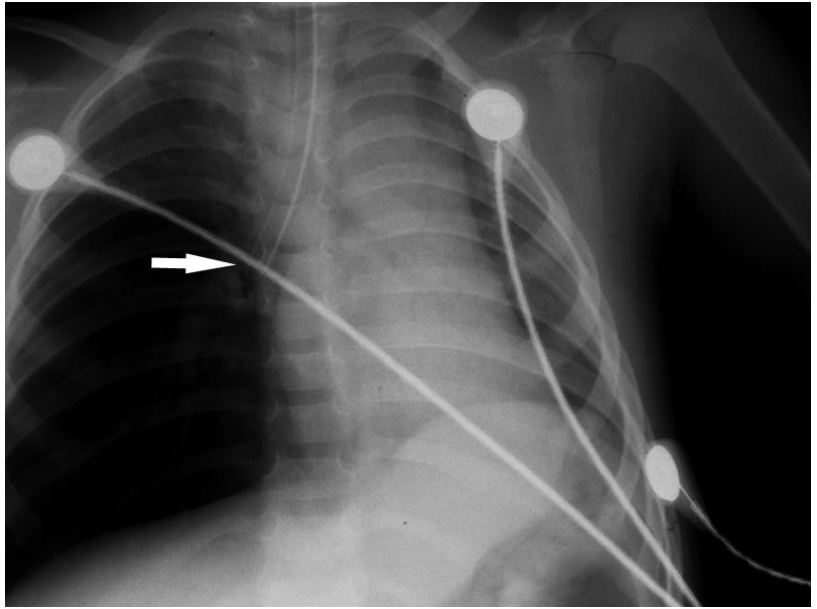
- Detecting exhaled CO_2 and rapid rise in heart rate are primary methods
- Auscultate breath sounds near both axillae during PPV
- Symmetrical chest movement
- Little or no air leak from mouth during PPV
- Decreased or absent air entry over the stomach
- Chest x-ray

Radiographic Confirmation

Correct



Incorrect



CO_2 Detector Problems

False Negative (Tube IS IN trachea but NO color change)	False Positive (Tube IS NOT in trachea but color changes)
• Inadequate ventilating pressure • Collapsed lungs • Bilateral pneumothoraces • Low heart rate • Low cardiac output	• Defective device changed color in package before use • Epinephrine contamination

If the baby's condition worsen after intubation

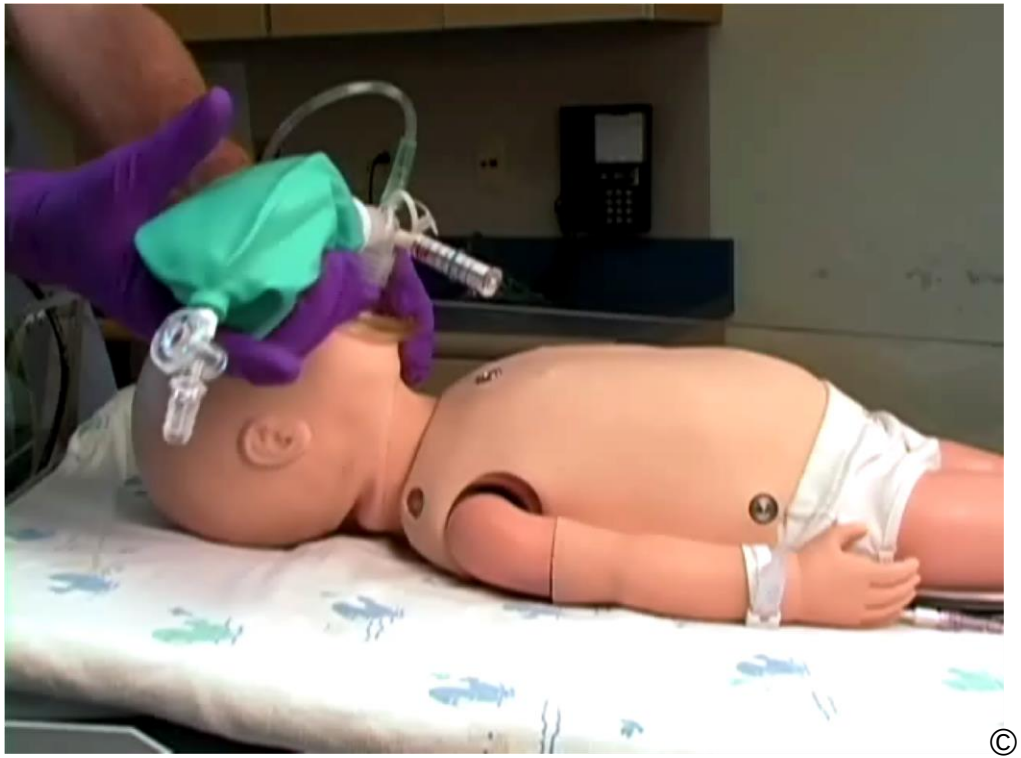
The DOPE mnemonic	
D	Displaced endotracheal tube
O	Obstructed endotracheal tube
P	Pneumothorax
E	Equipment failure

Important Points in the Neonatal Resuscitation Flow Diagram

- The ***most*** important and effective action in neonatal resuscitation is to ventilate the baby's lungs
- Effective positive-pressure ventilation in secondary apnea usually results in rapid improvement of heart rate
- If heart rate does not increase, ventilation may be inadequate and/or chest compressions and epinephrine may be necessary

Frequency of Ventilation:

40 to 60 breaths per minute



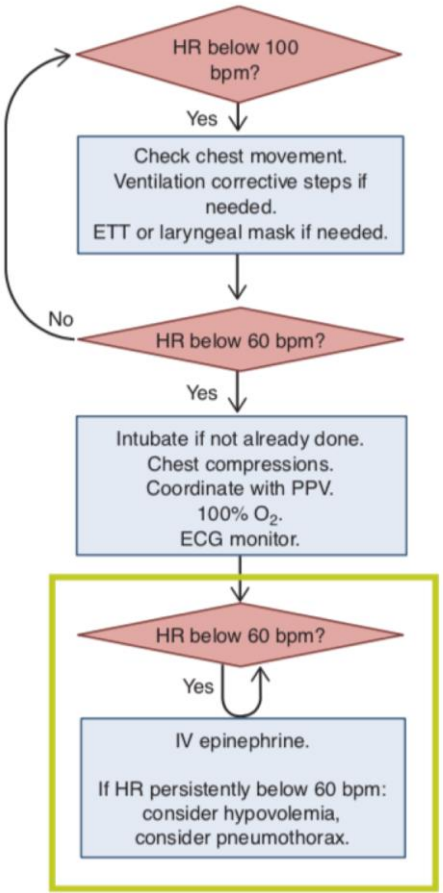
Chest Compressions

- Improves circulation and coronary blood flow by depressing the sternum and compressing heart against the spine
- Always ensure airway and ventilation before beginning chest compressions
- Temporarily increase circulation
- Should always use 100%oxygen

Chest Compressions

Indications for chest compression

- Heart rate remains less than 60 beats per minute (bpm) despite 30 seconds of effective PPV

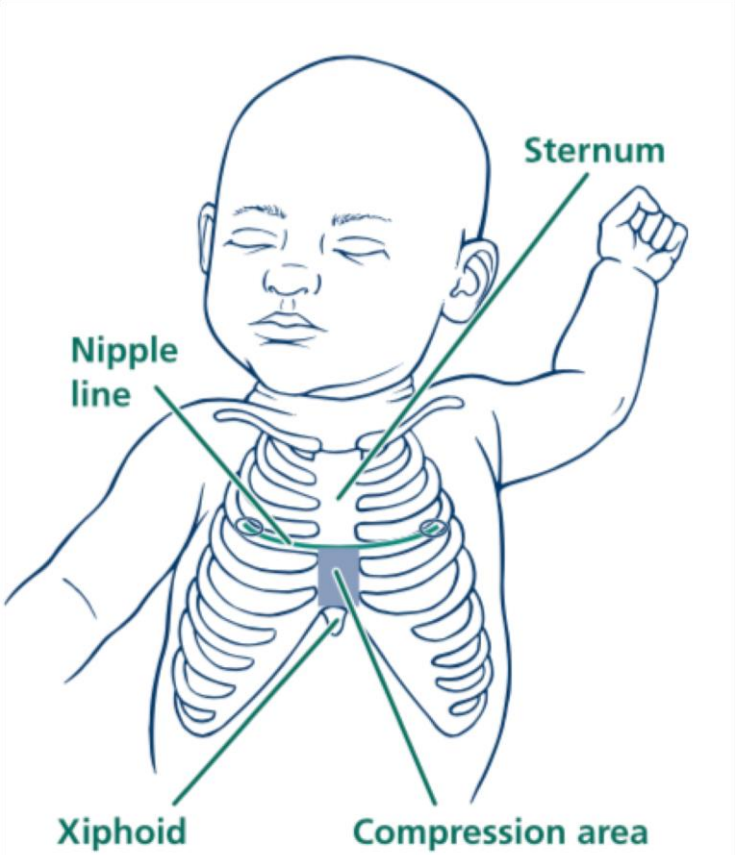


Chest Compressions: 2 People Needed

- One person compresses chest
- One person continues ventilation
- 3:1 compression ventilation ratio

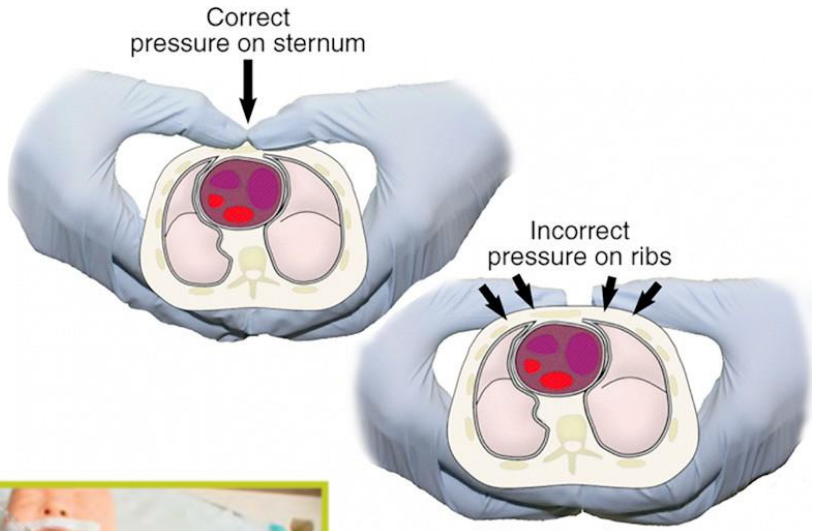
Chest Compressions: Positioning of Thumbs or Fingers

- Run your fingers along the lower edge of the rib cage until you locate the xyphoid
- Place your thumbs or fingers on the sternum, just below and imaginary line connecting the nipples.



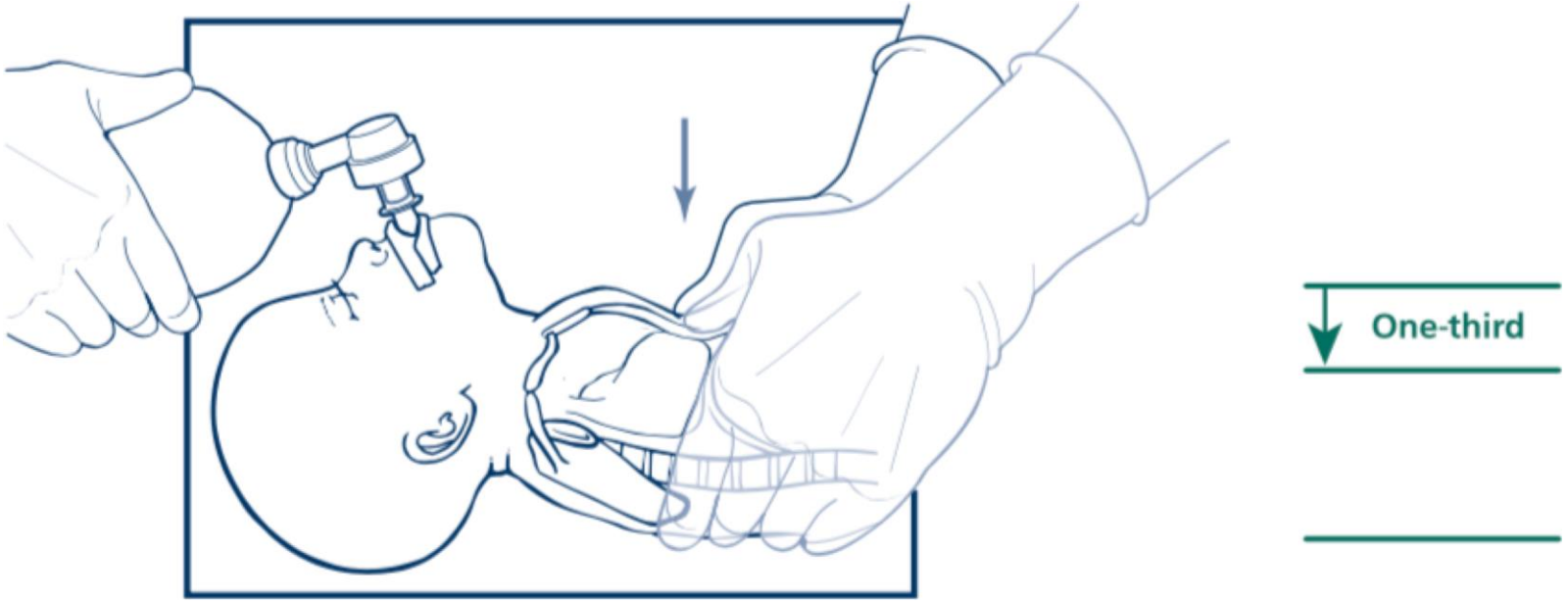
Thumb Technique

- Apply pressure during compression on the sternum
- Release pressure to allow chest recoil and ventilation



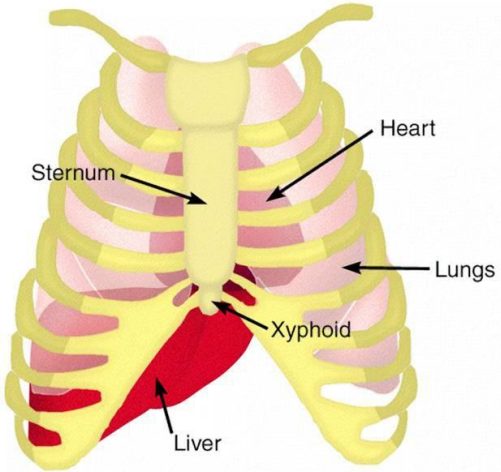
Compression Pressure and Depth

Compression depth is approximately one-third of the anterior-posterior diameter of the chest.

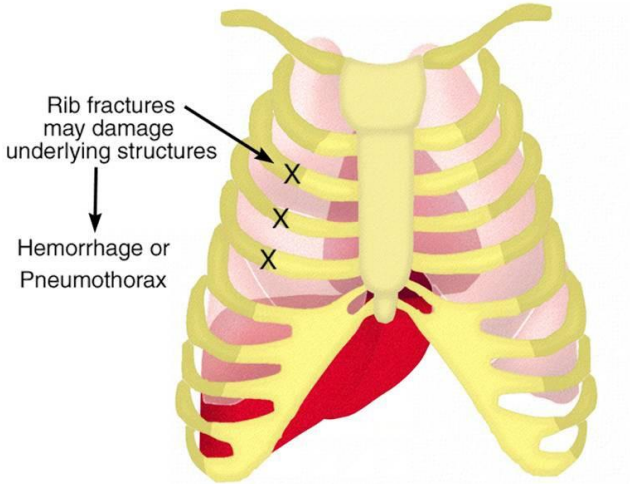


Complications of chest compressions

Laceration of liver



Broken ribs

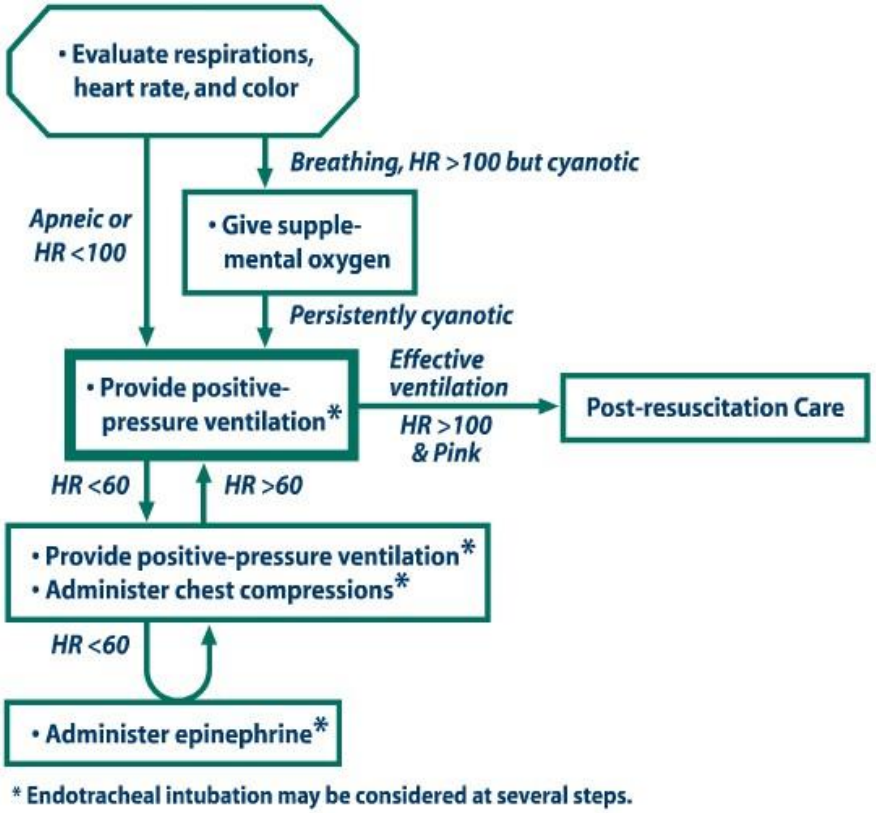


Chest compressions coordination with PPV

- 3:1 ratio-3 compressions to one breath=cycle
- One cycle takes 2 seconds
- 30 breaths and 90 compressions in one minute.
- This equals 120 “events” per minute

When do you check the heart rate after starting compressions?

- Check HR after 60 seconds
- If>60 bpm stop compressions but continue ventilation at 40-60 bpm
- If<60 check quality of ventilation and compressions



Heart Rate Remains Less than 60 bpm

- Check adequacy ofventilation and compressions
- Consider intubation if not already done
- Consider epinephrine either via ETT or insert umbilical catheter

Epinephrine (Epi)

Functions as a cardiac and vascular stimulant.

Is indicated when the heart rate remains < 60 bpm after:

- 30 seconds of assisted ventilation that inflates the lungs and
- 60 seconds of coordinated compressions and ventilation using 100% oxygen

---

Total =90 seconds

- Note: Epinephrine is **not** indicated before adequate ventilation is established.

Epinephrine Administration

Recommended Concentration	1:10,000
Recommended Route	Intravenously (Consider endotracheals route while intravenous access being obtained
Recommended Dose	0.1 to 0.3 mL/kg of 1:10,000 solution (consider 0.3 to 1mL/kg if given endotracheally)
Recommended Preparation	1:10,000 solution in 1-mL syringe (orlarger syringe if given endotracheally)
Recommended rate of administration	*Rapidly* – as quickly as possible

Effect of Epinephrine

- Assess the HR after 1 minute of epi administration while continuing PPV and chest compressions
- HR should increase to 60 bpm or above within 1 min
- If HR <60 bpm after 1 min repeat dose every 3-5 minutes
- Consider increasing dose to higher end of range

If no response to Epi

- **Check the following:**
  - Lungs are being adequately ventilated
  - Insert ETT if not already done
  - Confirm equal breath sounds
  - ETT is not bet, displaced, or obstructed by secretions
  - Chest compressions are give at the correct depth and rate
  - Interruptions of chest compressions are minimal

When to consider volume expanders?

- Baby is not responding to steps of resuscitation **AND** there are signs of shock or history of acute blood loss
- History of a conditions associated with fetal blood loss:
  - Extensive vaginal bleeding, abrupto placentae, placenta previa, twin-to-twin transfusion, tight nuchal cord, cord prolapse, or blood loss from umbilical cord)

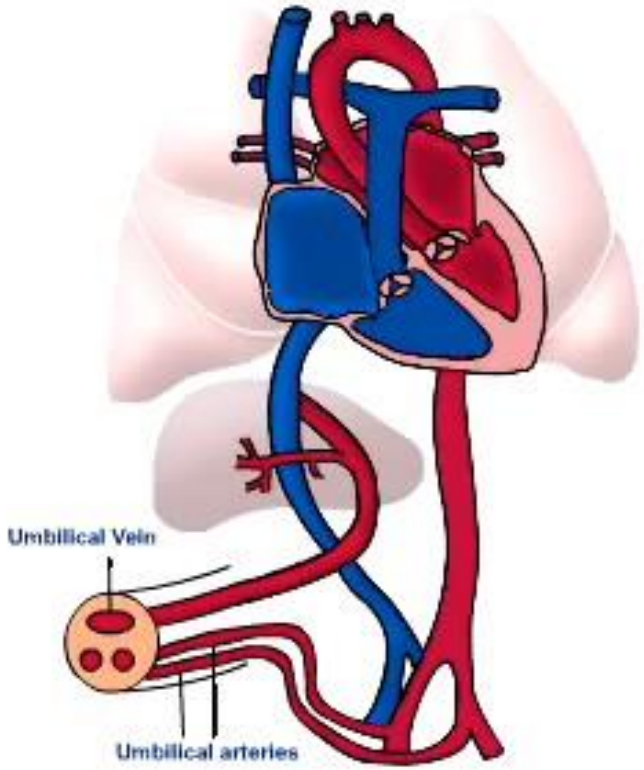
Volume Expanders: Dose and Administration

Recommended Solution	Normal Saline
Acceptable Solution	Ringer's lactate, or O Rh-negative blood
Recommended Dose	10 mL/kg
Recommended Route	Umbilical vein
Recommended Preparation	Correct volume drawn into large syringe
Recommended rate	Over 5 to 10 minutes

Expected signs of volume expansion

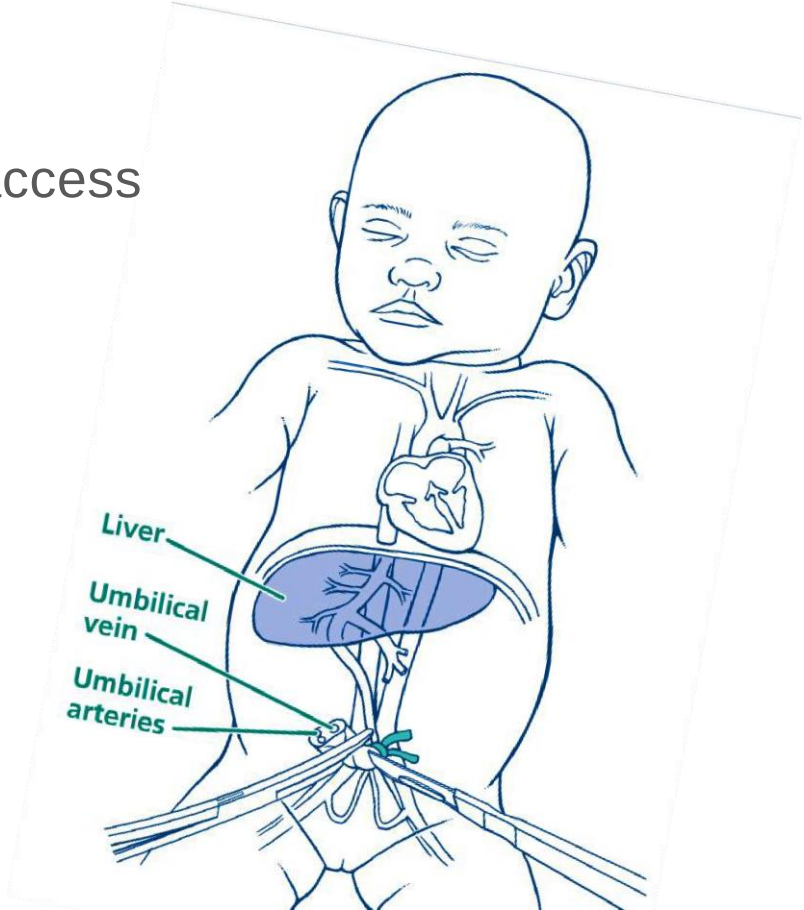
- Heart rate increases
- Pulses stronger
- Pallor lessens
- Blood pressure increases
- Repeat volume expanders if hypovolemia persists

Umbilical Vein Catheter Insertion



Medication Administration via Umbilical Vein

- Preferred route for intravenous access
- 3.5F or 5F end-hole catheter
- Sterile technique



Medication Administration via Umbilical Vein

- Insert catheter until you have blood return- usually 2 to 4 cm
- Note free flow of blood when aspirated
- Use less depth in preterm newborns
- Insertion in liver may cause damage

Preterm Births

Premature Babies have higher risk of complications due to:

- Excessive heat loss
- Vulnerability to hyperoxic injury
- Immature lungs and diminished respiratory drive
- Vulnerability to infection
- Immature brains that are prone to bleeding
- Small blood volume, increasing the implications of blood loss

Thermoregulation in the Preterm

- Increase delivery room temperature
- Thermal mattress under the blanket on the radiant warmer
- Polyethylene plastic bag or wrap
- Preheated transport incubator/radiant warmer
- Monitor baby’s temperature frequently

Plastic Bag for Thermoregulation

Oxygen Administration

- Hyperoxic/reperfusion injury may be more significant in preterm babies
- Oxygen blender, air source, and pulse oximeter recommended for babies born at <32 weeks' gestation

Assisted Ventilation in Preterms

- Preterms have immature lungs and may be difficult to ventilate and are more susceptible to injury from PPV
- Consider the following:
  - CPAP vs. intubation
  - PPV with low inflation pressures
  - Best to give PPV with PEEP
  - Surfactant administration

Oxygen use in Preterms

- More susceptible to reperfusion injury
- Optimum saturation for preterm babies in first minutes of life unknown
- 95% oxygen saturation may be too high for preterm babies
- Current recommendation is initiate resuscitation with 21-30% FIO2 for prematures <35 weeks

Oxygen Use in Premature

- Connect blender to oxygen and medical air sources
- Attach pulse oximeter to baby
- Need reliable oximeter signal
- Adjust oxygen concentration to achieve desired saturations (85%-95% range)

Decreasing Brain Injury in Preterms

- Handle the baby gently and avoid the Trendelenburg position
- Avoid high airway pressures with both PPV and CPAP
- Adjust ventilation gradually based on pulse oximetry and blood gases
- Do not rapidly infuse intravenous fluids

Post Resuscitation and Stabilization

- Monitor the baby's temperature
- Monitor blood glucose
- Monitor the baby for apnea and bradycardia

Ethical Principles of Neonatal Resuscitation

- Ethical principles for the newborn should be no different from those for older children or adults
- Common ethical principals
  - Autonomy
  - Beneficence
  - Non-maleficence
  - Justice

Laws and Neonatal Resuscitation

- Laws vary according to locale
- No federal law mandates resuscitations in all circumstances
- Withdrawal of support if resuscitation is deemed “futile” is appropriate

No Response to Resuscitation

Discontinuation of resuscitation efforts may be appropriate after 10 minutes of absent heart rate following complete and adequate resuscitation efforts

Parental Involvement after Baby's Death

- Encourage parental presence/holding of infant
- Reduce/treat parents' pain and suffering
- Be sensitive to cultural practices and spiritual needs

Conclusion

- Most newborns transition to extra uterine life without intervention
- For the small percentage that require support, the single most important concept in NRP is **timely and effective ventilation of the lungs**

Contributors

&

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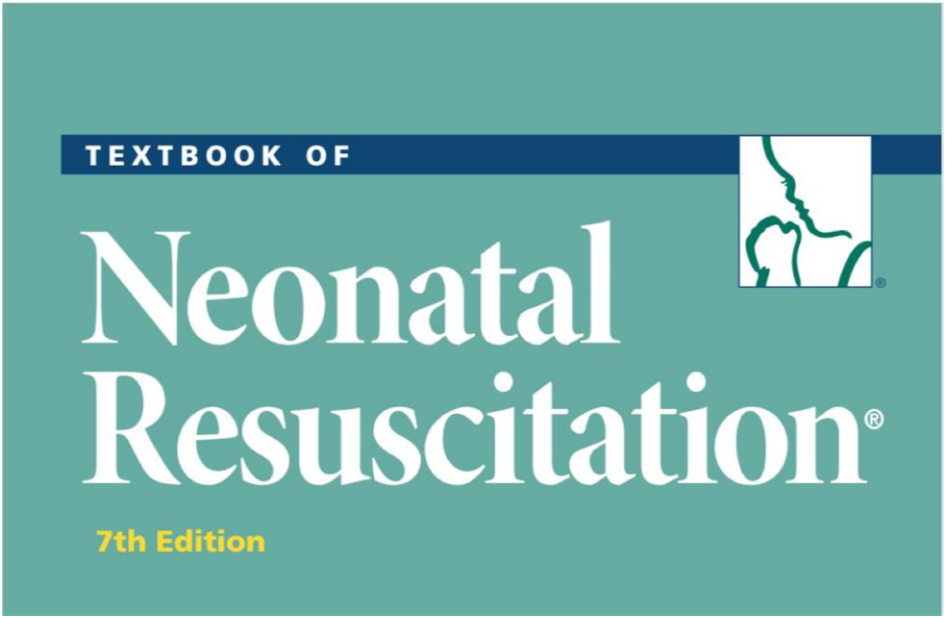
Reference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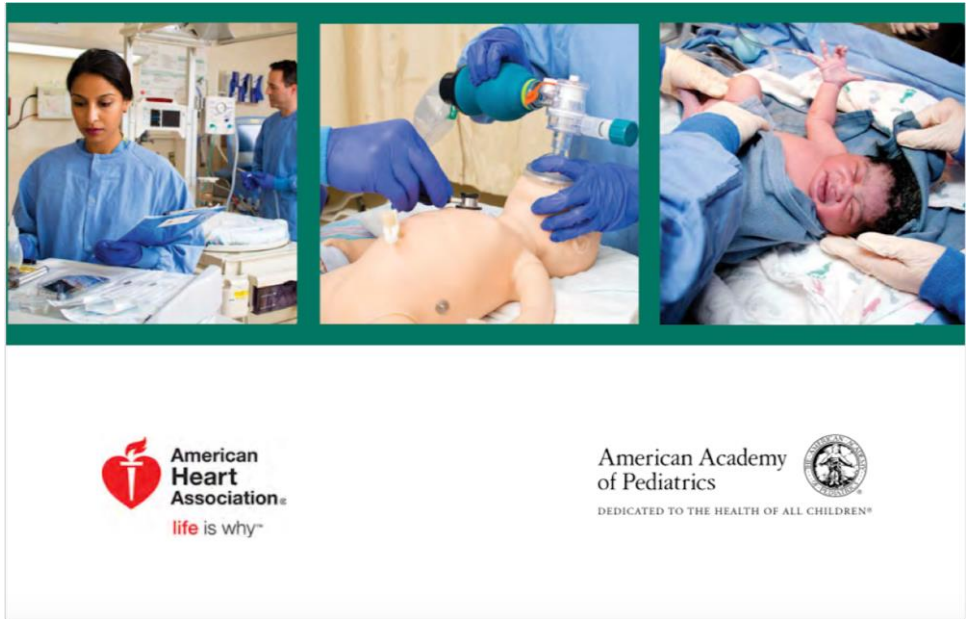
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