OPTIMAL OXYGEN ADMINISTRATION

This module is designed to improve knowledge, skills and clinical practice of all stakeholders involved in the care of preterm neonates for administration of oxygen optimally.

Learning objectives

The participants will learn

- To understand potential harms resulting from unnecessary and overuse of oxygen
- To be able to use oxygen delivery and monitoring equipment safely and effectively
- To use oxygen therapy rationally in various clinical situations in newborn infants
- To be able to audit and improve evidence-based oxygen therapy using quality improvement methods in the 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 summaries the important learning points in the webinar and the script
- **Video demonstration:** The videos in this module cover the use of pulse oximeter, oxygen concentrator, FiO_2 monitor, oxygen cylinder, methods of oxygen administration, monitoring a baby receiving oxygen therapy, use of oxygen during resuscitation, transport or other special situations and the titrating oxygen therapy when blender is not available.
- **Webinar:** The webinar in this module shall help the participant to gain knowledge regarding the importance of knowing about oxygen and the indications of use of oxygen therapy.
- **Poster demonstration:** The participant shall learn about the management of baby with respiratory distress, oxygen saturation targets and fractional inspired oxygen concentration (FiO_2) delivered with different flow rate combinations of oxygen and air
- **Self-assessment:** This will be done at the end of each objective, based on what participant has already learnt. Feel free to consult your text material, if you need assistance in recapitulating.
- **Skill check:** The skill check includes evaluation of the participant's skills on "pulse oximeter," "setting flow rate for oxygen without blender to achieve desired FiO_2" "delivering oxygen by hood" and "delivering oxygen using nasal prongs".
- **Simulation:** After reading through the text material, viewing videos, webinars and pictorial posters with messages, the participant shall be asked to perform realistic case scenarios on baby needing positive pressure ventilation during birth and baby with respiratory distress. While performing as a team; individual feedback and debriefing by team will be done.

Learning objective 1

Understanding the potential harms resulting from unnecessary and overuse of oxygen.

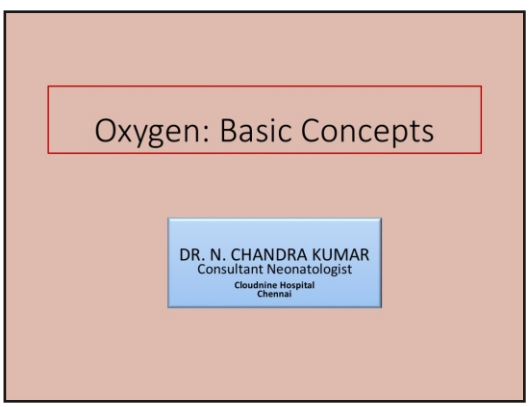
This objective covers the concept of potential harms resulting from unnecessary and overuse of oxygen and will be delivered as:

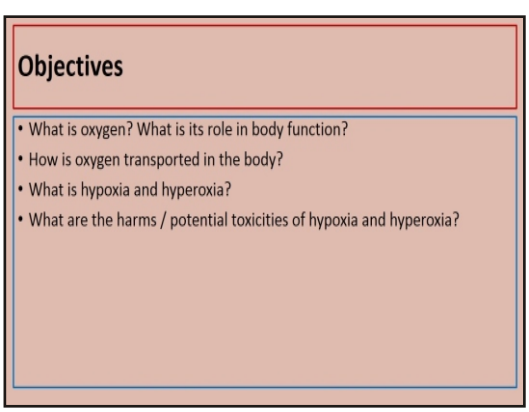
- Webinar
- Script
- Key messages
- Self-check MCQs

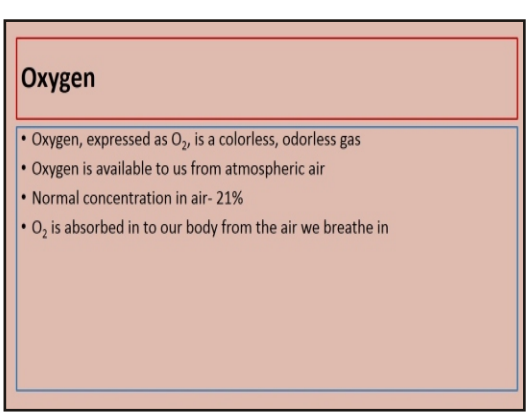
After viewing and listening to the webinar, and reading the script along with the key messages you shall undergo a self-evaluation based on what have you already learnt.

1.1: Webinar

You will view and listen to webinar on importance of knowing about oxygen 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.







Oxygen- its role in normal body function

- Essential for functioning of each and every cell of the body
- Energy synthesis (ATP)- cellular respiration
- This energy is required for normal functioning of the cell
  - Synthesis of structural proteins
  - Synthesis of functional proteins
  - Other metabolic reactions
- Lack of oxygen- depletion of energy- CELL DEATH

Oxygenation- How to measure?

- Oxygen delivered is expressed as FiO2
- Oxygen is transported
  - Bound to Hemoglobin
  - As dissolved oxygen
- Oxygenation can be expressed as
  - PaO_2 (partial pressure of oxygen)- Pressure exerted by dissolved oxygen
  - SpO_2 (% saturation of oxygen)-% of Hb totally bound to oxygen

Hypoxia & Hyperoxia

- Hypoxia and hyperoxia are terms used to describe low or high levels of oxygen
- Based on PaO_2:
  - Normal PaO_2: 50-70 mm Hg
  - Hypoxia: PO_2 <50 mmHg from arterial blood sample
  - Hyperoxia: PO_2 >70 mmHg
- Based on SpO_2:
  - Normal saturation targets: 90-95%
  - Hypoxia: <90%
  - Hyperoxia: >95%

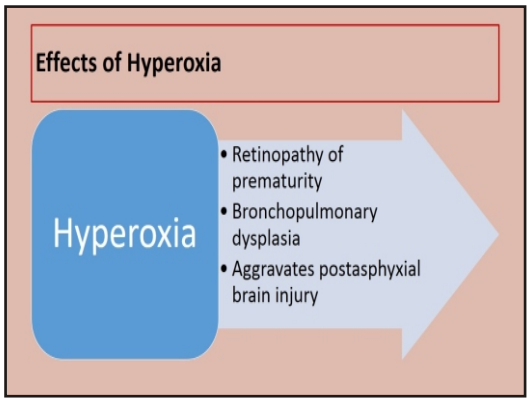
Effects of Hypoxia

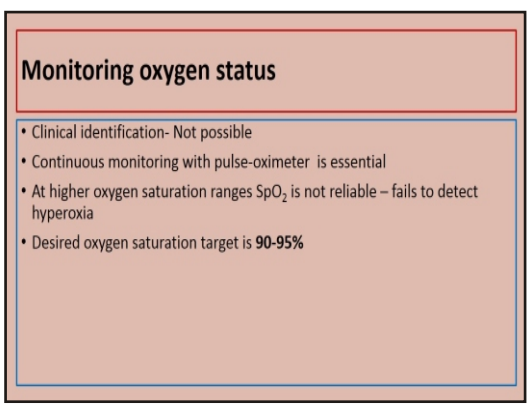
Acute hypoxia

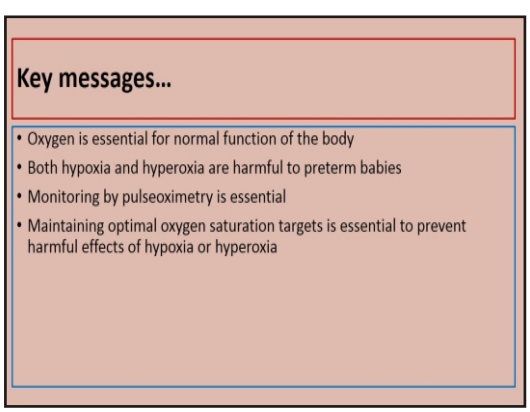
- Lethargy, poor activity, unconciousness
- Pallor
- Bradycardia, shock
- Decreased urine output

Recurrent hypoxia

- ↑ risk of death
- ↑ Necrotizing enterocolitis
- ↑ Periventricular Leukomalacia
- Pulmonary hypertension







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

Importance of knowing about oxygen

***This script shall help you to understand the* importance of knowing about oxygen.**

Oxygen is expressed as O_2. It is a colorless / odorless gas which is essential for normal body functions. Oxygen is available to us from the atmospheric air. Normal oxygen concentration in the air is 21%. Oxygen is absorbed in to our body from the air which we breathe in.

Role of oxygen in normal body function

- Oxygen is essential for normal functioning of each and every cell, the functional unit of our body.
  - Primarily it is required for energy synthesis (ATP)
  - This energy form (ATP) is used for synthesis of proteins / enzymes and to carry out normal cellular functions
  - Lack of oxygen results in inefficient energy synthesis and depletion of ATP eventually leading to cell death

Measuring oxygenation

- Oxygen delivered to baby is expressed as fraction of inspired oxygen concentration (FiO_2)
- Oxygen is transported bound to Hb and in dissolved form
- Oxygenation can be expressed as
  - Partial pressure of oxygen (PO_2) which is the pressure exerted by the oxygen dissolved in blood. Normal PaO2 in arterial blood is 50-70 mm Hg in neonates
  - Percentage saturation of oxygen (SpO_2)- which is percentage of oxygenated Hb . Normal SpO_2 is 90-95%.

Hypoxia and hyperoxia

- Hypoxia and hyperoxia are terms used to describe low or high levels of oxygen in blood.
- It can be defined based on arterial PO_2
  - Normal PaO_2: 50-70 mmHg
  - Hypoxia: PO_2 <50 mmHg from arterial blood sample
  - Hyperoxia: PO_2 >70 mmHg

- It can also be defined based on SpO_2
  - Normal saturation targets: 90-95%
  - Hypoxia: <90%
  - Hyperoxia: >95%

Effects of hypoxia

- Severe hypoxia developing over short time (acute hypoxia) affects almost all organ systems immediately particularly brain resulting in poor activity or lethargy progressing to loss of consciousness. Baby also develops shock, decreased urinary output, and bradycardia and can progress to cardiac arrest if not attended to hypoxia.
- Intermittent or prolonged hypoxia increases the risk of death and NEC in preterm infants. Hypoxia also causes periventricular leukomalacia in preterm infants resulting in neurodevelopmental impairment. It also results in pulmonary hypertension

Effects of hyperoxia

- Hyperoxia causes free radical injury resulting in increased risk of bronchopulmonary dysplasia, retinopathy of prematurity, brain damage in an infant with birth asphyxia

Monitoring oxygen status

- Clinical identification of hypoxia or hyperoxia is not possible. If not identified early will result in complications described earlier
- Continuous monitoring with pulse-oximeter is essential
- Oxygen saturation >95% may correspond to very high PaO_2 values and thus relying only on SpO_2 may fail to detect hypoxia
- Maintaining strict oxygen saturation targets is advisable to avoid both hypoxia and hyperoxia.
- Desired oxygen saturation target is 90-95%

1.3: Key messages

- Oxygen is essential for normal function of the body
- Both hypoxia and hyperoxia are harmful to preterm babies
- Monitoring by pulse oximetry is essential
- Maintaining optimal oxygen saturation targets is essential to prevent harmful effects of hypoxia or hyperoxia

1.4: Self-check MCQs

1. Normal concentration of oxygen in atmospheric air is
   a. 20%
   b. 21%
   c. 22%
   d. 23%

2. Oxygen is transported in to the tissues predominantly as
   a. Oxyhemoglobin
   b. Dissolved in blood
   c. Bound to bicarbonate
   d. Bound to myoglobin

3. Hypoxemia is
   a. Reduced level of oxygen in blood
   b. Increased level of oxygen in blood
   c. Reduced availability of oxygen to tissues
   d. Reduced level of oxygen in atmospheric air

4. Normal PaO2 in arterial blood in a neonate is
   a. 60-80 mmHg
   b. 50-70 mm Hg
   c. 40-60 mm Hg
   d. 80-100 mm Hg

5. Normal oxygen saturation recommended to be maintained in preterm infants is
   a. 95-97%
   b. 90-95%
   c. 88-93%
   d. 85-90%

Learning objective 2

To be able to use O_2 delivery equipments safely and effectively

This objective covers the safe and effective use of oxygen delivery and monitoring equipment safely and effectively in various clinical situations in preterm infants and is delivered as:

- Video
- Self-check MCQs

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

2.1: Video

There will be video demonstration by your facilitator on

1. How to use pulse oximeter?
2. How to use oxygen concentrator?
3. How to use FiO_2 monitor?
4. How to use oxygen cylinder?

The video demonstration will be followed by discussion on

1. The following aspects of how to use pulse oximeter were shown:
   i. ……..
   ii. ……..
   iii. ……

2. The following aspects of how to use oxygen concentrator were shown:
   i. ……..
   ii. ……..
   iii. ……..

3. The following aspects of how to use FiO_2 monitor were shown:
   i. ……..
   ii. ……..
   iii. ……

4. The following aspects of how to use oxygen cylinder were shown:
   i. ……..
   ii. ……..
   iii. ……

5. Comments on video:

Good aspect	Need improvement
……	……
……	……
……	……
……	……

2.2: Self-check MCQs

1. Pulse oximetry is based on which physical principle?
   a. Charles Boyles law
   b. Beer Lambert law
   c. Ohm's law
   d. Bernoulli's law

2. Differential absorption characteristics of hemoglobin suggest that
   a. Oxy Hb absorbs more infrared light
   b. Deoxy Hb absorbs more infrared light
   c. Oxy Hb absorbs more red light
   d. Deoxy Hb reflects more red light

3. What are the appropriate alarm limits for SpO_2 in neonates?
   a. 95 - 99%
   b. 88 - 95%
   c. 80 - 85%
   d. 98 - 100%

4. Probes are disinfected with
   a. 2% glutaraldehyde
   b. Povidone iodine
   c. 70% alcohol
   d. Distilled water

5. Non uniform waves could occur due to all except
   a. Motion
   b. Falling SpO_2
   c. Presence of BP cuff proximally
   d. Error in probe fixation

Learning objective 3

Use of oxygen therapy rationally in various clinical situations in newborn infants

This objective covers the use of oxygen therapy rationally in various clinical situations in newborn infants and is delivered as:

- Webinar
- Script
- Key messages
- Video

After viewing the videos, posters, role play and reading the script and the key messages you shall undergo a self- evaluation based on what have you already learnt.

3.1: Webinar

You will view and listen to webinar on indications of use of oxygen therapy 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.

Indications for Oxygen in neonates

DR. Sandeep Kadam
Neonatologist
KEM Hospital
Pune

Overview

- Oxygen is the most common and abundantly used drug in NICU
- Goal is to avoid both Hypoxia and Hyperoxia

Indication

- Assess clinical scenario before using Oxygen in NICU
- Works in Hypoxia due to pulmonary or pulmonary vascular disorders but not in cyanotic congenital heart disease
- Optimal use essential for good growth and neurodevelopmental outcomes

Indications for use of Oxygen in neonates

Hypoxia:

a. Reduced Alveolar oxygen

b. Intra-pulmonary shunt

c. Reduced oxygen- carrying capacity due abnormal hemoglobin

d. Impaired delivery due to shock or heart failure

Indications

- Documented Hypoxemia
- In neonates, supplemental O2 is indicated if the PaO2 is <60 mmHg and the SpO2 is <90%
- Pneumothorax Absorption

Indications…

- Apnea
- Shock
- Chronic lung disease

Carry home message

- Don't start all babies with oxygen
- Most important indication is Hypoxia
- Monitor oxygen once started

What did you learn from this webinar?

1. .....

2. .....

3. .....

What are the queries which come to your mind?

1. .....

2. .....

3. .....

3.2: Script

Indications of use of oxygen therapy

This script shall help you to understand the indications of use of oxygen therapy.

- Oxygen is one of the most commonly administered drugs in the neonatal intensive care unit. Oxygen therapy is the administration of oxygen at concentrations greater than that in ambient air with the intent of treating or preventing the symptoms and manifestations of hypoxia.
- The goal of oxygen therapy is to deliver adequate amount of oxygen to the tissues without causing oxygen toxicity. One needs to be aware of the judicious and correct indications for use of oxygen in neonatal intensive care so as to avoid both hypoxia and hyperoxia.
- The clinical situation has to be kept in mind. A newborn with congenital cyanotic heart disease may not benefit by oxygen supplementation. Hypoxemia (O2 saturation < 90% and / or PaO2<50 mmHg in room air) is the single most important indication for use of oxygen in neonates.
- Optimal use of oxygen in neonates is essential for maximizing short or long-term growth and development, while minimizing harmful effects.

Indications

Hypoxia is defined as a deficit of oxygen at the cellular level, and is commonly caused by one or more of the following:

a. Reduced availability of oxygen at the alveolar level, due to pulmonary disease (hypoventilation, uneven matching of ventilation to perfusion, diffusion defects);

b. Intrapulmonary shunts or "right to left" cardiac shunts

c. Reduced oxygen carrying capacity due to anemia or abnormal blood hemoglobin

d. Impaired oxygen delivery due to shock, heart failure, or localized decreases in perfusion

Apnea:

Use of oxygen is widely practiced in babies with apnea. Oxygen helps in improving the CO_2 sensitivity by the brain in preterm neonates; however one needs to avoid hyperoxia.

Shock and heart disease

Oxygen in these situations of reduced cardiac output would help in higher alveolar oxygen and thereby increasing the arterial oxygen content of the blood and improved tissue delivery.

Chronic lung disease

- Supplemental oxygen must always be monitored. In Level III NICU there should be facilities for ABG analysis and Pulse-oximetry. There is enough evidence that unmonitored and unrestricted us of oxygen in neonates has potential harm without any clear benefits. There is no need to start all babies especially with respiratory distress with oxygen. The only indication for use of oxygen in neonates is hypoxia.
- The babies need low or minimal oxygen so as to maintain saturations between 90-95%.

Special situations

Other indications for use of oxygen in neonates include spontaneous pneumothorax and pneumomediastinum. Administration of 100% oxygen causes absorption of nitrogen from the pleural/ mediastinal air, which is then absorbed in the circulation. Such a modality should not be tried beyond 12-16 hours to avoid oxygen toxicity.

3.3: Key messages

- Don't start all babies with oxygen
- Most important indication of administration of oxygen is hypoxia
- A neonate started on oxygen therapy needs continuous oxygen saturation monitoring.

3.4: Video

There will be video demonstration by your facilitator on

1. Methods of oxygen administration
2. Monitoring a baby with receiving oxygen therapy
3. Use of oxygen during resuscitation
4. Use of oxygen during transport or other special situations
5. Titrating oxygen therapy when blender is not available

The video demonstration will be followed by discussion

1. The following aspects on methods of oxygen administration were shown:
   i. .....
   ii. .....
   iii. .....

2. The following aspects on monitoring a baby with receiving oxygen therapy were shown:
   i. .....
   ii. .....
   iii. .....

3. The following aspects on use of oxygen during resuscitation were shown:
   i. .....
   ii. .....
   iii. .....

4. The following aspects on use of oxygen during transport or other special situations were shown:
   i. .....
   ii. .....
   iii. .....

5. The following aspects on titrating oxygen therapy when blender is not available were shown:
   i. .....
   ii. .....
   iii. .....

6. Comments on video:

Good aspect	Need improvement
.....	.....
.....	.....
.....	.....
.....	.....

3.5: Poster

There will be a poster demonstration on

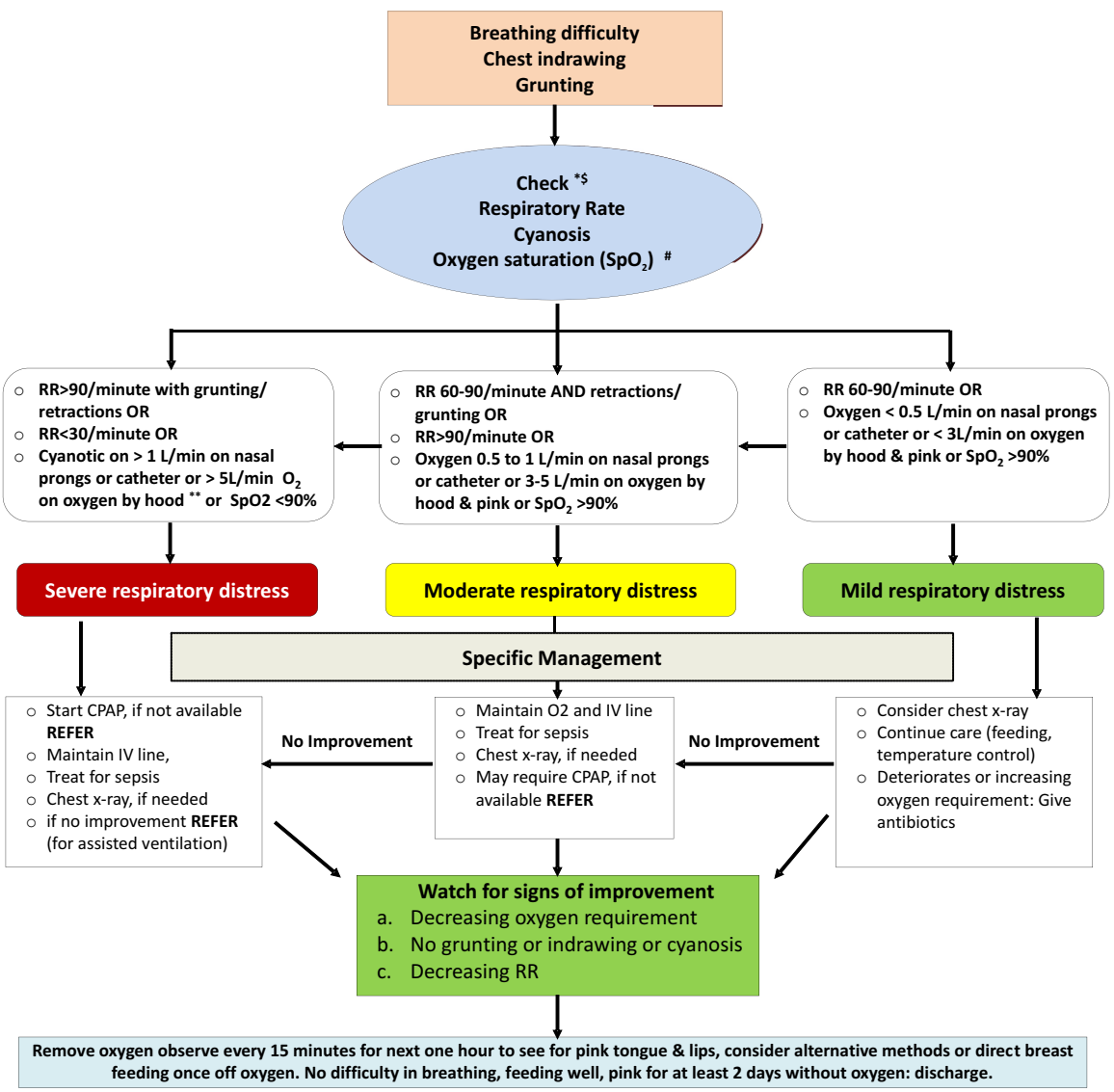
- STP on management of baby with respiratory distress
- Oxygen saturation targets after birth
- Chart on FiO_2 delivered with different flow rate combinations of oxygen and air
- Audit sheets

STP on management of baby with respiratory distress

The facilitator shall conduct a demonstration session on STP on management of baby with respiratory distress

Standard Treatment Protocol for Management of Common Newborn Conditions in Small Hospitals (Adapted from WHO Guideline)

Breathing difficulty in the Newborn



*Refer to Panel for assessment of respiratory distress
$ Signs of surgical conditions - scaphoid abdomen (diaphragmatic hernia), drooling of saliva (esophageal atresia)
# If Pulse Oximeter is available
** Congenital heart disease should be ruled out if cyanosis but no distress at > 5 L/ min
*** Aminophylline may be required in preterm infant to manage apnea

For additional / next level management please refer to WHO Guidelines (Managing Newborn Problems and Pocket Book of Hospital Care of Children), http://www.ontop-in.org/sick-newborn/, http://www.newbornwhocc.org/

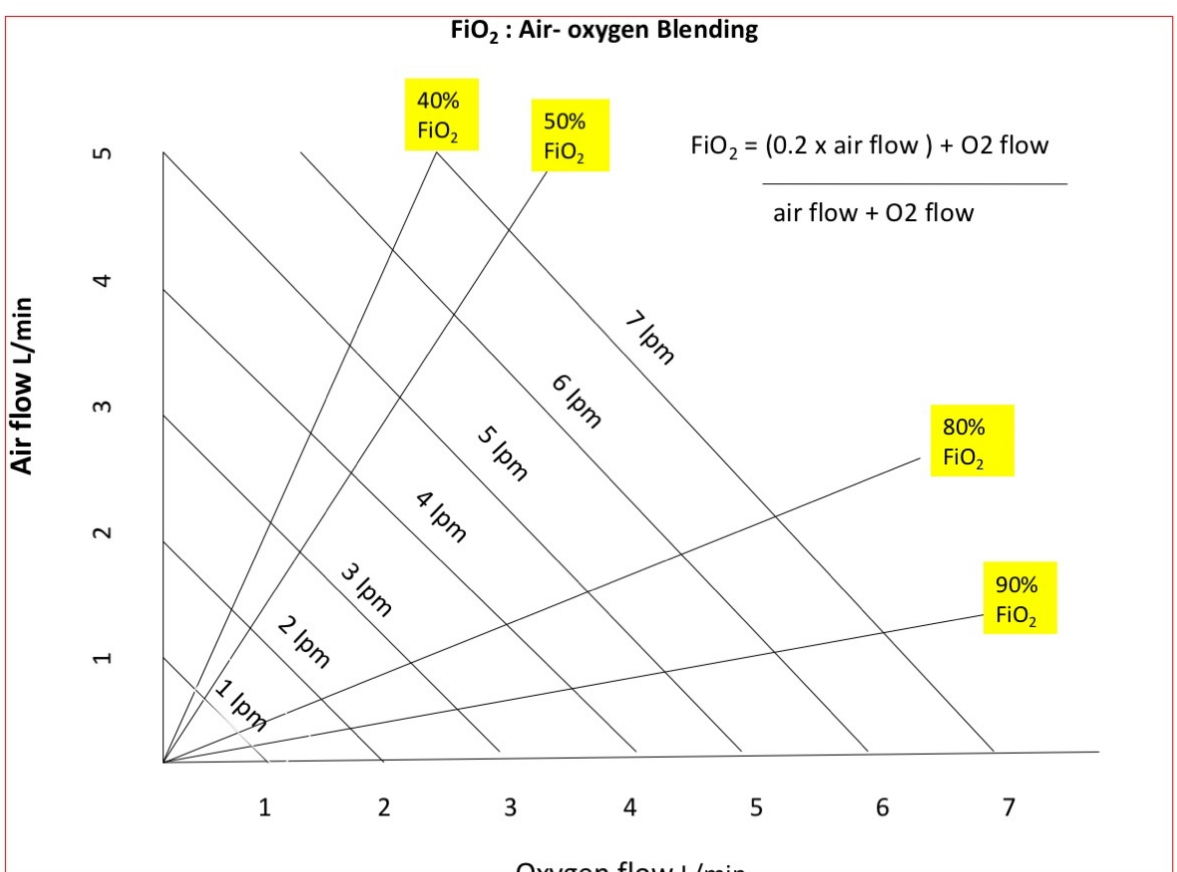
Oxygen saturation targets after birth

The facilitator conducts a demonstration session on Oxygen saturation targets after birth

TIME AFTER BIRTH	ALL PRETERM INFANTS
At 2 minutes	55–75%
3 minutes	65–80%
4 minutes	70–85%
5 minutes	80–90%
10 minutes	85–95%

Chart on FiO_2 delivered with different flow Rate combinations of oxygen and air

The facilitator conducts a demonstration session on chart on FiO_2 delivered with different flow rate combinations of oxygen and air



Audit sheets

The facilitator shall conduct a demonstration session on audit sheets

PUBLIC HEALTH FOUNDATION OF INDIA

FERNANDEZ HOSPITAL
Health Care for Women & Newborn

OXYGEN AUDIT

OXYGEN THERAPY – INDIVIDUAL BABY AUDIT										
1. Does the baby need Oxygen	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
a. Has respiratory distress (Y/N)										
b. Has tachypnea > 60/min										
c. Room air saturation < 90%										
d. Has apenic episodes										
2. Is the baby on oxygen (Y/N)										
3. If on oxygen (tick)										
a. Hood										
b. Nasal Prongs										
c. Free flow										
d. Oxygen using other respiratory support										
4. Mode of oxygen support given appropriate										
a. Gestation < 34 weeks / > 34 weeks - **(Y/N)**										
b. Severity of distress – Silverman score - **(Y/N)**										
c. Qualifies for CPAP or higher respiratory support - **(Y/N)**										
5. Oxygen support (monitored with pulse oximeter) (Y/N)										
6. On Oxyhood										
a. Flow rate (3 – 5 L/min) - **(Y/N)**										
b. Target saturation limits (90 – 95%)										
c. Hood – leak, cracks – **H / L / N ***										
7. On Nasal prongs										
a. Adequate size prongs (occupying < 50% nostril area)										
b. Target saturation limits (90-95%) – **H / L / N ***										
c. Flow rate (< 3 L of oxygen) – **(Y/N)**										
8. Free flow										
d. Target saturation limits (90-95%) - **H / L / N ***										

* **High – H**
Low – L
Normal - N

3.6: Self-check MCQs

Facilitator checks the MCQs given to the participants and give marks according to the answers provided below.

1. Oxygen therapy should be given in the following situations except

a) Neonate with tachypnea and grunt
b) Neonate having inadequate weight gain
c) Neonate in shock
d) Neonate with central cyanosis

2. What is the recommended oxygen flow while administering oxygen therapy by nasal prongs/cannula to a neonate with respiratory distress?

a) 0.5-1 L/min
b) 1-2 L/min
c) 2-4 L/min
d) 5-6 L/min

3. What is the minimum oxygen flow while giving oxygen therapy by oxygen hood to a neonate with respiratory distress?

a) 0.5-1 L/kg/min
b) 2-3 L/kg/min
c) 4-5 L/kg/min
d) 6-7 L/kg/min

4. A neonate is on oxygen therapy with nasal prongs. Monitoring includes

a) Checking vital signs
b) Assessing degree of respiratory distress
c) General condition including sensorium
d) All of the above

5. Oxygen toxicity in a preterm neonate leads to

a) Retinopathy of prematurity
b) Bronchopulmonary dysplasia
c) Periventricular leukomalacia
d) All of the above

Skill Check (OSCE)

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 skill of:

S.No.	OSCE
1	Oxygen without blender
2	Using pulse oximeter
3	Oxygen administration by hood
4	Oxygen administration by nasal prongs

1. Oxygen use without blender

A preterm neonate, 33 wk by gestational age /1.8 Kg now 2 days old is brought with respiratory distress. Saturation reading in pulse oximeter without oxygen is 70%. You are in a peripheral hospital without availability of blender but you have an oxygen and compressed air source. How will you administer oxygen to this neonate?

S. No.	Item	YES	NO
1.	Does hand hygiene		
2.	Asks for equipments and counsel (0.5×8) i. Oxygen source ii. Compressed air source iii. Flow meter for air and oxygen iv. Humidifier and device for warming gas v. Appropriate size nasal prongs and T piece vi. Adhesive for fixation of prongs, scissors vii. Job aid to adjust flow viii. Counsels the mother		
3.	Connects flow meters to air and oxygen source		
4.	Connects these to the one T piece		
5.	Connects humidifier and warmifier		
6.	Connects the system to nasal prongs		
7.	Adjusts flow of oxygen and flow of air looking at the job aid		
8.	Attaches nasal prongs to neonate		
9.	Attaches baby to pulse oximeter after cleaning the probe		
10.	Applies the probe to an extremity ensuring that the LED and the sensor are exactly opposite each other		
11.	Secures the probe with the attachedvelcro/micropore		
12.	Checks for upper and lower set alarm, if not appropriate adjusts upper alarm limit to 95% and lower limit to 88%.		
13.	Positions the infant's head in the midline and keep it in neutral position by placing the shoulder roll if required		
14.	If the neonate does not improve; expresses intent to take corrective steps		
15.	Expresses intent that shall look at pulse oximeter probe for waveform or re tie if not able to see the waveform		
16.	Increase FiO_2 level by adjusting flow of oxygen and air as per job aid if lower limit of alarm saturation is not achieved		
17.	If upper alarm limit of saturation is achieved, desires to decrease FiO_2 by adjusting flow rate of oxygen and air.		
	Total Score		

Score: (Maximum Score 20): _____

2. Using pulse oximeter

A preterm neonate born at 34 weeks gestation by LSCS is admitted for respiratory distress soon after birth in NICU. You are asked to check SpO_2 for this infant. Demonstrate how you will use pulse oximeter to check SpO^2.

S. No	Correct Action	YES	NO
1.	Ensures hand hygiene		
2.	Cleans SpO_2 probe with 70% alcohol		
3.	Applies the probe properly to any extremity		
4.	Ensures the machine end of the probe is connected in the socket		
5.	Connects the power cord to suitable power supply		
6.	Turns on the pulse oximeter		
7.	Checks / sets the alarm limits		
8.	Waits for stable pleth tracings and pulse rate		
9.	Documents the SpO_2 reading		
10.	Documents the pulse rate		
	Total Score		

Score: (Maximum Score 10): _____

3. Oxygen administration by oxygen hood

A 35week/2000 gram/ infant are brought to your SNCU on day 6 of life in view of poor feeding and respiratory distress. You decide to start oxygen therapy by hood. Demonstrate how you will start oxygen by hood.

S No.	Item	Yes	No
1.	Washes hands properly		
2.	Attaches the flow meter to the available oxygen source		
3.	i. Fills the humidifier chamber/bottle (1×2) ii. Fill it up to the proper mark		
4.	Says will fill only with distilled water not normal saline		
5.	Labels the date of filling on the humidifier chamber		
6.	Starts the flow of oxygen by rotating the knob of flow meter		
7.	Observes for bubbles in the humidifier chamber		
8.	Sets oxygen flow rate at 2-3 L/kg/min or between 4-6 L /min		
9.	Positions the infant's head in sniffing position		
10.	Keep the clean hood over the neonate's head (1×2). • Observes the front portion of the hood should be at the level of the neck of the neonate. • Ensure that the seal is not tight		
11.	Takes *new* oxygen tubing and attaches one end of it to the flow meter and the other end to the oxygen hood		
12.	Records SpO_2		
13.	Interprets SpO_2 as provided by the examiner and takes action		
14.	Assesses the: (1×4) i. Temperature ii. Heart rate iii. Respiration (rr and retractions) iv. Capillary refil time		
15.	Counsels the parents/caretakers		
	Total Score		

Score: (Maximum Score 20): _____

4. Oxygen administration by Nasal prongs

A 34 week/1800 gram infant is born by emergency LSCS in view of antepartum haemorrhage. The infant cried immediately after birth; however found to have respiratory distress at 20 minutes of life. You have decided to start oxygen by nasal prongs. Demonstrate how you will administer oxygen by nasal prongs.

S No.	Item	Marks
1.	Washes hands properly	
2.	Attaches the flow meter to the available oxygen source	
3.	i. Fills the humidifier chamber/bottle (1×2) ii. Fill it up to the proper mark	
4.	Says will fill only with distilled water not normal saline	
5.	Labels the date of filling on the humidifier chamber	
6.	Starts the flow of oxygen by rotating the knob of flow meter	
7.	Observes for bubbles in the humidifier chamber	
8.	Sets oxygen flow rate between 0.5-1 L /min	
9.	Chooses a proper size new nasal cannula	
10.	Positions the infant's head in sniffing position	
11.	Attaches appropriate end of the nasal cannula to the flow meter	
12.	Secures the nasal cannula on the cheeks near the nose with transparent adhesive	
13.	Records and interprets SpO_2 as provided by the examiner and takes action	
14.	Assesses the: (1×4) i. Temperature ii. Heart rate iii. Respiration (RR and retractions) iv. Capillary refil time	
15.	Counsels the parents/caretakers	
	Total Score	

Score: (Maximum Score 20): _____

Simulation

An essential pre-requisite before reaching this stage 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 optimal oxygen administration. 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.

- Baby needing PPV during birth resuscitation
- Baby with respiratory distress

This shall be followed by feedback and debriefing.