The Golden Hour – Newborn safety

Presented by :

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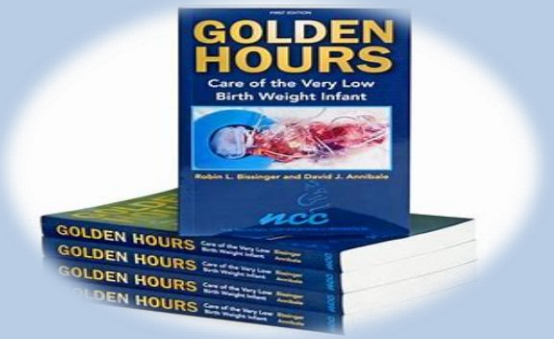
LEARNING OBJECTIVES



- To introduce the concept of golden minute and golden hour
- Enumerate the components of golden hour
- Explain the best practices and golden hour guideline to reach the optimal outcome.
- Incorporation of intensive care environment in the DR to improve outcomes
- Discuss the tools to improve the Performance

INTRODUCTION

- The VLBW infant requires many interventions for sustained life, these same interventions may cause irreversible damage and lead to lifelong morbidities.

- Although technology has improved over the past decade to enable hospitals to increase survival rates, with it comes increased morbidity in this population.

- Complications of resuscitation of the VLBW may lead to increased morbidities include hypothermia, BPD, ROP and IVH.

- Prolonged stabilization and admission time can result in short and long term problems including temperature instability, fluid loss and increased risk of IVH

- Improvement of the admission process should result in improved short and long term outcomes

- The golden hour term has been adopted from adult trauma where it is used for the initial first hour of trauma management.
- Dr. R. Adams Cowley gave the concept of “Golden Hour” in emergency medicine and showed that with the use of golden hour approach there was decrease in patient mortality with better transport and patient outcome .
- Reynolds et al. was the first person to implement this concept in the neonatal care .
- The neonatal management in the first hour of life have an important effect on both immediate and long-term outcomes of all neonates.

- Preterm infants are one of the most vulnerable patient populations.
- Prematurity is the second leading cause of death among infants in the United States.
- Over half of all infant deaths occur in preterm infants born at less than 32 weeks' gestation, and the infant mortality rate for this population is 88 times that of the rate for full-term infants.

- Preterm birth is the greatest contributor of infant death and is also a leading cause of long term disabilities in children throughout the world.
- Infants born very preterm (<32 weeks) are at high risk of prematurity related mortality and morbidity.
- The first hour of life is a critical period of transition requiring multiple adaptations to extra uterine life, for which the fragile preterm neonate is not prepared.
- Therefore, the vulnerable premature infant faces profound challenges in this transitional process that may adversely affect numerous short and long term outcomes and contribute to an increased risk of mortality and morbidities

FACTORS

- The immature lung with underdeveloped alveoli, surfactant deficiency, immature nervous system with poor respiratory drive and weak compliant chest muscles which predisposes to alveolar collapse contribute to poor lung expansion and difficulty with gas exchange in these infants.
- Their extremely immature skin and lack of epidermal barrier – HYPOTHERMIA

FACTORS

- The detrimental effects of hypothermia may result in increased oxygen and metabolic demands, acid-base derangements, respiratory and circulatory compromise, hypoglycemia and even death
- These neonates are also at an increased risk of serious blood stream infections due to their underdeveloped immune function.
- The presence of fragile germinal matrix blood vessels in the immature brain predisposes these infants to intracranial haemorrhage.

Special considerations for the Preemie <32 weeks and/or < 1.5 Kg

Poor thermal control

Poor respiratory drive

Surfactant deficiency

Poor energy stores

Immature adaptive systems

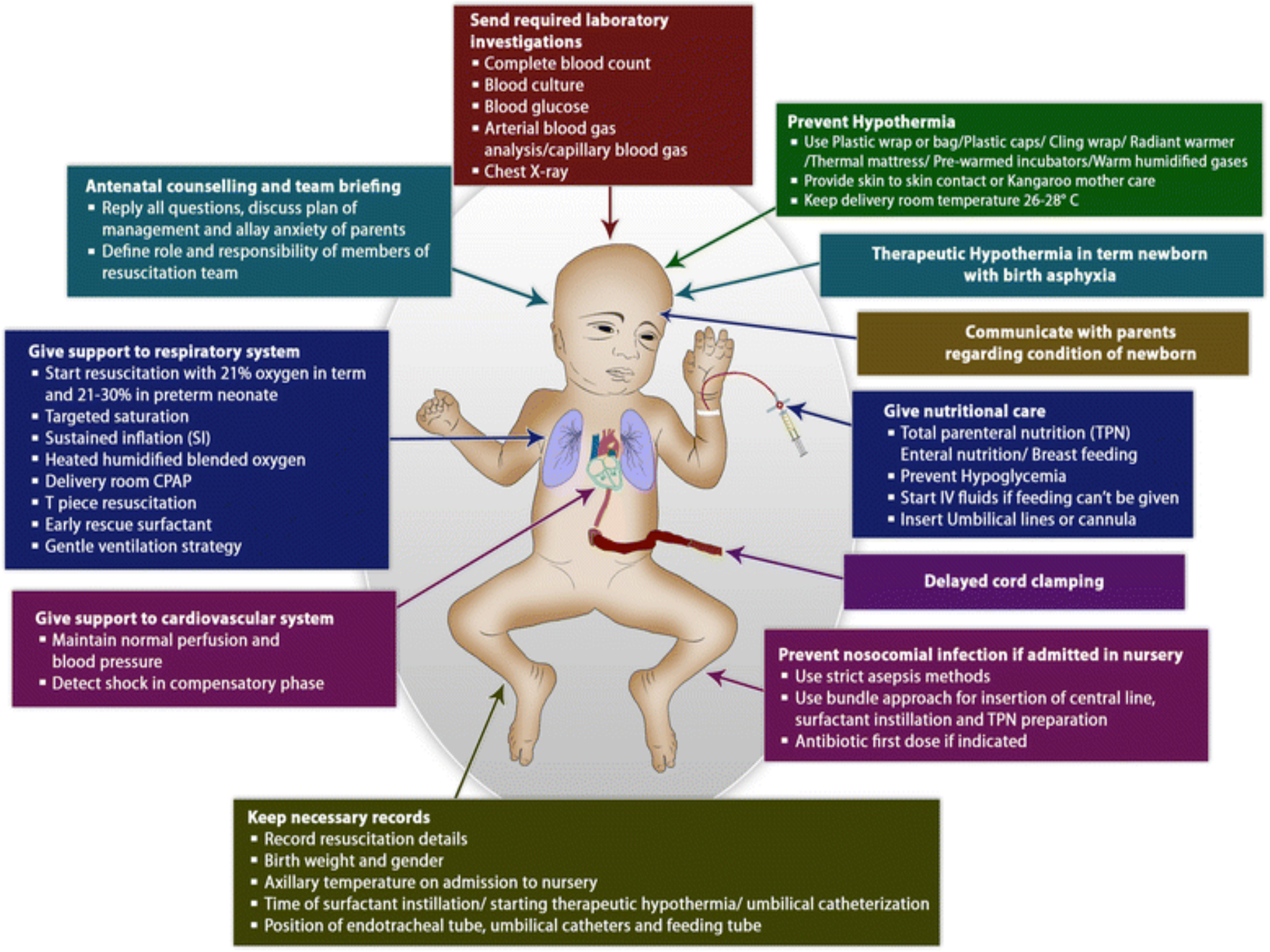
Often born after a complication

Susceptibility to IVH and PVL

Highly stressed family

- The ‘Golden Hour’ management for preterm infants uses evidence-based approaches in delivery room (DR) care to improve outcomes, by focusing on antenatal management, resuscitation and stabilization, team performance and communication.


STEPS


Send required laboratory investigations
Complete blood count
Blood culture
Blood glucose
Arterial blood gas analysis/capillary blood gas
Chest X-ray
Prevent Hypothermia
Use Plastic wrap or bag/Plastic caps/ Cling wrap/ Radiant warmer /Thermal mattress/ Pre-warmed incubators/Warm humidified gases
Provide skin to skin contact or Kangaroo mother care
Keep delivery room temperature 26-28° C
Antenatal counselling and team briefing
Reply all questions, discuss plan of management and allay anxiety of parents
Define role and responsibility of members of resuscitation team
Therapeutic Hypothermia in term newborn with birth asphyxia
Communicate with parents regarding condition of newborn
Give support to respiratory system
Start resuscitation with 21% oxygen in term and 21-30% in preterm neonate
Targeted saturation
Sustained inflation (SI)
Heated humidified blended oxygen
Delivery room CPAP
T piece resuscitation
Early rescue surfactant
Gentle ventilation strategy
Give nutritional care
Total parenteral nutrition (TPN) Enteral nutrition/ Breast feeding
Prevent Hypoglycemia
Start IV fluids if feeding can't be given
Insert Umbilical lines or cannula
Delayed cord clamping
Give support to cardiovascular system
Maintain normal perfusion and blood pressure
Detect shock in compensatory phase
Prevent nosocomial infection if admitted in nursery
Use strict asepsis methods
Use bundle approach for insertion of central line, surfactant instillation and TPN preparation
Antibiotic first dose if indicated
Keep necessary records
Record resuscitation details
Birth weight and gender
Axillary temperature on admission to nursery
Time of surfactant instillation/ starting therapeutic hypothermia/ umbilical catheterization
Position of endotracheal tube, umbilical catheters and feeding tube

Golden Hour Team Member Roles

Time	MD/Resident	Charge RN/Delivery Room RN	RT	Admit RN
Pre-delivery	• Review maternal history for pertinent information • Introduce team to family, answer questions • Pre-fill stat order form • Gather umbilical line tray and supplies • **PRE-HUDDLE** with team members	• Check delivery room temperature • Turn on radiant warmer • Ensure warm blankets, NeoHelp wrap, thermal mattress on bed • Ensure Kangaroo board available • **PRE-HUDDLE** with team members	• Check Neopuff and suction • Ensure intubation supplies at bedside • Set-up respiratory equipment at admission bed as needed • **PRE-HUDDLE** with team members	• Prepare admission bed in NICU • Prepare admission paperwork • **PRE-HUDDLE** with team members
0-10 Minutes	• Direct team members per NRP guidelines • Assess heart rate and respiratory rate • Appropriately address respiratory status	• If < 1000 grams, place infant in NeoHelp wrap on top of thermal mattress with blanket in between • Place pulse oximeter probe on infant's right hand/wrist, place EKG leads • Perform NRP skills as indicated	• Adjust FiO2 as needed to maintain FiO2 within target range	• Assist as needed
10-15 Minutes	• Stabilize and transport to NICU with family member(s)	• Stabilize and transport to NICU with family member(s)	• Stabilize and transport to NICU with family member(s)	• Assist as needed
15-20 Minutes	• Scrub and prep for umbilical line placement • 2nd MD/Resident: enter orders or complete stat order form	• String D10W • Assist admit RN	• Place on ventilator/respiratory support as indicated • Monitor SpO2 and adjust FiO2 as needed to maintain within target range • Ensure ETT secured (if intubated)	• Assess infant, obtain vital signs, measurements, weight • Administer erythromycin eye ointment and vitamin K injection • Place PIV; start D10W • Secure for UVC/UAC placement
20-45 Minutes	• Place UVC/UAC • Obtain labs (CBC, blood culture, blood gas)	• String starter TPN/UAC fluids • Send labs; call for x-ray; prep antibiotics if ordered	• Monitor SpO2 and adjust FiO2 as needed to maintain within target range	• Monitor vitals • Remove thermal mattress prior to x-ray • Assist MD as needed
45-55 Minutes	• Interpret x-ray; adjust UVC/UAC as needed and secure	• Assist admit RN	• Monitor SpO2 and adjust FiO2 as needed to maintain within target range	• Administer antibiotics as indicated • Remove NeoHelp wrap, place hat on infant's head • Discontinue D10W
55-60 Minutes	• Update family	• Assist admit RN	• Monitor SpO2 and adjust FiO2 as needed to maintain within target range	• Connect starter TPN and UAC fluids • Nest infant, close incubator top, ensure proper temperature and humidity settings • Obtain temperature at 1 hour of life
Post-admission	**POST-HUDDLE** with team members	**POST-HUDDLE** with team members	**POST-HUDDLE** with team members	**POST-HUDDLE** with team members

Recorder: Record times and vitals on NICU Admission Worksheet; timekeeper for team during Golden Hour

BEFORE DELIVERY (0-30 min)

AT DELIVERY (0-20 min)

AFTER DELIVERY (IN INCU) (20- 120 min)

Before Delivery (TEAM role delegation and briefing) (0-30 min)

Maternal History:

- Obtain a detailed maternal history.
- Check maternal notes for any antenatal care plan the infant and the neonatologist involved in the antenatal counseling.

ANTENATAL COUNSELLING AND TEAM BRIEFING

- Inform parents and assist in decision making
- Comfort care
- Accurate prognosis, morbidity and mortality and outcome
- Expected duration of NICU stay
- Treatment plan
- Counselling together by obstetric and neonatology team
- Assign team leader and roles of team members

Resuscitation Equipment:

- Check resuscitation equipment is functional and ready for use.
- Determine size of the mask, size and length of oral and nasal ETT, possible length of insertion for UVC and starting ventilator settings.

NICU Equipment:

- Nursing/ medical staff to prepare and gather all equipment for intubation and vascular access ready on a trolley in the NICU next to the allocated bed.

AT DELIEVERY (0-20MINS)

Personnel:

- Specialist Registrar Neonatology + Neonatal RN will attend to delivery
- Notify the Senior Specialist Neonatology of impending delivery

Cord clamping :

- Delayed cord clamping for 30-60 seconds.
- Milking cord * 4 times

Press APGAR timer

Delayed cord clamping

- DCC - 30 secs to 3 minutes following delivery improve BP, decrease IVH, NEC and need for transfusions.
- The foetal-placental circulation - 110 -115 mL/kg of foetal body weight, with approximately 35 - 40% of total is present in the placenta at one point of time.

Delayed cord clamping (DCC)

- **DCC** for one-minute lead to transfer of 80 ml extra blood and delay of three minutes leads to total transfer of 100 ml blood to the neonate
- **Cord milking** : In the umbilical vein alone there is approximately 15 to 20 mL of cord blood which can be transferred to newborn
- Milking 20 cm of umbilical cord 2 to 3 times before clamping at a rate of 20 cm per 2 seconds

Prevention of Hypothermia

- 1 degree celcius fall- 28% increase of mortality
- Causes: Environment, larger surface area, thin layer of subcutaneous fat and brown fat
- Lead to IVH, sepsis, hypoglycaemia, respiratory distress

Thermoregulation:

- Delivery room tempt: 26-28
- Use pre-warmed blankets, incubators, warmers, thermal mattress, warm humidified oxygen
- Do not dry the infant.
- Use a plastic bag
- Place a hat on head.
- Skin to skin contact

Targeted Preductal SpO_2 After Birth	
1 min	60%-65%
2 min	65%-70%
3 min	70%-75%
4 min	75%-80%
5 min	80%-85%
10 min	85%-95%

Oximeter: (the right wrist)

Oxygen for resuscitation:

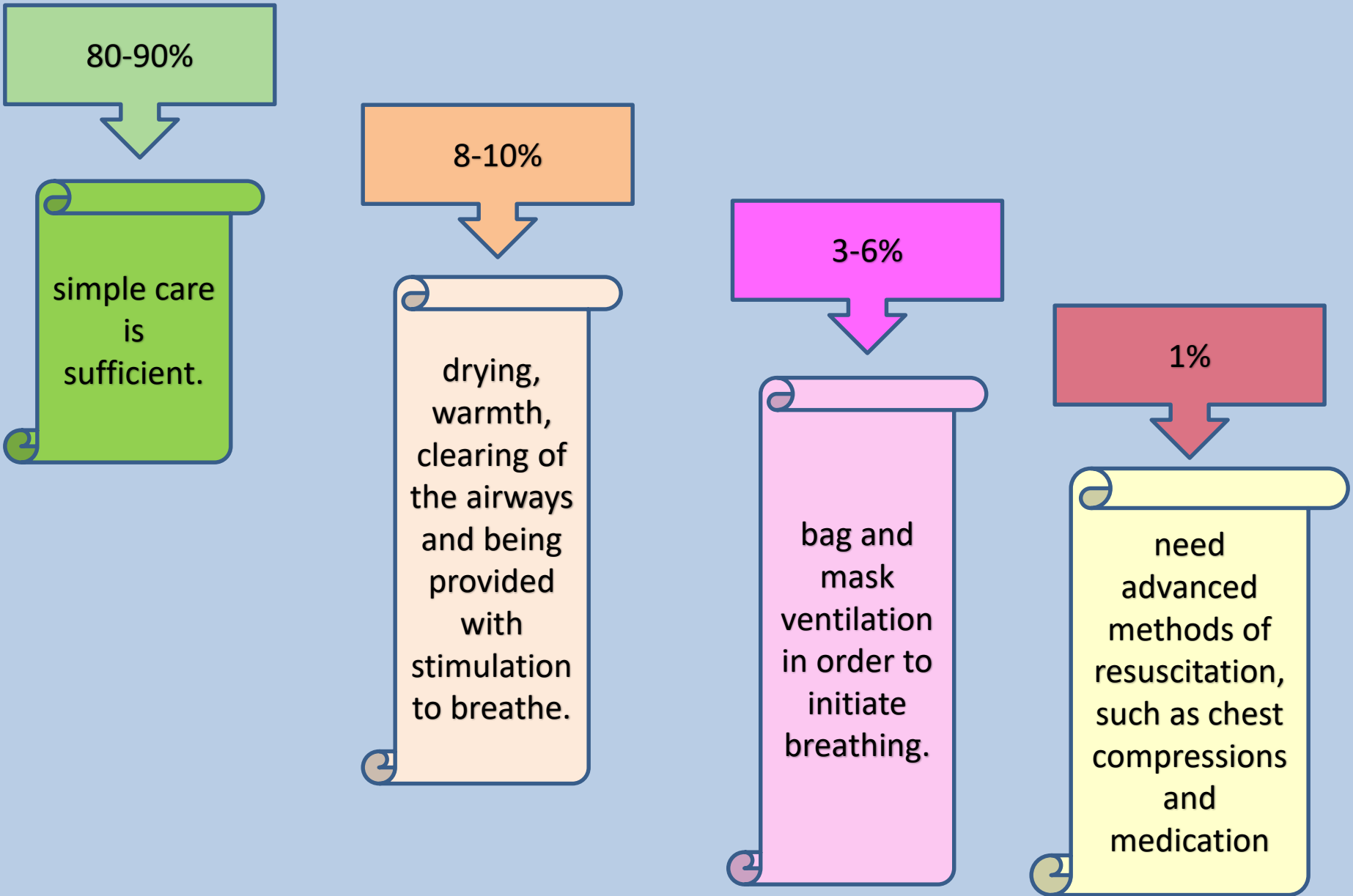
»Follow NRP (7th eds recommendation)

Cord Blood Gas

"Golden Minute"

- The first 60 seconds of a newborn baby's life
- Helping Babies Breathe (HBB)
- Approximately 10 million newborn babies can't do it by themselves, and need some assistance at birth. This golden minute is the focus of the HBB initiative.

Golden minute....



Golden minute – definition

It implies that by one minute of age, the newborn baby should start breathing on his or her own, or should be ventilated with a bag and a mask.

Respiratory management in the delivery suite/OT:

- »Commence non-invasive CPAP (6- 7 cm H2O) at birth (CPAP Guideline)
- »Use T-Piece with pre-checked pressures
- »Consider (RDS guideline)

23-27+6wk: intubation +/- surfactant

28-31+6wk: CPAP

Targeted Preductal SpO_2 After Birth	
1 min	60%-65%
2 min	65%-70%
3 min	70%-75%
4 min	75%-80%
5 min	80%-85%
10 min	85%-95%

Communication:

- »Call the unit
- »Talk to the parents

Transport from the delivery suite/ OT to NICU:

- »On non-invasive CPAP
- »Intubated babies to remain intubated for the transport to NICU.
- »Continuous monitoring during the transport

IN NICU (20- 120 min)

1. Weight, length and head circumference

2. Plastic Bag

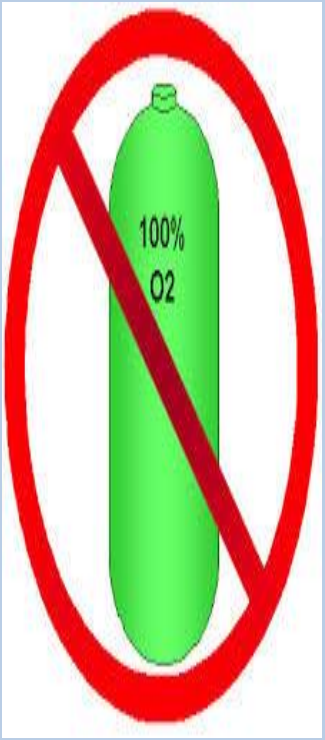
3. Incubator temperature and humidification

Initial ambient temperature at 36ᵉ C in air mode until the temperature is stable.

Set the humidification at 85% for infants < 29 weeks or Birth weight < 1000 g.

Ventilator/CPAP support & Surfactant:

- General starting CPAP pressure is 6-7 cm H2O. (CPAP Guideline)
- If mechanically ventilated:
- The preferred mode of ventilation is SIPPV (PC+AC) plus volume guarantee
- Aim to ventilate for as short a time as possible, avoiding hyperoxia, hypocarbia and volutrauma.
- For surfactant (RDS Guideline)



Complications of Mechanical Ventilation

Complications related to Intubation

Mechanical complications related to presence of ETT

Ventilator induced lung injury

Complications related to Oxygen

Infectious complications of mechanical ventilation

Remember

Intubation/ Reintubation criteria for infants on CPAP

- »FiO_2 > 40% to maintain saturations ≥ 90%
- »PCO_2 > 60 mmHg with pH < 7.20 and
- »Frequent significant apneas (example: > 1 per hour) or requiring bag and mask ventilation.
- »Target Oxygen Saturations:
- »Target the oxygen saturations to be between 90-95%. (Use Unit specific Oxygen Guideline……..).

Connections:

- Allow 10 minutes for the nursing staff to settle the baby
- Medical staff to decide on the sizes and lengths of ETT, UVC, UAC and plan the investigations needed in the first 2 hours and prescribe fluids and medications.

Vascular Access:

- *< 28 weeks or <1000 g:*

UVC+ UAC within the first 2 hours of birth.

- *≥ 28 weeks:*

peripheral IV cannula and PICC line or UVC+/-UAC.

Intravenous Fluids:

- »Collect basic investigations (CBC, Blood group & blood sugars) on admission. Blood culture if starting antibiotics.
- »Commence IV fluids (TPN guideline)
- »Aim to start IV fluids within 45 - 60 minutes of birth to maintain the normal blood sugar level.
- »Fluids with the exception of inotropes can be started through UVC by 45 minutes while waiting for X-ray to confirm the position.
- »Careful fluid balance

Antibiotics:

- »Decide the need for antibiotics and administer the first dose of antibiotics. (Antibiotic guideline…….)

Caffeine:

- »Commence loading dose of caffeine (20mg/kg stat IV).

Monitoring

(Heart rate, Respiratory rate, temperature, blood pressure……)

Documentation

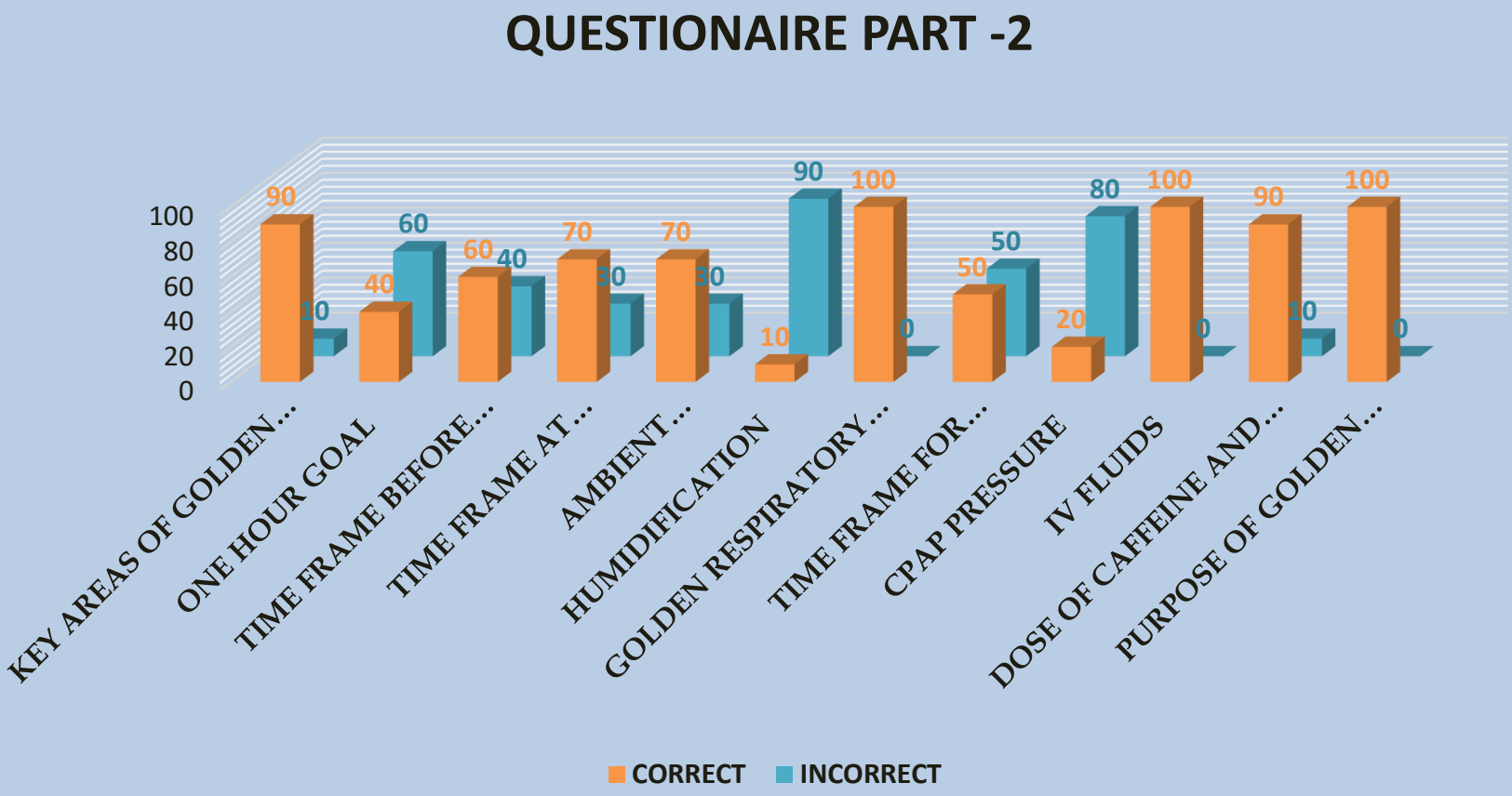
»Patient notes

»Admission book

»Audit form

»Consent forms.

DATA ANALYSIS



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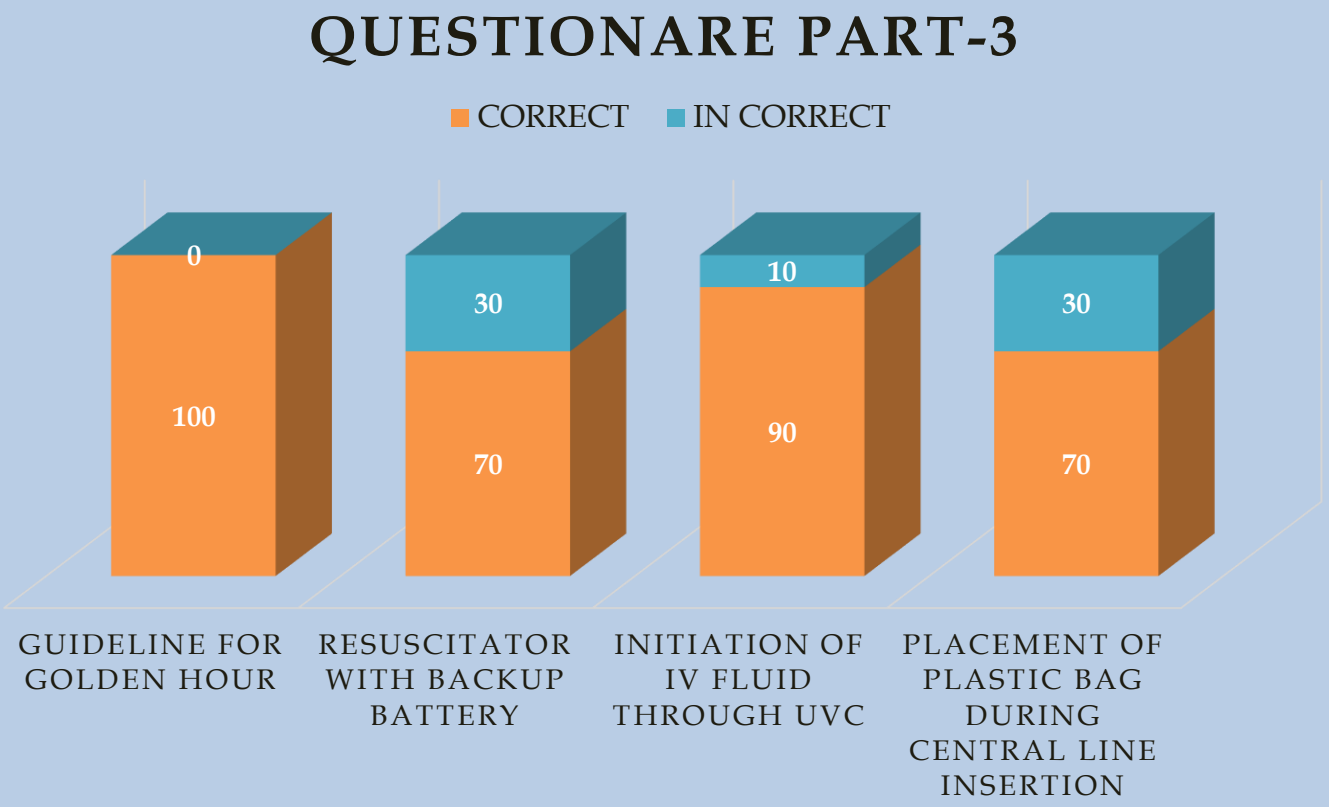
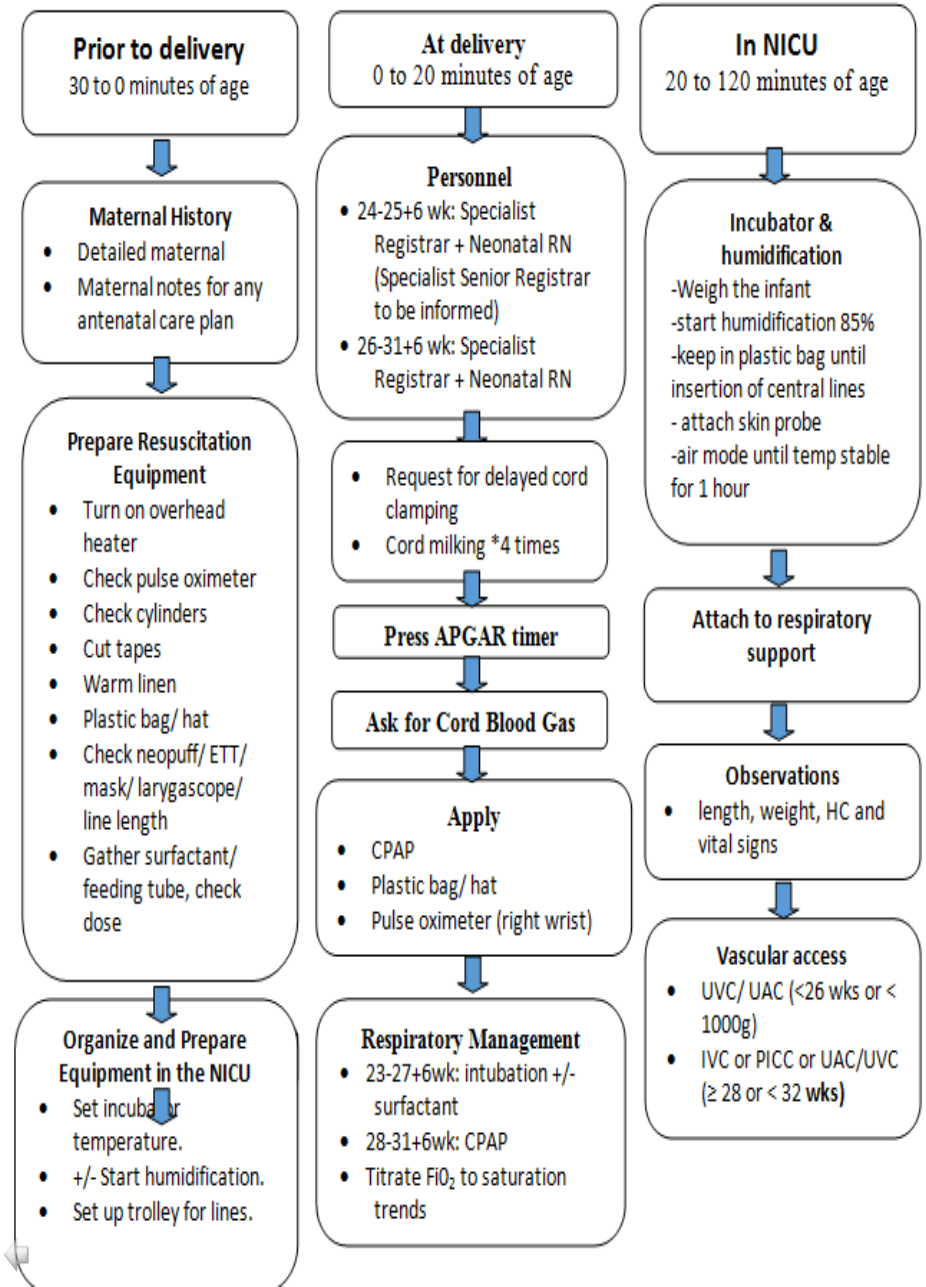


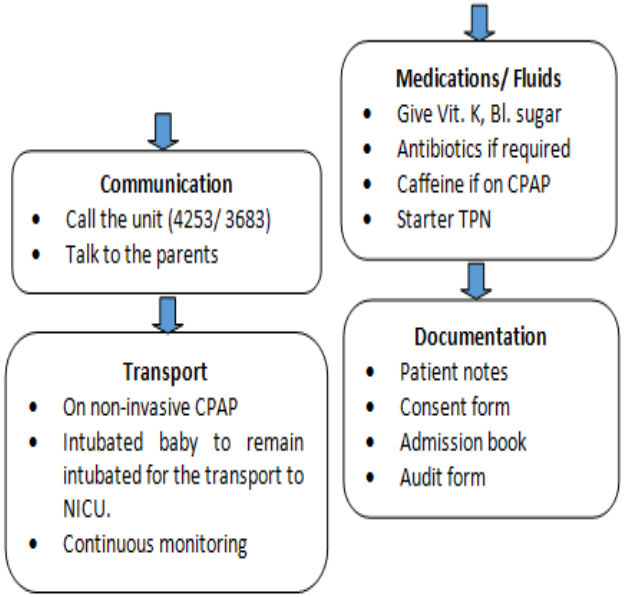
Performance Indicator:

- Compliance to golden hour management, in NICU.
- Monitoring the numbers of neonates admitted with Hypothermia in NICU, LWCH.
- Monitoring the number of cases of IVH
- Monitoring the cases of ROP
- Monitoring the cases of CLD

COMPLIANCE OF GOLDEN HOUR PRACTICE

APPENDIX. GOLDEN HOUR FLOW CHART





APPENDIX. GOLDEN HOUR AUDIT TOOL

GOVERNMENT OF DUBAI

DUBAI HEALTH AUTHORITY

DELIVERY RM/OT/NICU CLINICAL PATHWAY

GOLDEN HOUR (2HRS)

NAME :	**DOB:**		**TIME**	
HC NO. :	**WEIGHT:**		**DOA**	**TIME:**
DIAGNOSIS:			**ATTENDING DR:**	
MOTHERS HISTORY:	**PATHWAY STARTED:**			
CARE CATEGORY	**YES**	**NO**	**REMARKS**	
DELIVERY ROOM/ OT				
Temperature 24°C to 26°C				
Pre warmed Resuscitaire, hat, blanket				
Polyurethne or plastic bag in placed				
EQUIPTMENT SAFETY CHECK				
Radiant warmer on prior delivery				
Intubation kit with equipment ready to used				
O2 supply verified, suction apparatus checked				
AFTER DELIVERY				
Baby kept in polyurethane bag				
Head cap attached				
Baby is attached to pulse oximeter				
Vital Signs: HR: O2 Sat:				
PPV given Time started:				
PPV settings : PIP_____PEEP_____FiO2_____				
Intubated:			Nasal/ Oral ETT SIZE: _____, Depth_____	
Need for Surfactant				
Need for Canullation			Venous/ Arterial	
Need of Medication			Type	
MODE OF TRASPORTING				
Resuscitaire with back up battery				
Transport incubator/ ventilator				
Temperature skin probe attached				
Ventilatated:			Pressure_____PEEP_____FiO2____O2sat_____	
ADMISSION TO NICU(ADMITTING NURSE)				
Prew armed incubator				
Incubator humidity according to humidity guideline				
Heated humidified gas				
Baby's temperature: 36.5C				
Vital Signs: HR: RR: Temp: BP: O2 Sat:				
Non invasive Ventilation			Type: Parameters:	
Intubated			Time:_____ETT size:_____Depth:_____	
Invasive ventilation			Mode: ssure____PEEP____FiO2___O2sat___	
Hand hygiene/ Proper used of PPE				
Intravenous access, PICC line				
Umbilical cannulation			Venous/ Arterial, time for insertion:	
Volume expander			Type	
Blood collection				
Blood gas monitoring			Arterial/ Capillary	
Antibiotic administration				
Blood sugar monitoring				
X-ray				
DEVELOPMNETAL CARE				
Minimal handling				
Midline position				
20• head elevation				
Cluster care				
Reduce noise				
Reduce light				
Covered incubator				
Follow oxygen guideline			Initial setting: age:	

OT/DS ADMISSION NURSE		**NICU ADMITTING NURSE**	
Nane :SNO:		Nane	SNO:
Signature		Signature	

Referance

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Thank You...!!!