



# Resuscitation and stablization of babies born Preterm

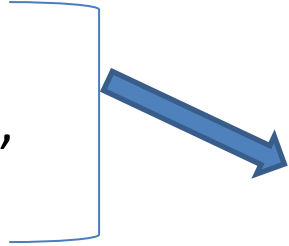
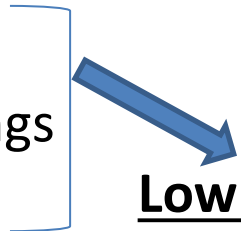
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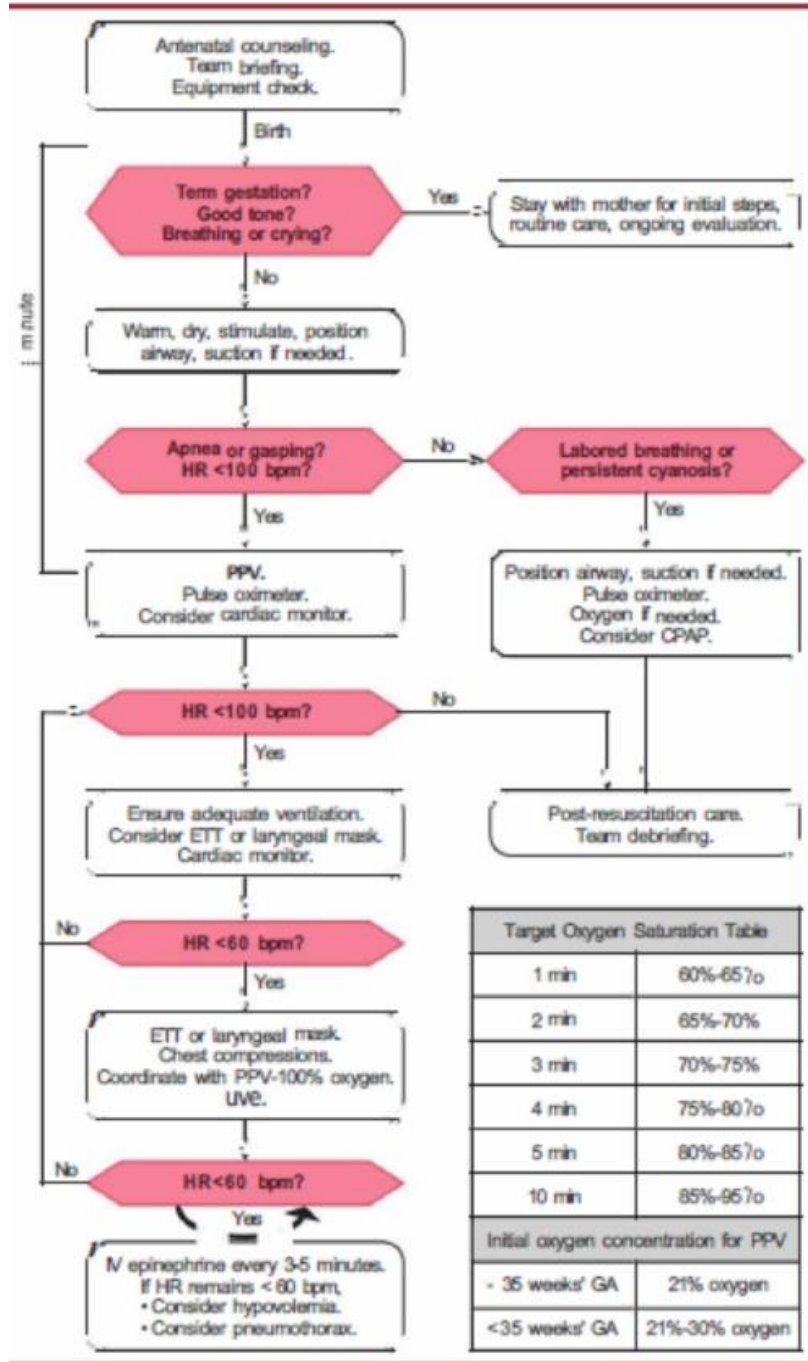
# Titles:

- Why preterms are at higher risk of medical complications
- The additional resources needed to prepare for a preterm birth
- Additional strategies to maintain the preterm baby's body temperature
- How to assist ventilation when a preterm baby has difficulty breathing
- Additional considerations for oxygen management in a preterm baby
- Ways to decrease the chances of lung and brain injury in preterm babies
- Special precautions to take after the initial stabilization period
- How to present information to parents before the birth of an extremely premature baby

# higher risk of complications:

- Thin skin,
  - decreased subcutaneous fat,
  - large surface area relative to body mass,
  - limited metabolic response to cold
- 
- rapid heat loss.**
- Weak chest muscles,
  - poorly compliant (stiff) lungs
  - flexible ribs
- 
- Low spontaneous breathing efforts**
- Immature lungs → **lack surfactant**
  - Immature tissues → **easily damaged by oxygen:**

- **Chorioamnionitis** → initiate preterm labor, and the baby's immature immune system increases → **risk severe infections** such as
  - pneumonia, sepsis, and meningitis.
- A smaller blood volume → **risk of hypovolemia** from blood loss.
- **Insufficient blood supply → brain bleeding or damage** : Immature blood vessels in the brain cannot adjust to rapid changes in blood flow.
- Limited metabolic reserves & immature compensatory mechanisms → **hypoglycemia**



Target Oxygen Saturation Table	
1 min	60%-65% <sub>o</sub>
2 min	65%-70%
3 min	70%-75%
4 min	75%-80% <sub>o</sub>
5 min	80%-85% <sub>o</sub>
10 min	85%-95% <sub>o</sub>
Initial oxygen concentration for PPV	
- 35 weeks' GA	21% oxygen
<35 weeks' GA	21%-30% oxygen

# additional resources need for preterm newborn:

- <32 weeks' gestation → prepare a [polyethylene bag or wrap & a thermal mattress](#).
- A servo-controlled radiant warmer with a temperature sensor
- .
- An oxygen blender and a pulse oximeter with an appropriate-sized sensor
- A cardiac monitor with 3 chest leads or limb leads
- A [resuscitation device capable of providing PEEP and CPAP](#), such as a T-piece resuscitator or flow-inflating bag.
- A preterm-sized resuscitation mask, size 0 laryngoscope blade (size 00 optional), and appropriate-sized endotracheal tubes (3.0 mm and 2.5 mm) should be prepared.
- Consider having [surfactant available](#) if the baby is expected to be less than 30 weeks' gestation.
- A [pre-warmed transport incubator](#) with [blended oxygen](#) and a [pulse oximeter](#)



# keep the preterm newborn warm:

hypothermia (body temperature below 36.5° C )

For larger babies:

- **drying with warm towels,**
- skin-to-skin contact,
- early breastfeeding
  
- Set the temperature in the **room 23° C to 25° C** (74° F to 77° F).
- **Preheat the radiant warmer** well before the time of birth.
- After delivery, quickly place a **hat on the baby's head**.
- Use a **pre-warmed transport incubator** if the baby will be moved after initial care is completed.
- Maintain **axillary temperature 36.5 ° C and 37.5° C** .



# Additional steps for thermoregulation of babies less than 32 weeks gestation

- **thermal mattress** as an additional heat source.
- Portable thermal mattresses release heat when a chemical gel inside the mattress is activated to form crystals.
- Thermal mattress should be stored & **activated at room temp. (19° C to 28° C or 66° F to 82° F)**. If the mattress is stored or activated at a warmer temperature, it may exceed the target surface temperature.
- Following the manufacturer's recommendations, squeeze the pad to activate the gel approximately **5 minutes before the baby is born**. Once activated, it will reach the target surface temperature within 5 minutes and maintain that temperature for **1 hour** after activation.
- place it on the radiant warmer and **cover it with a blanket** so the mattress is not directly exposed to radiant heat and the heated surface is not in direct contact with the baby's skin.



- Depending on the baby's birth weight and environmental conditions, some babies up to 35 weeks' gestation may benefit from the use of a thermal mattress and plastic bag/wrap

# Wrap the baby in a **polyethylene plastic bag or wrap**

- Drying the body is not necessary. **Instead of drying** the body with towels, very premature newborns should be wrapped up to their neck in polyethylene plastic immediately after birth.
- You may use a food-grade reclosable 1-gallon plastic bag, a large plastic surgical bag, food wrap, a commercially available plastic poncho, or sheets of commercially available polyethylene plastic.
- If using a reclosable bag, you may cut the bottom open, slide the baby into the bag through the cut side, and close the bag below the baby's feet.
- If using a plastic sheet or food wrap, you may either wrap the baby in a single sheet or use 2 sheets and place the baby between the sheets.
- It is important to keep the newborn fully covered during resuscitation and stabilization. If the newborn requires **insertion of an umbilical catheter, cut a small hole** in the plastic and pull the umbilical cord through the hole rather than uncovering the newborn.

- **Monitor the baby's temperature frequently** because overheating has been described while using a combination of warming methods.
- Consider placing a temperature sensor and sensor cover on the newborn and using the **warmer's servo-control mode** to adjust the radiant heat.

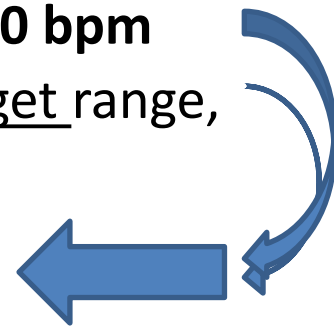
# Assist ventilation

- Use the **same criteria for initiating PPV** with a preterm baby that for a term baby (apnea, or gaspings, or heart rate less than 100 bpm within **60** seconds of birth despite the initial steps).

## ***special considerations for assisting ventilation of preterm babies:***

- If the baby is *breathing spontaneously* + heart rate 100 bpm
- but has labored respirations **or** oxygen saturation < target range,

*consider using **CPAP** rather than intubating.*



# • If PPV is required:

- the lowest inflation pressure necessary to achieve and maintain a heart rate greater than **100 bpm**. heart rate response is the best indicator of effective ventilation.
- An initial inflation pressure of 20 to 25 cm H<sub>2</sub>O is adequate for most preterm newborns. The volume of air required to ventilate a preterm baby's lungs is very small and may not result in perceptible chest movement.
- Use the lowest inflation pressure necessary to maintain a heart rate of at least 100 bpm and gradually improve oxygen saturation.
- The maximum inflation pressure used for a baby born at term may be too high for preterm newborn. however, it is reasonable to limit face-mask ventilation to a maximum inflation pressure of 30 cm H<sub>2</sub>O .
- **If** face-mask ventilation at this pressure does not result in clinical improvement, providing ventilation through an endotracheal tube may improve the efficacy of PPV and allow you to decrease the ventilating pressure.

- **Airway obstruction & face-mask leak are common** problems during face-mask ventilation with preterm newborns, and **very small changes in the head and neck** position may lead to significant changes in ventilation.
- CO<sub>2</sub> detector placed between the mask and PPV device may provide a visual cue to help identify when you have achieved the correct mask and neck position.



# device that can provide PEEP:

**PEEP (5 cm H<sub>2</sub>O )** helps the baby's lungs to remain inflated between positive-pressure breaths.

- This is particularly important if you are using an endotracheal tube for ventilation.
- **T-piece resuscitator and flow-inflating bag** can provide PEEP during ventilation through either a face mask or an endotracheal tube.
- If a PEEP valve is attached, a **self-inflating bag** may provide PEEP during endotracheal tube ventilation.
- It is difficult to maintain PEEP during face-mask ventilation with most self-inflating bags.

## surfactant if :

1- baby requires intubation for RD.

2- extremely preterm.

- Many preterm babies can be treated with early CPAP and avoid the risks of intubation and mechanical ventilation.
- Surfactant can be selectively administered to babies who fail a trial of CPAP. In some cases, you may be able to administer surfactant through a thin tube while the baby remains on CPAP (Less Invasive Surfactant Administration [**LISA**] or Minimally Invasive Surfactant Treatment [**MIST**]) or remove the endotracheal tube immediately after surfactant administration and return to CPAP for ongoing respiratory support (INTubate-SURfactant-Extubate [INSURE]).
- Some experts still recommend prophylactic surfactant for extremely premature newborns (less than 26 weeks' gestation) because the likelihood of CPAP failure in this subgroup is relatively high.
- Criteria for CPAP failure and the administration of surfactant should be developed in coordination with local experts.
- If the resuscitation team does not have expertise in surfactant administration, it may be preferable to wait for the arrival of more experienced providers.

# Oxygen:

- You have learned in previous lessons that injury during transition may result from inadequate blood flow & oxygen delivery and that restoring these factors are important goals during resuscitation.
- However, research indicates that administering excessive oxygen after perfusion has been restored can result in additional injury. Preterm babies may be at higher risk for this reperfusion injury because fetal tissues normally develop in a low-oxygen environment and the mechanisms that protect the body from oxygen-associated injury have not yet fully developed. Nevertheless, many preterm newborns will require supplemental oxygen to achieve the gradual increase in oxygen saturation that occurs after a healthy term birth.
- When stabilizing a preterm baby, it is important to balance the desire to rapidly correct low oxygen saturation against avoiding exposure to excessive levels of oxygen. The current recommendation is to initiate resuscitation of preterm newborns (less than 35 weeks' gestational age) with 21 % to 30% oxygen and use a pulse oximeter & oxygen blender to maintain oxygen saturation within the same target range described for full-term newborns

# Target Pre-Ducta Oxygen Saturation:

- 1 min >>> 60%-65%
- 2 min >>> 65%-70%
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- 10 min >>> 85%-95%

## Initial Oxygen Concentration for PPV:

> 35 weeks' GA → 21 % oxygen

<35 weeks' GA → 21%-30%oxygen

Table 8-1. Target Pre-Ductal O<sub>xy</sub> gen Saturation

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Initial Oxygen Concentration for PPV	
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# neurologic injury in preterm newborns:

- <32 weeks' gestation → fragile network of capillaries in brain
- Obstruction of venous drainage from the head or rapid changes in blood CO<sub>2</sub> levels, blood pressure, or blood volume may increase the risk of rupturing these capillaries. Bleeding in the brain may cause tissue damage and lead to lifelong disability.
- Inadequate blood flow and oxygen delivery may cause damage to other areas of the brain even in the absence of hemorrhage, while excessive oxygen administration may cause damage to the developing retina, leading to vision loss.
- An organized care plan that is practiced during simulation can help you to cluster interventions and complete them efficiently while minimizing disturbances to the preterm newborn.
- **Handle the baby gently.**
- **Do not position the baby's legs higher than the head (Trendelenburg position).**
- **Avoid using high pressure during PPV or CPAP.**
- **pulse oximeter & blood gases to adjust ventilation and oxygen concentration.**
- **Do not rapidly infuse intravenous fluids**

# special precautions should be taken after initial stabilization period

- • Monitor the baby's temperature.
- • Monitor blood glucose.
- • Monitor for apnea & bradycardia.

may be the first clinical sign of an abnormality in body temperature, oxygenation, CO<sub>2</sub>, electrolytes, blood glucose, or blood acid levels.

# Counsel parents

before the birth of an extremely preterm baby  
&  
after Resuscitation and stabilization of baby

*After Resuscitation & stablization of baby*

