

## Delivery room management of a preterm infant

**This module is designed to improve knowledge, skills and clinical practice of all stakeholders involved in the care of preterm neonates in delivery room management, triaging and transport of a sick newborn.**

### Learning objective

The participants will learn:

- To understand the need of timely and correct resuscitation of the preterm newborn ; to understand the concept of 'golden minute'; to understand the concept of gentle resuscitation
- To be able to use resuscitation equipment safely and effectively and have knowledge and skill of various steps of resuscitation
- To be able to reliably apply equipment and practice knowledge and skill with appropriate behavioral skills in complex clinical scenario of delivery room
- To be able to triage and ensure optimal transportation of a sick neonates
- To be able to audit and improve practices of resuscitation of preterm neonates using quality improvement methodology in local context

### Module contents

**This module includes following elements:**

- **Script:** Easy to read format, gives quick introduction and is an essential reference material for the participants
- **Key messages:** After having read through the script, these key messages summarizes the important learning points in the webinar and the script
- **Video demonstration:** The videos in this module cover the “procedures and equipment's used while caring for a preterm infant and organizing and conducting resuscitation of an individual baby”
- **Webinar:** The webinar in this module shall help the participant to gain knowledge about the “Effect of resuscitation practices on short and long term outcome of preterm neonates and preparation for resuscitation of a preterm neonate”
- **Poster demonstration:** The participant shall learn about “equipment checklist, equipment's used in delivery room (pulse oximeter, T piece and blender), weight and gestation based selection of ET size and suction catheter size tables”
- **Self-assessment:** This will be done at the end of each objective, based on what you have already learnt. Feel free to consult your text material, if you need assistance in recapitulating
- **Skill check:** The skill check includes evaluation of your skills on “Team preparedness and equipment checklist, thermoregulation in preterm infants, routine care, initial steps, bag and mask ventilation, chest compressions, pulse oximeter, T piece: application, setting up and delivery, blender: setting up, setting FiO<sub>2</sub> and asepsis”
- **Simulation:** After reading through the text material, viewing videos, webinars and pictorial posters with key messages, you shall be asked to perform the case based scenario on “Asepsis, preterm infant requiring thermoregulation, preterm infant requiring initial steps, bag and mask ventilation, chest compressions and administering medications and after performing as a team; individual feedback and debriefing will be done

## Learning Objective 1

### **Understanding the need of timely and correct resuscitation of the preterm newborn, the concept of 'golden minute' and the concept of gentle resuscitation**

This objective covers the need of timely and correct resuscitation of the preterm newborn, the concept of 'Golden minute' and the concept of gentle resuscitation and will be delivered as:

- Webinar
- Script
- Key messages
- Self-check MCQ's

After viewing and listening to the webinar, and reading the script along with the key messages you shall undergo a self-evaluation based on what you have already learnt.



### 1.1: Webinar

You will view and listen to webinar on the effect of resuscitation practices on short and long term outcome of preterm neonates along with your facilitator. You are free to interrupt your facilitator anytime for any clarifications or suggestions. The power point slides of the webinar are given here.

**Preterm Resuscitation**

DR. Rishikesh Thakre  
MD DM (Neonatology)  
Consultant, Neo Clinic & Hospital  
Aurangabad

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**Objective**

- To understand the need of timely resuscitation of the preterm newborn

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**Overview**

- India has upto 15% preterm births
- Upto 35% of neonatal deaths are due to prematurity
- Preterm babies are **at high risk** for asphyxia
- Timely interventions improve outcomes

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**FACT**

- Prematurity is a **risk factor** for resuscitation
- Preterm babies have higher chances of requiring resuscitation compared to term
- Equipments & expertise needed for preterm resuscitation/stabilization differs from term babies

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**Concerns of preterm in delivery room**

- Asphyxia
- Hypothermia
- Breathing difficulty
- Hypovolemia
- Hypoglycemia

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**Why preterms are at “high risk”?**

Issue	Contributing factors
Asphyxia	Poor respiratory drive, Poor tone, Immature brain control
Hypothermia	Less fat, thin skin, large surface area relative to body mass, limited thermal response
Breathing difficulty	Immature lungs, weak breathing muscles, immature respiratory drive
Hypovolemia	Smaller blood volume loss increases risk of hypovolemia
Hypoglycemia	Limited response-compensatory mechanism

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**What can be done ?**

- The first minutes of life are decisive
- Follow a systematic stepwise approach
- Place emphasis on
  - Temperature, Airway, Breathing, Circulation
- Actions during these minutes will have an influence later on outcome

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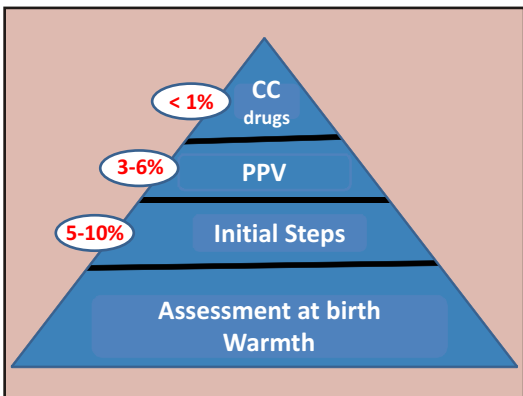
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**To Conclude**

Simple, effective, easy to practice steps can help save preterm lives

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Delivery room management and stabilization of a preterm infant

**What did you learn from this webinar?**

1. ....
2. ....
3. ....

**What are the queries which come to your mind?**

1. ....
2. ....
3. ....



## 1.2:Script

### Effect of resuscitation practices on preterm neonates

**This script shall help you to understand effect of resuscitation practices on preterm neonate.**

In India every year upto 15% of newborns are born preterm. Preterm population contributes to almost 35% of all neonatal deaths. One of the important causes of preterm morbidity and mortality is asphyxia. Skilled timely interventions in the delivery room can help improve short term and long term outcomes. It is well known that prematurity is a risk factor for resuscitation at birth. Compared to term newborns, preterm newborns have a higher chance of requiring resuscitation in the delivery room. The need for equipment and skills for preterm resuscitation differs from term newborns. Hence, we need to have skills to manage preterm asphyxia appropriately. There are multiple problems a preterm may develop in the delivery room in addition to asphyxia. These include hypothermia, respiratory distress, hypovolemia and hypoglycemia which may further complicate asphyxia. One needs to anticipate and take appropriate steps to care for these multiple problems in preterms at birth. Let us understand why a preterm is at risk for multiple problems at birth. Preterms are at high risk to develop asphyxia because of poor respiratory drive, poor muscle tone, and immature brain functioning. Hypothermia is more likely in preterm newborns because of lesser body fat, large body surface area and limited thermal responses. Breathing difficulty may be due to immature lungs, weak muscles or immature respiratory drive. Smaller blood volume loss may increase the risk of hypovolemia predisposing to shock in preterm newborns. One should anticipate being prepared and acting appropriately. To manage a preterm at birth is a challenge. We need to be prompt and act in timely fashion in a stepwise manner to assess support and maintain temperature, airway, breathing and circulation. Appropriate actions help improve short and long term outcomes.

### 1.3:Key Messages

- All newborns need assessment for need for resuscitation at birth
- Provision of warmth is a must for all newborns
- Majority of newborns would respond to initial steps or bag and mask resuscitation
- Very rarely one may need advanced resuscitation steps like chest compression and intubation



### 1.4: Webinar

You will view and listen to webinar on the preparation for resuscitation of a preterm neonate along with your facilitator. You are free to interrupt your facilitator anytime for any clarifications or suggestions. The power point slides of the webinar are given here.

**Preterm Resuscitation**

DR. Rishikesh Thakre  
MD DM (Neonatology)  
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**Failing to prepare  
is  
preparing to fail**

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**What additional resources in DR ?**

- At least 2 qualified people

STEP	EQUIPMENT
Temperature	Room temp (25-28°C ), Plastic bag
Airway	Suction catheter (8-10F)
Breathing	Preterm bag (180-250 mL), preterm face mask, oxygen blender, T piece resuscitator, Pulse oximeter, Laryngoscope with size 0 -00 blade, ET 2.5/3 mm
Circulation	Umbilical catheter (3.5-5 G)

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### Thermal stabilization in delivery room

- Room temp: 26-28° C
- **Combination of:**
  - Pre heat cloth/warmer
  - Servo control warmer
  - Plastic wrap
- Avoid hyperthermia

**Target**  
36.5-37.5° C

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### Counseling parents

- **Prior to birth:**
  - Inform anticipated problems
  - Available treatment options
- **After birth:**
  - Current problems
  - Short term & long term risks
- Use clear, simple words

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### To Conclude

- Preparation at birth is critical at the time of preterm newborn
- Additional persons and equipments need to be organised
- A checklist of preparation ensures adequacy of preparation

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### How to support breaths ?

- Ventilate to cause gentle chest rise
- Avoid hyper-ventilation
- Use T piece if labored breathing or low oxygen targets (if facilities exist)
- Assess HR/oxygenation by pulse ox

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**CPAP Use**

- **When:** Respiratory distress in DR
- **Monitor:** SA Score, SpO<sub>2</sub>, consciousness
- **Device:** T piece
- **When not to use:** Poor spontaneous respiration
- **How much:** PEEP 5, FiO<sub>2</sub> 0.5

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**How much oxygen ?**

- **Initiate with:**
  - Room air (21%) ≥35 weeks
  - 21-30% ≤35 weeks
- **Monitor & titrate oxygen**
  - Pulse oximeter
  - Oxygen blender
- 100% with chest compressions

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**Any special precautions?**

- Handle baby gently
- Do not waste time stimulating, if apneic
- Do not give head low position
- Avoid excessive pressure during BMV
- Use oxygen judiciously
- Avoid rapid bolus
- Ensure asepsis

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**What did you learn from this webinar?**

1. ....
2. ....
3. ....

**What are the queries which come to your mind?**

1. ....
2. ....
3. ....



### 1.5:Script

#### Preparation for resuscitation of a preterm neonate

**This script shall help you to understand preparation for resuscitation of a preterm neonate.**

Preterm babies need extra preparation for resuscitation. All preterm deliveries must be attended by at least 2 persons. Additional skilled people may be required if the resuscitation is prolonged or if there is twin delivery. In addition to regular resuscitation equipments, preterms need the following specific equipments:

- For thermal care, room temp should be kept at 25-28<sup>0</sup> C and in addition a plastic wrap be kept ready for very preterm babies
- Suction catheters of size 8-10 F gauge is required to suction when indicated
- To support breathing, preterm self inflating bag (180-250 mL), preterm face mask, oxygen blender, T piece resuscitator, pulseoximeter is necessary
- A laryngoscope with size 0 and 00 blade with ET size of 2.5 and 3 should be immediately available.
- An equipment checklist in the delivery room helps to ensure all equipments are present and in working condition.

Thermal support is an essential component for preterm care in delivery room. Hypothermia is common and is a known predictor of poor outcomes in preterm babies. All efforts must be made before and during resuscitation to ensure normothermia. Prior to arrival of the baby, the room should be warm, the warmer turned on with clean dry sheets kept under the warmer to ensure a warm welcome. All preterm babies needing resuscitation are kept under warmer in servo mode with a set temp of 36.5<sup>0</sup>C. For very preterm babies, immediately after birth before drying a plastic wrap is applied. The target is to maintain temp between 36.5-37.5<sup>0</sup> C. Preparation also includes preparation of parents to meet the challenges of preterm care. This starts prior to arrival of the baby.

#### 1.6:Key messages

- Parents need to be told about anticipated problems and the treatment options available in simple clear language
- The information should be based on unit practices and outcome and should be realistic about chances of survival



### 1.7:Self-check MCQ's

1. Of the following which is the most correct statement regarding personnel preparation at the time of birth
  - a. For all deliveries at least one personnel who is skilled in ventilation should be in-charge of newborn
  - b. Resuscitation personnel may have other responsibilities, such as assisting the obstetrician
  - c. Skilled personnel for complete resuscitation should be available "on call"
  - d. For high risk deliveries, an individual should be able to multitask
  
2. All of the following statements are true about neonatal resuscitation except
  - a. Birth of a newborn is a potential medical emergency
  - b. All newborns need assessment for resuscitation at birth
  - c. Majority of newborns do not need resuscitation at birth
  - d. Up to 1% of newborns need resuscitation at birth
  
3. What additional resources are desirable in the delivery room for a preterm 32 weeks gestation?
  - a. Additional trained personnel, including someone with expertise in performing Complete resuscitation
  - b. Additional means to maintain body temperature, such as plastic bag
  - c. A pulse oximeter and an oxygen blender
  - d. All of the above
  
4. Which of the following statements regarding newborn resuscitation is not 'true'?
  - a. For successful resuscitation, you should anticipate, prepare adequately and promptly initiate supportive measures
  - b. The need for resuscitation in newborns can generally be predicted
  - c. Resuscitation should be carried out in a warm, well-lit, draught-free area on a flat resuscitation surface
  - d. With preterm delivery <37 weeks gestation special preparations are not required
  
5. State if **true** or **false**: Preterm newborn can develop hypothermia, respiratory distress, hypovolemia and hypoglycemia which may further complicate asphyxia

## Learning Objective 2

### Using resuscitation equipment safely and effectively and have knowledge and skill of various steps of resuscitation

This objective covers using resuscitation equipment safely and effectively and develops the knowledge and skill of various steps of resuscitation and effectively and is delivered as:

- Videos
- Posters
- Self-check MCQ's

After seeing the videos, posters, and reading the script you shall undergo a self- evaluation based on what you have already learnt.



## 2.1: Video

### There will be a video demonstration by your facilitator on:

1. Thermal care in delivery room
2. Assessment at birth
3. Routine care
4. Delayed cord clamping
5. Initial steps
6. Ongoing assessment of baby: heart rate, breathing and oxygenation
7. Use of oxygen in delivery room
8. Use of blender in delivery room
9. Use of pulse oximeter in delivery room
10. Positive pressure ventilation: use of self-inflating bag
11. Positive pressure ventilation: use of T-piece
12. Use of CPAP in delivery room
13. Chest compression
14. Intubation
15. Post-resuscitation care
16. Asepsis during resuscitation
17. Umbilical vessel catheterization
18. Volume expander administration

### The video demonstration will be followed by the discussion:

1. The following aspects of thermal care in delivery room were shown:
  - i. ....
  - ii. ....
  - iii. ....
2. The following aspects of assessment at birth were shown:
  - i. ....
  - ii. ....
  - iii. ....
3. The following aspects of routine care were shown:
  - i. ....
  - ii. ....
  - iii. ....
4. The following aspects of delayed cord clamping were shown:
  - i. ....
  - ii. ....
  - iii. ....
5. The following aspects of initial steps were shown:
  - i. ....
  - ii. ....
  - iii. ....
6. The following aspects of assessing the condition of the baby: heart rate, breathing and oxygenation were shown:
  - i. ....
  - ii. ....
  - iii. ....

7. The following aspects of the use of oxygen in delivery room were shown:
  - i. ....
  - ii. ....
  - iii. ....
  
8. The following aspects of the use of blender in delivery room were shown:
  - i. ....
  - ii. ....
  - iii. ....
  
9. The following aspects of the use of pulse oximeter in delivery room were shown:
  - i. ....
  - ii. ....
  - iii. ....
  
10. The following aspects of the positive pressure ventilation: use of self-inflating bag were shown:
  - i. ....
  - ii. ....
  - iii. ....
  
11. The following aspects of the positive pressure ventilation: use of T-piece were shown:
  - i. ....
  - ii. ....
  - iii. ....
  
12. The following aspects of CPAP in delivery room were shown:
  - i. ....
  - ii. ....
  - iii. ....
  
13. The following aspects of the chest compression were shown:
  - i. ....
  - ii. ....
  - iii. ....
  
14. The following aspects of the intubation were shown:
  - i. ....
  - ii. ....
  - iii. ....
  
15. The following aspects of the post-resuscitation care were shown:
  - i. ....
  - ii. ....
  - iii. ....
  
16. The following aspects of the asepsis during resuscitation were shown:
  - i. ....
  - ii. ....
  - iii. ....
  
17. The following aspects of the umbilical vessel catheterization were shown:
  - i. ....
  - ii. ....
  - iii. ....

18. The following aspects of the volume expander administration were shown:

- i. ....
- ii. ....
- iii. ....

**Comments on video:**

Good aspect

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Need improvement

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**2.2: Poster**

**There will be a poster demonstration by your facilitator on:**

- Equipment checklist
- Equipment's (pulse oximeter, T piece and blender)
- Weight and gestation based endotracheal size calculation
- Suction catheter size tables
- Delivery room management of a preterm

## EQUIPMENT CHECKLIST

The facilitator shall conduct a demonstration session on equipment checklist.

<b>TEAM</b>	<ul style="list-style-type: none"> <li>✓ Team leader</li> <li>✓ Team members responsibilities</li> <li>✓ Identify risk factors</li> <li>✓ Anticipate complications</li> <li>✓ Counsel parents</li> <li>✓ Timer</li> </ul>
<b>ASEPSIS</b>	<ul style="list-style-type: none"> <li>✓ Wash, dry hands</li> <li>✓ Gloves, mask, gown</li> <li>✓ No touch technique</li> </ul>
<b>WARMTH</b>	<ul style="list-style-type: none"> <li>✓ Warmer turned on</li> <li>✓ A/C or fan switched off</li> <li>✓ No draft of air</li> <li>✓ Room temperature 26°C</li> <li>✓ Two set of clean cloth under warmer</li> <li>✓ Cap, plastic wrap</li> </ul>
<b>AIRWAY</b>	<ul style="list-style-type: none"> <li>✓ Disposable suction catheters</li> <li>✓ Check Suction machine</li> <li>✓ Neonatal stethoscope</li> </ul>
<b>BREATHING</b>	<ul style="list-style-type: none"> <li>✓ Check resuscitation bag - function</li> <li>✓ Set T piece resuscitator</li> <li>✓ Preterm face mask</li> <li>✓ 8G feeding tube, 10-20 cc syringe</li> <li>✓ ET tube size</li> <li>✓ Laryngoscope, blade, batteries</li> <li>✓ Adhesive, scissors</li> </ul>
<b>CIRCULATION</b>	<ul style="list-style-type: none"> <li>✓ Umbilical venous catheter, supplies</li> <li>✓ 1cc, 2cc syringe</li> <li>✓ Cord clamp, scissors, cord tie</li> </ul>
<b>DRUGS</b>	<ul style="list-style-type: none"> <li>✓ Adrenaline (1:10,000)</li> <li>✓ Normal saline (0.9%)</li> <li>✓ 10-20 cc syringe</li> </ul>
<b>OXYGEN</b>	<ul style="list-style-type: none"> <li>✓ Neonatal probe</li> <li>✓ Pulse oximeter</li> <li>✓ Blender</li> <li>✓ Oxygen saturation target chart</li> </ul>
<b>DOCUMENT</b>	<ul style="list-style-type: none"> <li>✓ Birth chart</li> </ul>



## EQUIPMENT- PULSE OXIMETER

The facilitator shall conduct a demonstration session on equipment pulse oximeter.

When to use?
<ul style="list-style-type: none"> <li>• Whenever the need for resuscitation is anticipated</li> <li>• When PPV is administered for more than a few breaths</li> <li>• When persistent cyanosis is suspected</li> <li>• Whenever supplemental oxygen is used</li> <li>• To monitor sick newborn</li> </ul>
How to use?
<ul style="list-style-type: none"> <li>• Plug the mains on. Turn on the pulse oximeter</li> <li>• Ensure the sensor is not connected to the oximeter cable</li> <li>• Attach the sensor to the infant's right hand or wrist</li> <li>• Connect the sensor to the end of the oximeter cable</li> <li>• This displays preductal oxygen saturation</li> </ul>
How to interpret SpO <sub>2</sub> ?
<ul style="list-style-type: none"> <li>• The wave or bar display should be uniform</li> <li>• Note the sensorium, activity and FiO<sub>2</sub></li> <li>• In the first 10 minutes after birth use minute specific oxygen concentration chart</li> <li>• Always use right hand/wrist readings in delivery room</li> <li>• Any reading below 88% and above 95% should be notified</li> </ul>
How to clean pulse oximeter?
<ul style="list-style-type: none"> <li>• Clean the outer surface by clean dry cloth</li> <li>• Cleanse the surface using soap and water or 70% Isopropyl alcohol</li> <li>• The probe may be disposable or cleaned with alcohol wipes</li> </ul>
How to make most of pulse oximeter?
<ul style="list-style-type: none"> <li>• Keep away from bright light</li> <li>• Ensure probe site is changed every 4-6 hourly</li> <li>• Use appropriate size probe</li> <li>• Place alarm limits 88-95%</li> <li>• Ensure the baby is quiet, warm and has good perfusion</li> <li>• Do not mute the alarm</li> </ul>
How to respond to alarm?
<ul style="list-style-type: none"> <li>• RESPOND TO PATIENT FIRST</li> <li>• Check the vitals of the patient - temperature , perfusion</li> <li>• Check the probe is well placed</li> <li>• Check the sensor is connected to the cable</li> <li>• Check if there is excessive movement of the limb or bright light exposure</li> <li>• Check for low battery power</li> <li>• Check if the sensor is emitting light or has damage</li> </ul>

## EQUIPMENT- T PIECERESUSCITATOR

**The facilitator shall conduct a demonstration session on equipment T piece**

**A T-piece device, is a manually operated, gas driven device to,**

1. Provide 100% oxygen
2. Ventilate newborn infants with precise PIP, PEEP and FiO<sub>2</sub> for short duration
3. Support spontaneously breathing infant with PEEP (CPAP)

### How to set up a T piece?

- Connect blended air/oxygen supply to the gas inlet port
- Connect T piece circuit to gas outlet port
- Connect test lung to T piece
- Occlude PEEP cap and adjust max pressure control knob to 30 cm H<sub>2</sub>O
- Adjust gas supply to 10L/min

### How to make settings on T piece?

- Occlude PEEP cap and turn PIP control knob to desired settings
- Adjust PEEP cap to desired setting
- Adjust FiO<sub>2</sub> to desired setting
- Deliver breath by occluding and releasing the thumb over the PEEP cap at a rate of 40-60/min
- Turn off gas supply and remove test lung
- The machine is ready to be used for patient care

### How to use during resuscitation?

- Ensure gas supply, PIP, PEEP, FiO<sub>2</sub> has been set prior to delivery
- Apply T piece mask to patients mouth and nose to snugly fit
- Resuscitate by occluding and removing the thumb over the PEEP cap to deliver breath at preset PIP, PEEP and FiO<sub>2</sub>
- PIP is adequate if you get a chest rise
- PEEP is adequate if there are no chest retractions
- FiO<sub>2</sub> is adequate if the oxygen saturation is within limits

### How to use for CPAP?

- Ensure gas supply (10 L/min), PEEP (5 cm H<sub>2</sub>O), FiO<sub>2</sub> (0.5) has been set prior to delivery
- Turn the PIP knob to zero
- Do not occlude the opening over the PEEP cap
- Ensure patient has spontaneous breathing
- Apply T piece mask to patients mouth and nose to fit gently

### How to clean T piece resuscitator?

- Dry all surface by clean cloth
- Clean exterior by soap and water or isopropyl alcohol

An alternative self inflating bag or flow inflating bag should be immediately available

## EQUIPMENT- BLENDER

### The facilitator shall conduct a demonstration session on equipment blender

The oxygen blender is a mixing device that permits you to mix oxygen with compressed air to deliver precise concentration of oxygen.

#### How to use

- Ensure the blender is in upright, secured position
- Connect the air and oxygen supply lines to the appropriate inlet fittings on the bottom of the blender
- Connect flow meter to blender outlet
- Adjust the oxygen concentration dial to the prescribed concentration
- Turn "OFF" gas supplies when air-oxygen blender is not in use

#### How to clean

- Disconnect all gas connections and equipment before cleaning
- Clean exterior surfaces with a cloth dampened with mild detergent and water
- Wipe dry with a clean cloth
- DO NOT steam autoclave, immerse into any liquid, use any strong solvent or abrasive cleaners
- Gas sterilize with EtO

#### Alarm test

- Connect the air-oxygen blender to air and oxygen sources,
- Turn "ON" the flow meter
- Set oxygen concentration dial to 60% FiO<sub>2</sub>
- Disconnect or turn "OFF" the air supply to the air-oxygen blender
- The blender should alarm with a loud noise. This indicates the alarm is operating correctly
- Reconnect and activate the air supply line to the blender, the alarm should stop whistling
- Disconnect or turn "OFF" the oxygen supply line to the blender. The noise indicates the alarm is operating correctly
- Reconnect and activate the oxygen supply line to the blender,
- The alarm should stop

#### Trouble shooting

Problem	Remedial Actions
No flow at blender outlets	<ul style="list-style-type: none"> <li>• Turn gas sources "ON"</li> <li>• Connect gas sources</li> </ul>
Alarm	<ul style="list-style-type: none"> <li>• Correct pressure difference until air and oxygen pressures are within specification</li> </ul>
Oxygen concentration-discrepancy between blender setting and analyzer/monitor (greater than 3%)	<ul style="list-style-type: none"> <li>• Recalibrate analyzer/monitor</li> <li>• Verify with second analyzer/monitor</li> <li>• Remove obstruction</li> <li>• Check gas sources with calibrated oxygen analyzer/</li> <li>• Monitor to confirm oxygen is 100% and air is 21%</li> <li>• Isolate blender</li> <li>• Check oxygen concentration at blender outlets</li> </ul>

#### Maintenance to be done by trained technician

- The alarm should be tested on installation and periodically there after
- Every year conduct the operational verification procedure (OVP)
- Every 2 years the air-oxygen blender should be serviced

## WEIGHT, GESTATION, ENDOTRACHEAL TUBE SIZE AND DEPTH OF INSERTION TABLES

The facilitator shall conduct a demonstration session on weight and gestation based endotracheal tube size and depth of insertion table and the relevant drug/ normal saline doses.

**Weight and gestation based endotracheal tube size and depth of insertion table**

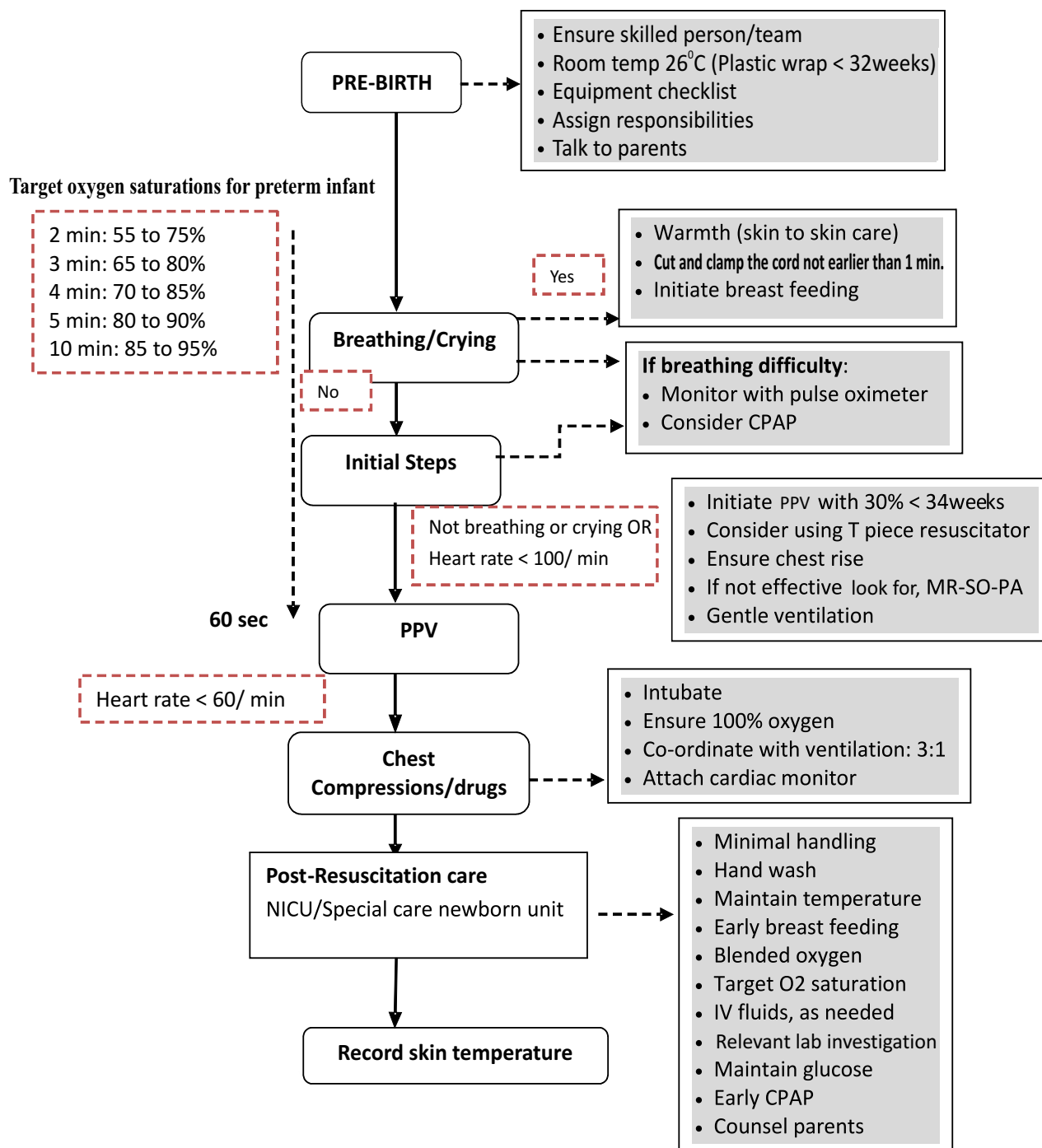
Weight (kg)	Gestation	ET tube size (mm)	Depth of insertion (oral) (cm)
< 1	Below 28 weeks	2.5	7
1-2	28 to 34 weeks	3.0	8
2-3	Greater than 34 weeks	3.5	9

**Drug and normal saline dosage table**

Drug	Dose/Route	Weight	IV Volume (mL)	Note
<b>Adrenaline</b>	0.1 cc/kg, IV, (1:10:000)	1	0.1-0.3	Give fast via umbilical line Repeat after 3-5 min if HR < 60 with ongoing chest compression
		2	0.2-0.6	
		3	0.3-0.9	
<b>Normal saline</b>	10 cc/kg, IV	1	10	Give over 5-10 min Reassess after bolus Indicated in shock
		2	20	
		3	30	

## DELIVERY ROOM MANAGEMENT OF A PRETERM BABY

The facilitator shall conduct a demonstration session on delivery room management of a preterm



Ensure baby temperature of 36.5-37.5° C



### 2.3:Self-check MCQ's

1. Reservoir bag mask with oxygen flow of 10 L/m delivers an inspired oxygen concentration of
  - a. 95-100 %
  - b. 85-90 %
  - c. 80-85 %
  - d. 75 %
2. During newborn resuscitation, what is the most appropriate ratio? of giving ventilation and chest compressions
  - a. Breaths should be given for every 20 chest compressions
  - b. Effective breaths should be given for every 30 chest compressions
  - c. 1 effective breaths should be given for every 15-20 chest compressions
  - d. 1 breaths should be given for every 3 chest compressions
3. You would start chest compression in a newborn
  - a. If heart rate is < 60 bpm despite effective ventilation
  - b. If heart rate is 60 to 80 bpm and not rising despite adequate ventilation
  - c. If heart rate is < 80 bpm
  - d. If heart rate is < 60 bpm with poor perfusion
4. The most effective way to assess initial response to ventilation during resuscitation is
  - a. Chest expansion
  - b. Air entry
  - c. Change in color
  - d. Rise in heart rate.
5. The preferred site for chest compression in newborn is
  - a. At the inter nipple line over the mid sternum
  - b. Lower half of the sternum just above the xiphoid
  - c. 1cm below the inter- mammary line
  - d. Lower half of the sternum
6. For effective chest compressions in a newborn you would compress the sternum to
  - a. 1/3 the anteroposterior diameter of chest
  - b. 3/4 the anteroposterior diameter of chest
  - c. 1/2 inches the anteroposterior diameter of chest
  - d. 1/3-1/2 the anteroposterior diameter of chest
7. The heart rate assessment during newborn resuscitation is the most important vital sign. Which of the following statement is 'true'?
  - a. The reliable way to assess heart rate is at the base of the umbilical cord
  - b. Pre-cordial auscultation is preferred to umbilical cord palpation for heart rate
  - c. Heart rate < 60 is an indication to start positive pressure ventilation
  - d. HR is best judged by pulse-oximeter in first few minutes of life

8. Regarding use of pulse oximeter in delivery room, which of the following statements is **false**
  - a. Indicated when there is need for PPV for more than few breaths
  - b. Used to decide about need for supplementary oxygen
  - c. The probe should be attached to left upper or lower limbs for better signal pickup
  - d. Special oximeters should be preferred over conventional pulse oximeters
  
9. Sequential assessment during newborn resuscitation is done by
  - a. HR, RR, color
  - b. HR, RR, tone
  - c. HR & RR
  - d. HR, RR and oxygenation by pulse oximetry
  
10. Free flow oxygen can be given by all of the following except
  - a. Flow inflating bag
  - b. T piece resuscitator
  - c. Oxygen tubing held close
  - d. Self inflating bag
  
11. Suctioning during resuscitation is indicated if
  - a. Obvious obstruction to spontaneous breathing
  - b. Prior to intubation
  - c. Non vigorous baby born of MSAF
  - d. Routinely for all babies
  
12. The dose of epinephrine during newborn resuscitation is
  - a. 0.1-0.3 cc/kg, 1:10,000, IV
  - b. 0.3-0.5 cc/kg, 1:10,000, IV
  - c. 0.5-1 cc/kg, 1:10,000, IV
  - d. 0.5-1 cc/kg, 1:1000, IV
  
13. Which of the following best describes the initial steps of neonatal resuscitation?
  - a. Provide warmth; position the head and clear airway; evaluate heart rate
  - b. Provide warmth; position, suction, dry, stimulate & re-position
  - c. Position the head and clear airway; evaluate color and respirations; give oxygen as necessary
  - d. Provide warmth; position the head and clear airway (if necessary); dry and stimulate
  
14. A 36 week baby needed PPV for approximately 1 minute. Which care should be provided next?
  - a. Routine care
  - b. Observational care
  - c. Post resuscitation care
  - d. Kangaroo mother care
  
15. All the following statements about use of CPAP in delivery room are true '**except**'
  - a. Term infants with respiratory distress in delivery room should be given a trial of CPAP
  - b. The most appropriate choice of CPAP may be guided by local expertise and preferences
  - c. Preterm infants on CPAP are at increased risk of pneumothorax
  - d. Spontaneously breathing preterm infants who have respiratory distress may be supported with CPAP rather than intubation and mechanical ventilation

16. If positive-pressure ventilation with a mask is to be continued for more than several minutes, you should consider
  - a. Assessing heart rate periodically every 30 sec
  - b. Putting an orogastric tube
  - c. Consider Intubation
  - d. All of the above
17. A fluid challenge for prolonged resuscitation with suspected hypovolemia should be
  - a. 10 mL/ kg of D5 %
  - b. 10 mL/ kg of 5 % albumin
  - c. 10 mL/ kg of RL
  - d. 10 mL/ kg of normal saline
18. The most appropriate mode of administration of drugs during resuscitation is
  - a. IV access through the umbilical vein
  - b. Endotracheal instillation
  - c. Peripheral vein
  - d. Intra muscular
19. If the heart rate does not rise following PPV it may be due to
  - a. Inadequate seal
  - b. Blocked airway
  - c. Not enough pressure being delivered
  - d. All of the above
20. Heart rate during chest compression is best evaluated by
  - a. By auscultation
  - b. Feeling the radial pulse
  - c. Feeling the umbilical cord pulsations
  - d. Cardiac monitor



### Learning Objective 3

#### **Applying knowledge and skill gained in actual practice using appropriate behavioral skills in complex clinical scenario of delivery room.**

This objective covers applying knowledge and skill gained in actual practice using appropriate behavioral skills in complex clinical scenario of delivery room and will be delivered as:

- Video
- Self-check MCQ's

After viewing and listening to the videos, you shall undergo a self-evaluation based on what you have already learnt.



### 3.1:Video

**There will be a video demonstration by your facilitator on organizing and conducting complete resuscitation of individual baby.**

**The video demonstration will be followed by discussion**

1. The following aspects of organizing and conducting complete resuscitation of individual baby were shown:

- i. ....
- ii. ....
- iii. ....

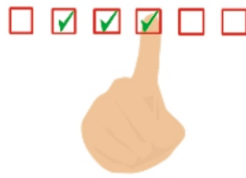
**Comments on video:**

Good aspect

.....  
.....  
.....

Need improvement

.....  
.....  
.....



### 3.2:Self-check MCQ's

1. A 34 weeker baby has spontaneous respiration and cry at birth, you notice the baby to be dusky, the most appropriate action would be
  - a. Start free flow oxygen
  - b. Duskiness is normal at birth hence should be ignored
  - c. Provide routine care
  - d. Assess by neonatal probe with pulse oximeter
  
2. You have a 34 weeker newborn apneic after positioning, drying and tactile stimulation, the HR is 90/min, the next step should be
  - a. Initiate PPV with room air
  - b. Initiate PPV with reservoir
  - c. Initiate PPV with oxygen at 5 L/min & reservoir
  - d. Intubate and provide bag to tube ventilation
  
3. After 30 seconds of effective PPV you find the HR of 50 per min, you decide to initiate chest compressions. Which of the following statement is **'true'**?
  - a. Two finger technique is preferred over two thumb technique
  - b. You should provide un-interrupted co-ordinated chest compressions and ventilation for 45-60 seconds
  - c. Ensure 100 % oxygen during chest compressions
  - d. Provide chest compressions at a ratio of 15: 2
  
4. As you initiate bag and mask resuscitation you find the baby becoming blue. You take corrective actions for ventilation but the baby continues to worsen. Which of the following is the next appropriate action?
  - a. Insert a laryngeal mask airway
  - b. Intubate and ventilate with bag to tube
  - c. Give 10cc/kg of NS push
  - d. Provide an oral airway
  
5. You are resuscitating a newborn that remains persistently bradycardic and cyanotic. What is the most likely reason for the persistence of these findings?
  - a. Congenital heart disease
  - b. Sedation due to maternally administered narcotic prior to birth
  - c. Congenital neuromuscular disorder
  - d. Inadequate oxygenation and ventilation

## Learning Objective 4

### Understanding the triaging of sick newborn babies and transportation of a sick neonates

This objective covers the triaging sick newborn babies and transportation of a sick neonates and will be delivered as:

- Webinar
- Script
- Key messages
- Self-check MCQ's

After viewing and listening to the webinars, and reading the script along with the key messages you shall undergo a self-evaluation based on what you have already learnt.



### 4.1: Webinar

You will view and listen to the webinar on the 'triaging sick newborn babies' and the 'essential components of neonatal transport' along with your facilitator. You are free to interrupt your facilitator anytime for any clarifications or suggestions. The power point slides of the webinar are given here.

**Triage Assessment and Management**

DR. Col K. Venkatnarayan  
MD DNB MNAMS DM (Neonatology)  
Associate Professor & Head  
Department of Pediatrics  
Command Hospital, Pune

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**Triaging**

- Definition
  - The word “triage” means sorting
  - Process of rapidly screening sick neonates
- Place of triaging
  - The reception and resuscitation area/ casualty
- Staff
  - Trained staff and most experienced doctor

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**Categorizing the groups**

- Emergency cases
  - Require urgent intervention and emergency treatment
  - Need to be admitted in the SNCU
- Priority cases
  - Need immediate assessment and priority treatment
  - Need to be admitted in the SNCU
- Non-urgent cases
  - Need assessment

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### Examples of groups of triaging

Emergent cases	Priority signs
<ul style="list-style-type: none"> <li>• Hypothermia (temp &lt; 36° C)</li> <li>• Apnea or gasping respiration</li> <li>• Severe respiratory distress</li> <li>• Central cyanosis</li> <li>• Shock</li> <li>• Coma, convulsions or encephalopathy</li> </ul>	<ul style="list-style-type: none"> <li>• Tiny neonate (&lt; 1800gms)</li> <li>• Cold stress (temp 36° C to 36.4° C)</li> <li>• Mild to moderate respiratory distress</li> <li>• Irritable/restless/jittery</li> <li>• Refusal to feed</li> <li>• Abdominal distension</li> <li>• Severe jaundice / Severe pallor</li> <li>• Bleeding from any sites</li> <li>• Major congenital malformations</li> </ul>

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### Process of triaging: Assessment for emergency signs

- **Temperature**
  - Assess if baby has hypothermia
- **Airway and breathing**
  - Apnea/ gasping respiration
  - Respiratory distress (RR > 60/min, retractions, grunting)
  - Central cyanosis
- **Circulation**
  - CFT > 3 sec
  - Tachycardia and weak pulse
- **Sensorium**
  - Assess response to stimulus
  - Look for convulsions

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### Emergency management: Triaging

- **Manage temperature**
  - Re warm the baby
  - Maintain temperature: 36.5° C - 37.5° C
  - Keep the baby dry and the head, hands and feet covered
- **Maintain airway**
  - Place shoulder roll: baby in “sniffing” position
  - Clear secretions if required

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### Emergency management: Triaging

- **Assist breathing**
  - Start with 1-2 L/min by nasal cannula or 5-6 L/min by hood if baby is distressed
  - Give PPV if baby is gasping or apneic
  - Connect to pulse oxymeter
- **Support circulation**
  - Give bolus of NS 10 mL/Kg over 30 min
  - Repeat if response is poor
  - Blood transfusion if bleeding is the cause
  - Start inotropes if poor response

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**Triaging: other key issues**

Baby may have more than one underlying condition to treat, so look for all conditions and treat them

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**What did you learn from this webinar?**

1. ....
2. ....
3. ....

**What are the queries which come to your mind?**

1. ....
2. ....
3. ....



## 4.2:Script

### Triaging sick newborn babies and the essential components of neonatal transport

**This script shall help you to understand the triaging sick newborn babies and the essential components of neonatal transport**

- The word “triage” means sorting. Triage is the process of rapidly screening sick neonates when they arrive at the hospital and categorizing them in one of the groups depending on the urgency of the care needed
- The site at the facility where a neonate is first brought to the hospital such as an emergency area or the reception and resuscitation corner in the casualty should be the triaging area
- All the staff involved should be trained in the triaging process. The most experienced doctor present who is trained in neonatal care should undertake the responsibility of emergency treatment and management of the neonate

**By triaging, we classify the babies into the following three categories**

- **Those needing emergency care:** These babies require urgent intervention and emergency treatment and need to be admitted in the SNCU
- **Those needing priority care:** These babies need immediate assessment and priority treatment and need to be admitted in the SNCU
- **Non urgent:** Those neonates whose underlying medical conditions do not merit immediate management

**Some of the examples of babies needing emergency care include:**

- Babies with moderate to severe hypothermia (temp < 36°C), apnea or gasping respiration, severe respiratory distress, central cyanosis, shock, coma, convulsions or encephalopathy
- Babies with priority signs include tiny babies (< 1800gms), babies in cold stress (temp 36.4°C - 36°C), babies with Respiratory distress, those who are Irritable/restless/jittery, babies presenting with refusal to feed, abdominal distension, those with severe jaundice or severe pallor or bleeding from any sites, and babies with major congenital malformations
- All cases **not** categorized as emergency or priority such as those with superficial infections, minor trauma, neurodevelopment delayed would be examples of non urgent cases

**The process of triaging involves assessment of emergency signs**

- Assess temperature and look for hypothermia
- **Assess airway and breathing-** Is the child apneic or has gasping respiration. It could be due to apnoeic spells or aspiration or blockage of airway
- **Assess if the baby has severe respiratory distress** - such as respiratory rate more than 60/min, retractions or grunting. Is there central cyanosis? This is said to be present if the lips and tongue are blue or the mucosa in and around the mouth is blue
- **Assess circulation**  
Look for evidence of shock. Are the hands and feet cold? Look for capillary filling time by pressing the front of chest and blanching the area not the hands and feet. If the area takes more than 3 seconds to become pink again, it is suggestive of prolonged CFT. Check for the



pulse. If the child has tachycardia (HR > 180/min) and the pulse is weak and rapid, it is suggestive of shock

- **Assess for sensorium**

Assess for response to stimulus and evaluate if the baby is awake, responds to pain or is unresponsive. Evaluate if the baby has convulsions, which may be generalized or localized

**Having assessed the vital signs in the emergency treatment we need to firstly;**

- **Manage temperature**

If the baby's temperature is less than 34°C, then do rapid re-warming till temperature of 34°C is reached. Subsequently, maintain the baby's temperature between 36.5°C - 37.5°C. Keep the baby dry and the head, hands and feet covered

- **Maintain the airway**

Place the child in sniffing position, Place a shoulder roll under the shoulder to position the child. Clear the airway of secretions by suctioning if indicated

- **To assist breathing**

Support the child's respiration by using nasal cannula which can be placed just inside the nostrils and secured with a tape. The flow rate can maintained be around 1-2 L/min. The child could also be placed under an oxygen hood with an oxygen flow rate of 5-8 L/min. Positive pressure ventilation will be required if the baby is apenic or having gasping respiration. The oxygen should be monitored by a pulse oximeter for monitoring oxygen saturation.

- **To support circulation**

If the child is in shock; Give an IV bolus of normal saline at the rate of 10ml/kg over 20-30 mins. Repeat bolus IV fluid if features of shock persist. Give blood transfusion if bleeding is the cause of shock. Initiate dopamine or dobutamine as the condition demands if the neonate remains in shock despite fluid boluses

It's important to recognize that baby may have more than one underlying condition to treat, so we need to look for all underlying conditions and treat them.

### 4.3:Key messages

- Triage is the process of rapidly screening sick neonates
- All the health care practitioner involved should be trained in the triaging process
- Process of triaging involves assessment of emergency signs and initiating appropriate initial management



### 4.4: Webinar

**You will view and listen to webinar on key issues in transportation of a sick neonate along with your facilitator. You are free to interrupt your facilitator anytime for any clarifications or suggestions. The power point slides of the webinar are given here.**

**Transport of Sick Neonates**

**DR. Col K. Venkatnarayan**  
MD DNB MNAMS DM (Neonatology)  
Associate Professor & Head  
Department of Pediatrics  
Command Hospital, Pune

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**Transport of sick neonate**

- Best transport of preterm baby is in-utero transfer before delivery
- For ideal transport, ensure optimal
  - Resources: personnel, equipment, vehicle
  - Pre transport stabilization of baby
  - Communication
  - Documentation

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**Resources**

- Human resources
  - Doctors, nurses, ANM, ASHA worker
- Ambulance and equipments
  - Oxygen, ventilator, power back up and infusion pumps and essential drugs should be available

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### Pre transport stabilization

STABLE	TOPS
<ul style="list-style-type: none"> <li>• S-ugar</li> <li>• T-emperature</li> <li>• A-irway and breathing,</li> <li>• B-lood pressure</li> <li>• L-aboratory work</li> <li>• E-motional support</li> </ul>	<ul style="list-style-type: none"> <li>• T-emperature</li> <li>• O-xygenation (Airway &amp; Breathing)</li> <li>• P-erfusion</li> <li>• S-ugar</li> </ul>

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### Communication and documentation

- Effective communication
  - Between referring and referred units, parents, doctors, feedbacks
  
- Documentation
  - History, treatment given, diagnosis, reasons for transfer, consents

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### Care during transport

- Ensure Temperature, Airway, Breathing and Circulation
  
- It is best to not attempt feeding sick babies with abnormal sensorium or severe respiratory distress before or during transfer
  
- Take baby to nearest facility by fastest mode of transport by the shortest route

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**What did you learn from this webinar?**

1. ....
2. ....
3. ....

**What are the queries which come to your mind?**

1. ....
2. ....
3. ....



## 4.5:Script

### Key issues in transportation of a sick neonate

**This script shall help you to understand the key issues in transportation of a sick neonate**

The best mode of transport of a preterm neonate is in-utero transport before delivery to a higher centre. To have a smooth transfer of sick babies we need to have optimal resources in terms of human resources, equipments and vehicle. We also need to ensure optimal Pre- transport stabilization of baby, communication and documentation

The human resources for the transportation could include, the doctors or nurses or ANMs or ASHA workers if transport is being done from a remote area. An ambulance with minimal life saving equipments with such as oxygen, ventilator, power back up and infusion pumps and essential drugs should be available.

There are various models available for pre-transport stabilization and care during transport. The emphasis on pre-transport stabilization includes optimizing temperature, airway, breathing, circulation, blood sugar and ensuring emotional support to parents. Some of the popular acronyms are as shown in the slide and include **STABLE** and **TOPS**:

**STABLE stands for-** Sugar, Temperature, Artificial breathing, Blood pressure, Laboratory work, and Emotional support

**TOPS: stands for-** Temperature, Oxygenation (Airway & Breathing), Perfusion, and Sugar

It is important to have regular and effective communication between the referring unit and the referred hospital about the underlying condition, diagnosis, treatment given and reason for transfer of baby. The parents should be informed about the reasons for transfer. Effective communication is the key to reduce the medico-legal complications that arise during transportation. It is also important for the referred unit to give feedback on the condition of the baby transferred to parent unit. Finally, all these need to be documented and should include appropriate consent forms, lab reports and data sheets.

### 4.6:Key Messages

- During transport we need to ensure that the Temperature, Airway, Breathing and Circulation of the baby is maintained
- It is best not to attempt feeding sick babies with abnormal sensorium or severe respiratory distress before or during transfer.
- It is best to maintain sick babies with abnormal sensorium or severe respiratory distress on IV fluids before or during transfer.
- It is important to take the baby to the nearest health facility by the fastest mode of transport by the



### 4.7:Self-check MCQ's

1. Babies with moderate to severe hypothermia, severe respiratory distress, convulsions or encephalopathy are categorized under which category?
  - a. Emergency care
  - b. Priority care
  - c. Urgent care
  - d. None of the above
  
2. After assessing the emergency signs, the team needs to focus on
  - a. Managing temperature
  - b. Maintaining airway
  - c. Assisting breathing, circulation
  - d. All of the above
  
3. Before transportation of a sick neonate while triaging, we need to ensure the
  - a. Pre-transport stabilization of a baby
  - b. Communication
  - c. Documentation
  - d. All of the above
  
4. State '**True**' and '**False**': It is important to take the baby to the nearest health facility by the fastest mode of transport by the shortest route, if the baby is categorized under priority care.
  
5. Preferable mode of transport in high risk pregnancies
  - a. Giraffe incubator
  - b. Radiant warmer
  - c. In utero
  - d. Food grade plastic wrap
  
6. All the following conditions require transfer of high risk neonate except
  - a. Seizures
  - b. Congenital anomalies
  - c. Gestation age >35 weeks
  - d. Respiratory failure



### Skill Check

After you have read through the scripts, seen the videos and the webinars, you shall be asked to undergo a skill check on task trainers. The facilitator shall assess you and provide feedback. This shall include assessment of skills of:

S. No.	OSCE
1.	Team preparedness and equipment checklist
2.	Thermoregulation in preterm infants
3.	Pulse oximeter: Apply probe, note readings, set alarm limits
4.	T piece: application, setting up and delivery
5.	Blender: Setting up, setting FiO <sub>2</sub>
6.	Asepsis
7.	Routine care
8.	Initial steps
9.	Bag and mask ventilation
10.	Demonstrate management of MSAF baby
11.	Chest compressions

#### Common requirements for OSCE (to be arranged at each point)

1. 3 helpers
2. Newborn mannequin
3. Equipment checklist
4. Resuscitation apparatus (warmer, 3 cloths, suction machine, suction catheters, oxygen, feeding tubes, drugs, syringes, ET tube, laryngoscope, stethoscope)
5. Warmer
6. Room thermometer
7. Pulse oximeter with neonatal probe
8. O<sub>2</sub> chart
9. T piece resuscitator
10. Inspiratory expiratory tubing
11. Air oxygen source, blender
12. Flow meter, test lung
13. Air- oxygen flow
14. Blender, air-oxygen mixing chart
15. Gloves, mask, gown, resuscitation apparatus
16. 3 clean towels, disposable syringes-ETT-catheters
17. Sterile umbilical catheter
18. Cord tie/clamp
19. Cord cutting scissor

### 1: Equipment checklist and team preparation

You are in the delivery room with a junior doctor, staff and helper. A primi with no risk factors is about to deliver a 32 weeks newborn. How do you get ready for resuscitation?

S.No.	STEPS	YES	NO
1.	Identifies self		
2.	Assigns roles to care for airway, chest compression, medications and documenting/counseling		
3.	Ensures effective communication		
4.	Leader ensures each can do the task/skill		
5.	Leader asks members to give input/feedback from time to time		
6.	Is courteous and shows respect		
7.	Uses the equipment checklist and checks availability		
8.	Uses the equipment checklist: checks function		
9.	Leader summarizes the scenario		
	<b>Total score:</b>		

Score :(Maximum score 9): \_\_\_\_\_

### 2: Thermal care

You are in the delivery room with a primigravida, no risk factors who is about to deliver a 30 weeks newborn. All equipment's have been checked and are functional. You have taken all aseptic precautions. How do you provide thermal care at delivery?

S.No.	STEPS	YES	NO
1.	Ensures newborn corner is draft free		
2.	Requests A/C or fans off		
3.	Ensures room temperature is 26-28°C		
4.	Turns the warmer on in air mode at 100% heater output		
5.	Keeps two clean cloth under warmer		
6.	Receives baby in a clean cloth and places skin to skin on mothers abdomen		
7.	Dries the baby and covers with clean cloth on mothers Abdomen		
8.	Removes wet linen		
9.	After cutting cord at 30-60 sec, puts baby onto mother's chest for breast feed		
10.	Assess baby color, activity, breathing		
11.	Asks staff to record axillary temperature before shifting the baby out of delivery room		
	<b>Total Score:</b>		

Score :(Maximum score 11): \_\_\_\_\_

### 3: Using pulse oximeter

You are in the delivery room. How do you use pulse oximeter during resuscitation?

S.No.	STEPS	YES	NO
1.	Identifies indications for using pulse oximeter		
2.	Goes to setting menu of pulse oximeter and chooses the alarm settings		
3.	Dial the upper limit to 95 and lower limit to 88		
4.	Ensures the alarm volume is on and not muted		
5.	Puts the probe onto the right palm/wrist of the newborn		
6.	Attaches neonatal probe to the oximeter		
7.	Plugs the pulse oximeter to the power. Turns it on		
8.	Notes the reading		
9.	Interprets reading looking at minute specific oxygen saturation chart		
10.	Knows causes of erroneous values with pulse oximeter		
	<b>Total score:</b>		

Score :(Maximum score 10): \_\_\_\_\_

### 4: Using T piece resuscitator

You are in the delivery room. How do you set the T piece resuscitator for use during resuscitation?

S.No.	STEPS	YES	NO
1.	Attaches air and oxygen flow to the blender		
2.	Attaches a tube from the blender to the gas inlet on the T piece		
3.	Attaches expiratory tubing from the gas outlet on T piece to a test lung		
4.	Sets the flow meter to 10L/min		
5.	Adjusts the PIP to desired value by dialing peak inspiratory pressure knob		
6.	Adjusts PEEP to desired value by dialing the PEEP valve		
7.	Dials the desired oxygen concentration		
8.	To deliver breath, occludes and releases pressure at the opening on T piece at a rate of 40-60 /min (breathe-two-three)		
9.	Attaches pulse oximeter probe to the right upper hand		
10.	Knows signs of efficacy for use of T piece		
11.	Turn off gas supply and removes test lung		
	<b>Total Score:</b>		

Score :(Maximum score 11): \_\_\_\_\_



## 5: Using blender

You are in the delivery room. How do you set the blender for use during resuscitation?

S.No.	STEPS	YES	NO
1.	Identifies air port and attaches air flow to the appropriate inlet fitting on the bottom of the blender		
2.	Identifies oxygen port and attaches oxygen flow to the appropriate inlet fitting on the bottom of the blender		
3.	Connects flowmeter to blender outlet		
4.	Performs the "Alarm test". Disconnects air tubing and oxygen tubing alternately. There should be loud alarm which disappears on reconnecting the tubing.		
5.	Dials the knob on blender to set desired FiO <sub>2</sub>		
6.	Turn "OFF" gas supplies when air-oxygen blender is not in use		
<b>Total Score:</b>			

Score :(Maximum score 6): \_\_\_\_\_

## 6: Asepsis

You are in the delivery room. How do you ensure asepsis at resuscitation?

S.No.	STEPS	YES	NO
1.	Performs hand washing and asks helpers also. Dries hand		
2.	Wears gloves, mask and gown		
3.	Is meticulous not to touch anything in the vicinity		
4.	Ensures resuscitation equipment is unpacked from the sterile pack		
5.	Ensures three clean towels for receiving, drying and wrapping of the baby		
6.	Ensures disposable supplies – syringes, suction catheter, ET tubes, umbilical catheter		
7.	Ensures oxygen bottle, suction machine and all resuscitation apparatus, is clean		
8.	Receives baby in a clean towel. Dries and replaces by another clean towel.		
9.	Ensures clean cord tie two finger breath away from umbilicus.		
10.	Ensures clean cord cut by sterile scissors		
11.	Applies sterile cord clamps to the cord.		
12.	Performs all tasks with no touch technique with due asepsis precautions		
13.	Promotes early skin to skin contact for vigorous baby		
14.	Ensures early breast feeding		
15.	Discourages early bath		
16.	Discourages removing of vernix		
17.	Discourages routine suction		
18.	Encourages rooming in		
19.	Instructs minimal handling of the baby by other staff/relatives		
20.	Informs mother to report if the baby appears dull or does not feed over six hours		
21.	Discards gloves and mask in appropriate manner		
22.	Washes hand before leaving the delivery room		
<b>Total Score:</b>			

Score :(Maximum score 22): \_\_\_\_\_

### 7: Demonstrate routine care

A term newborn is just born and is crying, there are no risk factors in the mother. How do you assess at birth?

S.No.	STEPS	YES	NO
1.	Assess if baby is breathing well (Yes)		
2.	Postpones cord clamping for atleast 1 min		
3.	Keeps baby on mother's abdomen. Covers the baby with a dry, clean cloth		
4.	Ensures clear airway, suctions if visible secretions		
5.	Dries the baby, cuts the cord		
6.	Ensures the baby is dry		
7.	Gives to mother for early skin to skin contact		
8.	Asks the mother to initiate breast feeding		
9.	Re-assesses well being - breathing, activity, feeding, temperature		
10.	Weighs the baby after the complete skin to skin contact		
<b>Total Score:</b>			

Score :(Maximum score 10): \_\_\_\_\_

### 8: Initial steps

A term newborn is just born and baby is not breathing. How do you assess the baby?

S.No.	STEPS	YES	NO
1.	Receives the baby in warm linen		
2.	Calls for help		
3.	Ensures clear airway, suctions if visible secretions		
4.	Dries the baby, cuts the cord		
5.	Ensures the baby is dry		
6.	Gently stimulates over back and soles		
7.	Assess heart rate/ respiration after 30 sec		
8.	Provides post resuscitation care		
<b>Total Score:</b>			

Score :(Maximum score 8): \_\_\_\_\_

### 9: Positive pressure ventilation

A newborn is apneic after initial steps of resuscitation. You may ask relevant details as you proceed to manage this case.

S.No.	STEPS	YES	NO
1.	Indicates need for PPV		
2.	Calls for help; requests for pulse oximeter		
3.	Positions mask correctly		
4.	Delivers adequate pressure to get chest rise		
5.	Ventilates at appropriate rate (Breathe-two-three to achieve 40-60/min)		
6.	Requests HR response within 5-10 test breaths		
<i>Facilitator to speak: HR...40/min, no breath sounds heard</i>			
7.	Says I will take corrective steps for ventilation		
8.	Reapplies mask		
9.	Repositions baby head		
10.	Assess for chest rise and breath sound, Requests response		
<i>Facilitator to speak: No chest rise and breath sounds</i>			
11.	Suctions mouth		
12.	Ventilates with mouth open		
13.	Assess for chest rise and breath sound, Requests response		
<i>Facilitator to speak: No chest rise and breath sounds</i>			
14.	Increases bag pressure; Requests response		
<i>Facilitator to speak: There is chest rise</i>			
15.	Administers effective PPV for 30 seconds		
16.	Asks for HR		
<i>Facilitator to speak: HR is 120/min and baby is breathing we</i>			
17.	Gradually discontinues PPV		
<b>Total Score:</b>			

Score :(Maximum score 17): \_\_\_\_\_

### 10. Demonstrate management of MSAF baby

A term, newborn is just born with meconium stained liquor. How do you manage in the delivery room?

S.No.	STEPS	YES	NO
1.	Asks for respiration and tone (baby is not breathing and limp)		
2.	Cuts the cord immediately and shift the newborn under warmer		
3.	Sniffing position, Perform brief and quick oro-pharyngeal suction (12 G)		
4.	Dries head, trunk, extremities with firm vigorous strokes. Removes wet linen		
5.	Asks for breathing, HR		
	<i>Not breathing</i>		
6.	Initiates PPV. Looks for chest rise after few breaths		
	<i>There is no chest rise</i>		
7.	Reapplies mask, repositions head. Gives PPV. Looks for chest rise		
	<i>There is no chest rise</i>		
8.	Incubates to place ET tube between the vocal cords		
9.	Asks attendant to monitor heart rate		
10.	Attaches ET tube to suction machine using meconium adaptor. Applies suction withdrawing ET tube		
11.	Assess respiration, HR to decide need for further course of action		
	<b>Total Score:</b>		

Score :(Maximum score 11): \_\_\_\_\_

### 11: Demonstrate chest compression

A newborn has ongoing PPV, there is a chest rise but HR after 30 seconds is 50 per min. How do you support this newborn?

S.No.	STEPS	YES	NO
1.	Indicates need for chest compression		
2.	Asks colleague to electively intubate the newborn		
3.	Ensures 100% oxygen delivery		
4.	Locates the site for chest compression at the lower third of the sternum		
5.	Encircles the chest with hands putting the thumbs adjacent to each other		
6.	Delivers compression with "one and two and three and..." pneumatic followed by a positive breath & ratio of 3:1 with ventilation		
7.	Delivers compression squeezing 1/3 the AP diameter of the chest		
8.	Provides un-interrupted co-ordinated chest compression and ventilation for 45-60 seconds		
9.	Ensures effective ventilation by chest rise		
10.	Asks for HR at the end of 60 seconds		
	<b>Total Score:</b>		

Score :(Maximum score 10): \_\_\_\_\_



## Simulation

An essential pre-requisite before reaching this stage in each module is that the learner should have undergone the entire module, seen the videos and webinars facilitated by the facilitator, attempted the evaluation questionnaire, and demonstrated the skill check.

This session brings out learning and practice in a realistic environment for delivery room management of a preterm infant. The emphasis is on working together as a team and not on individual skills.

**You shall be asked by the facilitator to participate as a team for the management of the following conditions:**

1. Asepsis
2. Preterm infant requiring thermoregulation
3. Preterm infant requiring initial steps, bag and mask ventilation, chest compressions, administering medications

**This shall be followed by feedback and debriefing.**