Chapter 3B
NEONATAL RESUSCITATION

Learning Objectives:

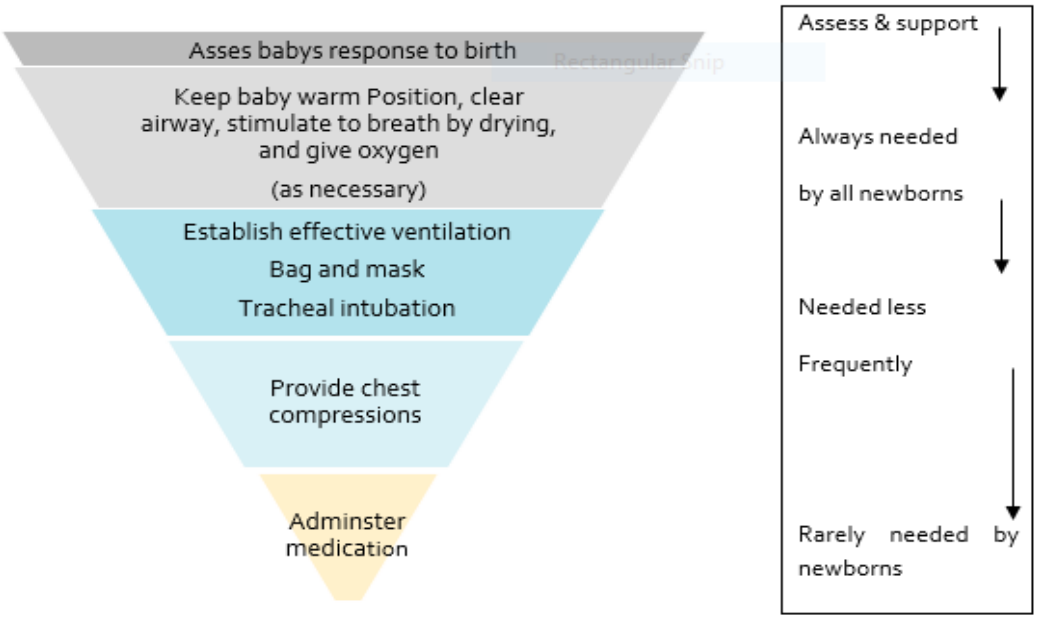
- To understand major killers of newborn and demonstrate essential lifesaving newborn care to be given to all newborn during delivery to ensure newborn survival and thrive.
- To understand and demonstrate advanced neonatal resuscitation to critically sick newborns

INTRODUCTION

The inverted pyramid below illustrates the relative frequencies of interventions for resuscitation of the newly born that does not have meconium stained amniotic fluid. A majority of infants respond to simple measures.

- The vast majority of term newborns require only maintenance of temperature, clearing of the airway & stimulation by drying.
- At least one person skilled in neonatal resuscitation should be present at every delivery.
- Adequate ventilation is the cornerstone of neonatal resuscitation
- The resuscitation starts with TABC**, T** for temperature (warmth) is very critical.

  Temperature (warm and dry)
  Airway (position and suction)
  Breathing (stimulate to cry)
  Circulation (heart rate and color)



Cornerstones of early essential newborn care

1. Ensure warmth and stimulation by;
   - Immediate thorough dry
   - Remove wet linen and keep skin-to-skin contact
   - Cover the baby by cap and linen
2. Proper timing and sterile procedure of cord cutting (Delayed cord clamping)
3. Ensure to give oxytocin to mothers within 1 minutes if baby is breathing
4. Ensure to give 1st chest rise by effective positive pressure ventilation (PPV) if baby is not breathing
5. Ensure initiation of breastfeeding on 1st hunger cue within 1 hour by breast crawl.
6. Ensure non-separation of mother and newborn and eliminate harmful procedures.

EARLY ESSENTIAL NEWBORN CARE (EENC) FOR BREATHING BABY

TIME BAND: PREPARING FOR THE BIRTH

Anticipate Problems at Birth and Prepare accordingly

- Take history from mother and MCH card:
  - **Baby:** Twins, preterm or post term, fetal distress, precipitous labor
  - **Mother:** Age, ANC, Diabetes, hypertension, fever, bleeding, drugs

- Ensure privacy.
- Ensure that the delivery area is between 25–28 °C using a non-mercury room thermometer.
- Test whether the delivery area is draft-free by hanging a piece of tissue paper.
- Eliminate draft if present, e.g. turn off fans and/or air-conditioning units.
- Introduce yourself to the mother and her companion of choice or support person.
- Review with the mother what care to expect for herself and her baby in the immediate postpartum period.
- Wash hands with clean water and soap.
- Place a dry cloth on her abdomen or within easy reach.
- Prepare the following:
  - clean linen or towel(s),
  - bonnet,
  - syringe,
  - 10 IU ampoule of oxytocin,
  - Basin with 0.5% chlorine solution for decontamination
- Open the delivery kit containing sterile umbilical clamp or tie, instrument clamp, and scissors.
- Do not touch the sterile items.
- Prepare newborn resuscitation area by:
  - clearing a flat, firm surface; and
  - checking that resuscitation equipment including bag masks and a suction device (preferably single-use), oxygen is within reach, clean and functional.

TIME BAND: PRIOR TO DELIVERY AT PERINEAL BULGING WITH PRESENTING PART VISIBLE

(2nd STAGE OF LABOUR, PERINEAL PHASE)

- Perform proper hand washing.
- Put on sterile gloves.
- Put on two sets of sterile gloves.
- Allow the mother to push as she wishes with contractions
- Do not perform routine episiotomy
- Episiotomy should be considered only in the case of:
- complicated vaginal delivery (breech, shoulder dystocia, vacuum or forceps extraction);
- scarring of the female genitalia or poorly healed third-or fourth-degree tears; or
- fetal distress.
- Provide good perineal support with controlled delivery of the head.

NOTE: *If lone birth attendant, put on two sets of sterile gloves; if a team, the gloves of the health worker who will handle the cord should be sterile.*

TIME BAND: WITHIN THE FIRST 30 SECONDS

- Dry and provide warmth
  - ✓ Call out time of birth.
  - ✓ Immediately dry the baby (starting within the first 5 seconds after birth), as follows:
    - use a clean, dry cloth and dry the baby thoroughly;
    - wipe the eyes, face, head, front, back, arms and legs; and

- do a quick check of baby's breathing while drying.

✓ Remove wet cloth and place baby in skin-to-skin contact with the mother.
✓ Cover the baby and mother with a clean warm cloth.
✓ Cover the baby's head with a bonnet.

NOTE: *DO NOT do routine suctioning. During the first 30 seconds:*
- *do not suction unless the mouth/nose is/are blocked; and*
- *do not suction meconium unless the baby is not vigorous.*

IF breathing or crying, Continue skin-to-skin contact

If baby is breathing normally or crying, avoid manipulation such as routine suctioning that may cause trauma or introduce infection. Postpone routine procedures such as weighing and measurements. Continue skin-to-skin contact with the baby prone on the mother's abdomen or chest. Turn the baby's head to one side. Keep the baby's back covered with a blanket and head with a bonnet.

NOTES:
- *DO NOT separate baby from the mother as long as the baby is well – i.e. does not exhibit severe chest in-drawing, gasping or apnea, or severe malformation – and the mother does not need urgent medical stabilization, e.g. emergency hysterectomy.*
- *DO NOT wipe off the vernix, if present.*
- *DO NOT bathe the baby during the first 24 hours of life.*
- *IF an identification band is used, place on the baby's ankle.*
- *IF the baby must be separated from his/her mother, clamp and cut the cord and put the baby on a warm*
- *Surface in a safe place close to the mother.*

Inject oxytocin into the mother's arm or thigh

Explain to the mother that you will be injecting her with oxytocin to make her uterus contract and protect her from excessive bleeding. A trained second health worker, if available, could inject the oxytocin. Put soiled instruments into a decontaminating solution.

Assist with multiple births

If there is another baby/ies, get help. Deliver the next baby. Manage as in a multi fetal pregnancy.

Do appropriately timed cord clamping and cutting

Ensure gloves are sterile when touching or handling the cord:

- if single health worker with double sterile gloves, remove soiled set of gloves prior to touching or handling the cord
- If other health worker: wash hands and use sterile gloves.
- Clamp and cut the cord after cord pulsations have stopped (between 1–3 minutes), as follows:
  - apply a sterile plastic clamp or tie around the cord at 2cm from the umbilical base
  - drain the cord of blood by stripping away from the baby
  - apply the second clamp at 5 cm from the umbilical base (which is 3 cm from the first clamp)
  - cut close to the first clamp or tie using sterile scissors, and
  - apply a second tie if there is oozing blood.
- Put soiled instruments into a decontaminating solution.

IF after thorough drying and stimulation (as close to 30 seconds as possible), newborn is gasping or is not breathing:

- Call for help.
- Clamp and cut the cord with sterile scissors and with sterile gloves on.
- Transfer to warm, firm surface.
- Inform the mother in a kind and gentle tone that the baby has difficulty breathing and that you will help the baby to breathe.
- Start ventilation.

TIME BAND: WITHIN 90 MINUTES

- Leave the baby on mother's chest in skin-to-skin contact, with the head turned to one side and mother in a semi-upright position, or on her side.
- Observe the baby
- Only when the baby shows feeding cues (e.g. opening of the mouth, tonguing, licking, rooting), suggest to the mother to encourage/nudge her baby towards the breast.
- Provide breastfeeding support to ensure good positioning and attachment. When the baby is ready, advise the mother to:
  - make sure the baby's neck is not flexed or twisted;
  - make sure the baby is facing the breast with the baby's nose opposite her nipple and chin touching the breast
  - make sure the baby is facing the breast with the baby's nose opposite her nipple and chin touching the breast
  - hold the baby's body close to her body
  - support the baby's whole body, not just the neck and shoulders
  - wait until her baby's mouth is opened wide, and
  - move the baby on to her breast, aiming the lower lip well below the nipple
  - Look for signs of good attachment and suckling, including:
    - mouth wide open;
    - lower lip turned outwards;
    - baby's chin touching breast; and
    - slow and deep suckling, with some pauses.

NOTE: *Breastfeeding is a learned behavior for both baby and mother. Baby will make several attempts to breastfeed before being successful. Health workers should avoid interfering with this process (e.g. manipulating baby's head and/or body).*

IF attachment or suckling is not good, try again, and reassess.

Do not leave the mother and baby alone. Monitor breathing and warmth.

IF the baby has signs of illness or does not show readiness to feed, i.e. feeding cues within 90 minutes, EXAMINE the baby and MANAGE urgent conditions.

IF the breast is engorged, express a small amount of breast milk before starting breastfeeding to soften the areola area so that it is easier for the baby to attach.

NOTES:

- *DO NOT touch the baby unless there is a medical indication.*
- *DO NOT give sugar water, formula or other pre-lacteals. Do not give bottles or pacifiers.*
- *DO NOT throw away colostrum.*
- *IF the mother is HIV-positive, take measures to prevent mother-to-child transmission. Do counseling and testing.*

Do eye care

- Explain to the mother that you will be putting an ointment or drops into her baby's eyes to prevent infection. Reassure her that this is a routine procedure.
- After baby has located the breast, administer erythromycin or tetracycline ointment, or 2.5% povidone-iodine drops, to both eyes according to national guidelines. Apply from the inner corner of each eye, outwards.
- Do not wash away the eye antimicrobial.

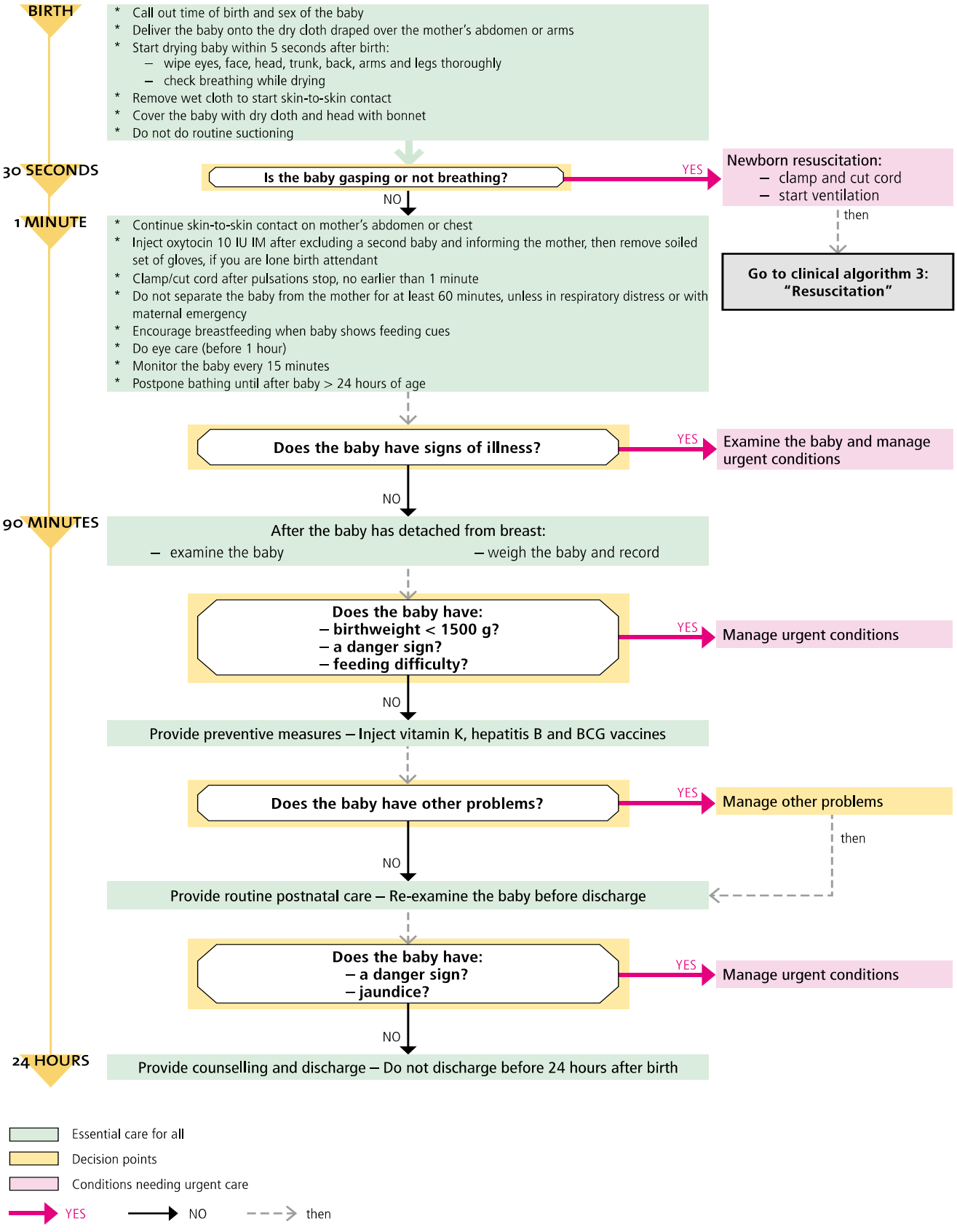
Provide additional care for a small baby (or twin)

For a visibly small baby or a baby born > 1 month early:

- encourage the mother to keep the baby in skin-to-skin contact;
- provide extra blankets to keep the baby warm;
- do not bathe the baby; and
- ensure hygiene by wiping with Adam cloth, but only after 24 hours.
- IF the mother cannot keep the baby in skin-to-skin contact because of complications:
  - wrap the baby in a clean, dry, warm cloth;
  - place in a cot;
  - cover with a blanket; and
  - Encourage another family member to keep the baby in skin-to-skin contact or use a radiant warmer if room is < 28 °C. Prepare a very small baby (< 1500 g or a baby born > 2 months early) for referral. Keep the baby in skin-to-skin contact or in an incubator while waiting for referral.

NOTE: *Low-birth-weight (LBW) babies weighing >1200 g who do not have complications should be maintained in skin-to-skin contact with the mother or other family member immediately after birth, after drying them thoroughly to prevent neonatal hypothermia. See Bibliography. Pocket book of hospital care for children: guidelines for the management of common childhood illnesses.*

Algorithm 2: **Essential newborn care**



EARLY ESSENTIAL NEWBORN CARE (EENC) FOR NON-BREATHING BABY

IF baby is gasping or not breathing after thorough drying and stimulation (for as close as possible to 30 seconds):

- Call for help and explain gently to the mother that her baby needs help to breathe.
- Clamp and cut the cord immediately to allow effective ventilation to be performed
- Transfer the baby to the resuscitation area (a dry, clean and warm surface).
- Keep the baby wrapped or under a heat source, if available.
- Consider immediate referral at any point, where feasible.

Open airway and Clear the airway only if it is blocked

- Position the head so it is slightly extended.
- Only if the mouth/nose are blocked, introduce the suction/tube:
  - first, into the baby's mouth 5cm from the lips and suck while withdrawing;
  - second, 3cm in to each nostril and suck while with drawing;
  - repeat once, if necessary, taking no more than a total of 20 seconds; and
  - do tracheal suctioning, where feasible.

NOTE: *DO NOT do routine suctioning of the mouth and nose of babies with:*

- *clear amniotic fluid if they are breathing on their own;*
- *clear amniotic fluid prior to positive pressure ventilation if mouth and nose are free of secretions;*
- *meconium staining if they have started breathing on their own, meaning that they are vigorous.*

Ventilate, if still not breathing

- Start bag/mask ventilation within one minute after birth: for babies<32weeks, it is preferable to start with 30% oxygen, where feasible.
- Place mask to cover chin, mouth and nose to achieve a seal.
- ***NOTE: DO NOT cover the eyes.***
- Squeeze bag attached to the mask with two fingers or whole hand, according to bag size, 2–3 times. Observe rise of chest.
- IF chest is not rising: first, reposition the baby's head.
- IF chest is still not rising: check for adequate mask seal.
- IF chest is still not rising: squeeze bag harder.
- IF chest is rising: ventilate at 40 breaths per minute until baby starts crying or breathing.
- Check breathing; and check heart rate every 1–2 minutes of ventilation.
  - Assess chest rise.
  - Assess heart rate:
    - If heart rate is < 100 per minute, take ventilation corrective steps (see below); or
    - If heart rate is < 60 per minute, where feasible give supplemental oxygen, chest compressions, other ventilatory support and medications.

IF baby fails to improve, follow ventilation corrective steps.

- At any time, if the baby starts breathing or crying and has no chest in-drawing, stop ventilating. Observe to ensure that the baby continues to breathe well.

Then:

- return the baby to the mother's chest on skin-to-skin contact;

Ventilation Corrective Steps
1. Check position of head
2. Check for adequate mask seal
3. Check for blocked airway
4. Check resuscitator bag

- exclude a second baby, give oxytocin (if not already given);
- wash hands, re-glove and trim the cord, as needed.

- At any time, if the baby starts breathing or crying and has no chest in-drawing, stop ventilating. Observe to ensure that the baby continues to breathe well.

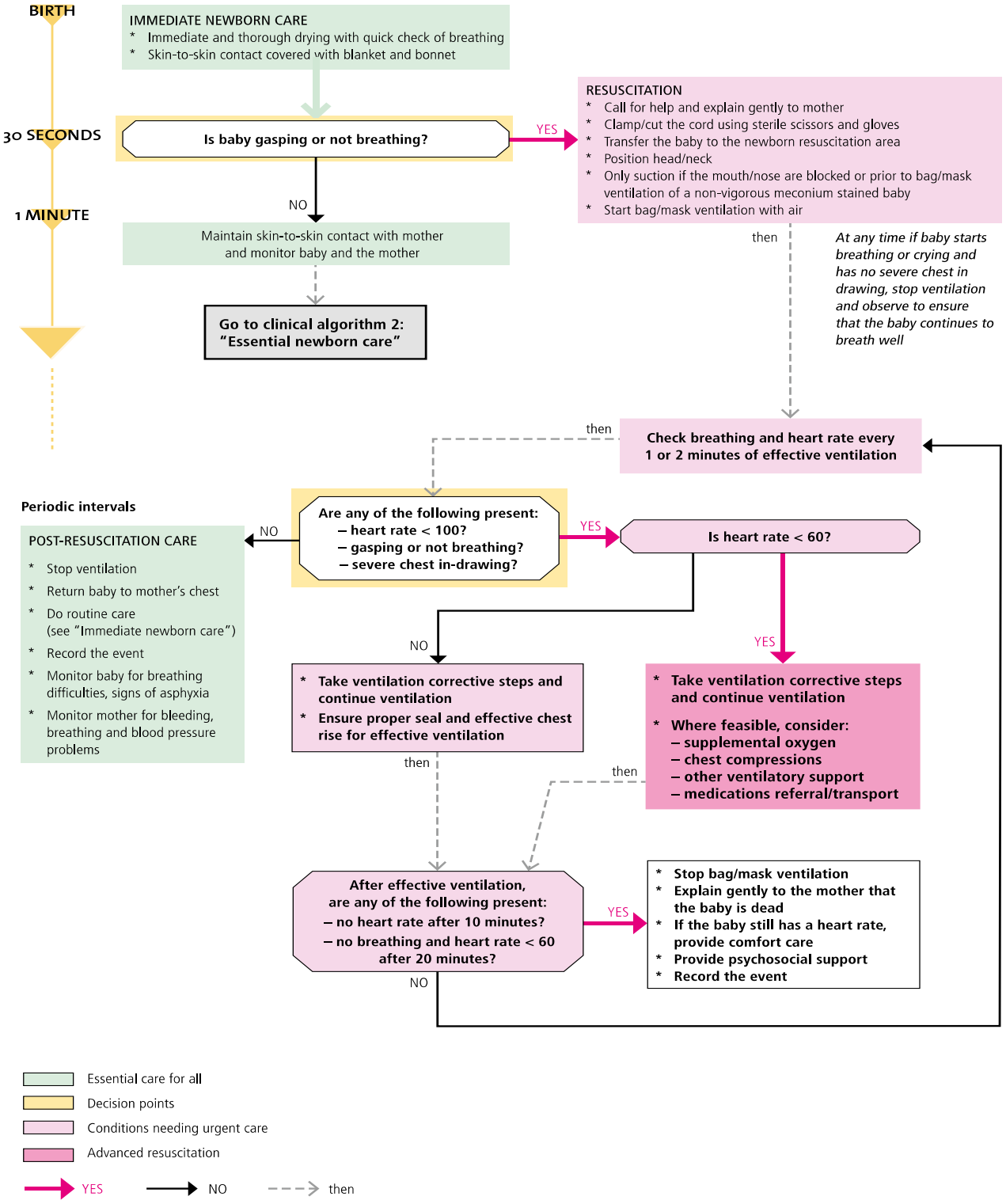
Then:

- return the baby to the mother's chest on skin-to-skin contact;
- exclude a second baby, give oxytocin (if not already given);
- wash hands, re-glove and trim the cord, as needed.

NOTES:

- *While ventilating, refer and explain to the mother what is happening, what you are doing, and why.*
- *Ventilate, if needed, during transport.*
- *Record the event on the referral form and labor record.*

Algorithm 3: **Newborn resuscitation**



BEYOND EENC; ADVANCED NEONATAL RESUSCITATION

If there is no improvement with corrected and effective PPV, consider following if feasible:

- supplemental oxygen
- chest compressions
- other ventilatory support (Intubation/CPAP)
- medications referral/transport

***NOTE**: If the ventilation technique is not optimal, do not proceed to the chest compressions and instead focus on providing optimal ventilation*

ADVANCED ASSESSMENT

Next assessment:

- Evaluate respirations, HR, color
- If HR>100 but cyanotic, give supplemental oxygen; if persistently cyanotic, provide positive pressure ventilation (Bag and mask ventilation)
- If HR<100 or apneic, provide positive pressure ventilation (may intubate)

Next assessment:

- Evaluate HR
- If HR>60 continue providing positive pressure ventilation (may intubate)
- If HR<60 administer chest compressions & continue positive pressure ventilation (may intubate)

Next assessment:

- Evaluate HR, count (HR for 6 sec X 10)
- If HR>60 continue positive pressure ventilation (may intubate)
- If HR<60 continue chest compressions, positive pressure ventilation (may intubate), and administer epinephrine
  - Epinephrine 0.1-0.3mL/kg 1:10,000 solution UVC/IV/IO
  - Epinephrine 0.3/1.0mL/kg 1:10,000 solution ETT

Next assessment:

- If above measures fail, re-check effectiveness of ventilation, chest compressions, endotracheal intubation, and epinephrine delivery.
- If newborn is receiving effective positive pressure ventilation and compressions, and has reliably received epinephrine, consider hypovolemia,
- If there is history or possibility of blood loss. May give bolus of NS 10mL/kg UVC/IV/IO.
- If HR remains absent for >15 minutes despite resuscitation, consider calling for termination of efforts.

How to give oxygen administration

- Use oxygen to newborns that are breathing regularly but remain cyanotic or not reach to target situation
- Give free flow oxygen by hand cupped over the face & oxygen tubing or a face mask
- Don't use self-inflating bag to give oxygen

How to give alternative ventilation:

- Bag size 500ml with pressure release valve of 30 – 35 cm H_2O with a reservoir
- Mask size (cover nose, mouth and chin but not the eyes)

- Give 30 to 50 breaths per minute.
- Count: squeeze, two, three, squeeze.
- Give enough to see chest rise a "normal easy breath".
- **LISTEN** over the upper chest or axilla and over the stomach.

Indication for positive pressure ventilation (Bag and mask)

- Apnea
- Gasping respiration
- Heart rate <100/min
- Central cyanosis despite 100% oxygen

Table 3B.1 Indication for tracheal intubation

1	The neonate meets the criteria for resuscitation, the amniotic fluid is meconium-stained and tracheal suctioning of meconium could be an effective method of opening the airway
2	Heart rate is still < 100/min at about 30 sec after starting effective ventilation
3	Not only ventilation but also chest compressions are continued for a long period of time
4	Adrenalin will be administered endotracheally through an ET tube
5	The neonate appears to have certain conditions such as congenital diaphragmatic hernia or respiratory distress syndrome requiring surfactant replacement therapy

Source: The Textbook of Neonatal Cardiopulmonary Resuscitation, NCPR program, Japan Society of Perinatal and Neonatal Medicine, 2016.

Table 3B.2 Size and lengths of ET tube to use by gestational age and birth weight

Body weight (kg)	Gestational age	Tube size (mm)	Insertion depth from the corner of the mouth 6+ body weight (kg) cm
< 1.0	< 28	2.0-2.5	6.5-7.0
1.0-2.0	28-34	2.5-3.0	7.0-8.0
2.0-3.0	34-38	3.0-3.5	8.0-9.0
3.0 <	38 <	3.5	9.0 <

Source: The Textbook of Neonatal Cardiopulmonary Resuscitation, NCPR program, Japan Society of Perinatal and Neonatal Medicine, 2016.

Size of laryngoscope (Miller)

Size 0 laryngoscope blade for preterm
Size 1 for term infants

Table 3B.3 Intubation Problems and Solutions

Situation	Problem	Solution
Blade not visible due to tongue blocking	Tongue not moved out of the way on insertion	Move the tongue from the right and re-insert the blade
Tongue visible in front of blade	Blade insertion not far enough	Advance the blade further

Epiglottis hanging in front of blade	Blade has not reached epiglottis	Place blade on epiglottis and lift again
Esophagus visible in front of blade	Blade inserted too far	Slowly withdraw the blade keeping the same angle
Opening of the trachea and vocal cords visible on left or right side only	Blade slipped off center to the right or left on insertion	Shift the larynx left or right from the outside using the little finger or ring finger of the left hand
Only the lower half of the tracheal opening and vocal cords are visible	Tongue and jaws not lifted high enough	Lift tongue and jaws up or provide thyroid and cricoid pressure

Source: The Textbook of Neonatal Cardiopulmonary Resuscitation, NCPR program, Japan Society of Perinatal and Neonatal Medicine, 2016.

Table 3B.4 Complications related to intubation

Complication	Cause	Prevention and management
hypoxia	Excessive duration of intubation Tube malpositioning	Provide adequate oxygenation before intubation (prevention) Monitor during intubation (prevention) Take no more than 20 sec to intubate (prevention) Check with end-tidal CO2 monitor (prevention) Check insertion depth (prevention)
Bradycardia	Hypoxia Vagal response caused by intubation procedures	Ensure adequate oxygenation by ventilation (management) Intubate quickly (prevention)
Pneumothorax	Unilateral pulmonary over inflation due to unilateral lung intubation Excessive ventilation pressure	Inset to proper depth (prevention) Check for equal breathing sound i.e. respiratory sounds in left and right lungs (prevention) Use correct ventilation pressure (prevention) Transillumination (diagnosis) Chest drainage (management)
Oral/respiratory tract injury	Aggressive handling of the laryngoscope blade and/or ET tube	Practice and master gentle handling techniques (prevention)
Perforation of trachea or esophagus	Aggressive handling of ET tube Improper use of stylet	Handle equipment gently (prevention) Follow procedures properly (prevention)
Obstruction of ET tube	Bent tube	Check and suction with suction catheter (management) Remove and re-insert ET tube (management)

	Obstruction by secretion or meconium	
Infection	Unsanitary handling of equipment	Wash hands (prevention) Wear gloves (prevention)

Source: The Textbook of Neonatal Cardiopulmonary Resuscitation, NCPR program, Japan Society of Perinatal and Neonatal Medicine, 2016

Table 3B.5 Assessing outcomes of endotracheal intubation

Physical findings etc.

1) *Both sides of the chest rise and fall in concert*
2) *Respiratory sounds auscultated at the same strength in lung fields in both axillary regions*
3) *No sound of air entering the stomach*
4) *No gastric distension*
5) *"water vapor" produced by breathing visible in the tube*
6) *Neonate's heart rate, color, and vigorousness improved*

Monitors etc.

1) *Expired CO2 detected by end-tidal CO2 monitor or CO2 detector (however, CO2 will not be detected if there is no effective cardiac output due to a cause such as cardiac arrest)*
2) *Improvement in heart rate and oxygen saturation on pulse oximeter*
3) *Improvement in heart rate on ECG monitor*
4) *Position of ET tube observed on chest X-ray films*

Source: The Textbook of Neonatal Cardiopulmonary Resuscitation, NCPR program, Japan Society of Perinatal and Neonatal Medicine, 2016.

Table 3B.6 Medications for neonatal resuscitation

Drug	**Dose**	**Dissolution method used in practice**	**Recommended syringe**	**Actual dose**
Bosmin (0.1% adrenaline) (1 mg/ml)	Intravenous 0.01-0.03 mg/kg	1 ml Bosmin + 9 ml saline (0.1 mg/mL)	1 mL	0.1-0.3 ml/kg
	Endotracheal 0.05-0.1 mg/kg	1 ml Bosmin + 9 ml saline (0.1 mg/mL)	5 mL/10 mL	0.5-1.0 ml/kg
Normal Saline	10 ml/kg/dose	Stock solution	20 mL/30 mL	10 ml/kg/dose
Meylon 8.4% (8.4% sodium bicarbonate)	1-2 mEq/kg/dose	5 ml Meylon 8.4% + 5 ml distilled water (0.5 mEq/mL)	10 mL	2-4 ml/kg/dose

Source: The Textbook of Neonatal Cardiopulmonary Resuscitation, NCPR program, Japan Society of Perinatal and Neonatal Medicine, 2016.

How to Give Chest Compression

- If the HR < 60/min despite effective positive pressure ventilation (PPV) for 30 sec.
- Site – lower third of sternum.
- Rate: 120 events/min, (90 compressions and 30 ventilation/ min).
- Two-person rescue: use two thumb technique.
- Compression: ventilation ratio = 3:1
- Always accompany compressions with PPV because ventilation is of primary importance in newborn resuscitation.

How to give medication: rarely necessary for neonatal resuscitation

- Use If HR < 60/min despite adequate ventilation with 100% O_2& chest compression.
- Adrenaline and volume expansion are the most effective neonatal resuscitation medication.
- Adrenaline: 1; 10,000 = 0.1 -0.3 ml/kg IV.
- Volume expanders (NS/ RL) = 10ml/kg as IV bolus over 5 to 10 mins.

Emergency UVC Insertion

Only adrenaline can be given from endotracheal tube. Other medicines need to be given from intravenous access. Therefore, if rapid IV access is necessary, UVC is best option for administering emergency fluids and medications. When unable to establish peripheral IV within reasonable time or attempts or when more than one intravenous line is required, emergency UVC insertion should be considered.

The procedures are

1. Prepare the equipment
2. Attach 3 way stop cock to the umbilical catheter (>1500g 5Fr, <1500g 3.5Fr)
3. Prime/flush the catheter by sterile normal saline and close 3-way stopcock
4. Clean the cord by povidone iodine.
5. Tie the basis of the cord by sterile cord tie (Do not tie to tight, tie enough to stop bleeding and allow catheter to go through)
6. Grasp cord stump (with toothed forceps, if available)
7. Gently insert tips of fluid filled catheter, attached to the stopcock and syringe, 2 to 3 cm into vein.
8. Apply gentle suction to syringe. If there is no, easy blood return, catheter may have a clot at the tip. Withdraw catheter. Remove the clot and reinsert. If free flow of blood obtained, keep on inserting till desired length. (Just 2cm below the skin level, avoid too deep as it can malposition into hepatic vein)
9. Avoid air get into the catheter and administer emergency drugs.

SPECIAL CONSIDERATION

No Improvement After Resuscitation:

The most common cause of failure to respond to resuscitation is ineffective ventilation.

❖ **Failure to ventilate:**

- Reassess ventilation.
- Mechanical blockage of airway
  - Meconium or mucus plug.
  - Airway malformation (e.g., Robin syndrome).

  - Choanal atresia.
- Impaired function
  - Pneumothorax
  - Congenital pleural effusion
  - Congenital diaphragmatic hernia
  - Pulmonary hypoplasia
  - Extreme prematurity
  - Congenital pneumonia

❖ **Persistent cyanosis or bradycardia**

- Ensure chest is moving with ventilation
- Listen for equal bilateral breath sounds
- Confirm 100% oxygen is being given
- Consider congenital heart block or cyanotic heart disease (rare)

❖ **Failure to initiate spontaneous breathing:**

- Sedation secondary to maternal drugs
  - Narcotic analgesics
  - Magnesium sulfate
- Brain injury (hypoxic ischemic encephalopathy).
- Congenital neuromuscular disorder

Resuscitation Outside Hospital:

☐ Warm, position, clear airway
- Skin to skin; drying, use fingertip covered with cloth

☐ Stimulate to breathe

☐ Establish effective ventilation
- Mouth-to-mouth/nose; self-inflating bag

RESUSCITATION FOR PREMATURE BABIES

Resuscitation for premature babies require special considerations due to:

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

Therefore, resuscitation for premature babies should be provided with:

- Additional trained personnel, including some skilled at intubation
- Assemble team and equipment before resuscitation
- Increase delivery room temperature
- Preheat resuscitation area
- Preheat blankets
- Use warming pad
- Consider polyethylene bag for babies <28 weeks' gestation
- Follow same criteria for initiating positive-pressure ventilation
- Adjust oxygen concentration to reach target saturations
- Consider using CPAP if the baby is breathing spontaneously and has a heart rate above 100

- Use the lowest inflation pressure to achieve an adequate response
- Consider surfactant administration if available at the resuscitation corner in case CPAP failure.

Stable preterm who do not require resuscitation can be kept with mother immediately after birth with skin to skin contact at least 90 minutes and beyond to provide 24 hours continuous Kangaroo Mother Care to ensure warmth, stabilize breathing and establish breastfeeding. Even unstable preterm, KMC should be provided as soon as the baby become hemodynamically stable.

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Advanced Neonatal Resuscitation Algorithm