ENDOTRACHEAL INTUBATION
**NEONATAL FLOW ALGORITHM**

**BIRTH**
- Term gestation?
- Amniotic fluid clear?
- Breathing or crying?
- Good muscle tone?

**Routine Care**
- Provide warmth
- Clear airway if needed
- Dry
- Assess color

**Evaluate respiration, heart rate and color**
- Breathing, HR >100 & Pink

**Observational Care**

**A**
- Provide warmth
- Position clear airway* (as necessary)
- Dry, stimulate, reposition

**B**
- Apneic or HR <100
  - Give supplementary oxygen
  - Persistent cyanosis

**Provide positive-pressure ventilation***
- Effective Ventilation, HR >100 & Pink
- Post-resuscitation care

**C**
- HR <60
  - HR >60

**D**
- Administer epinephrine and/or volume*

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*Endotracheal intubation may be considered at several steps*
Indications for intubation

- Meconium suctioning in non vigorous baby
- Diaphragmatic hernia
- Prolonged PPV
- Ineffective B & MV
- Elective
  - < 1Kg
  - with CC
  - for medication
Intubation equipment
Preparing laryngoscope

- No. 1 for full term
- No. 0 for preterm / LBW
- No. 00 for extremely preterm (optional)
## Selecting endotracheal tube

<table>
<thead>
<tr>
<th>Tube Size (ID mm)</th>
<th>Weight</th>
<th>Gest. Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5</td>
<td>&lt;1000 gm</td>
<td>&lt; 28 wks</td>
</tr>
<tr>
<td>3.0</td>
<td>1000-2000 gm</td>
<td>28-34 wks</td>
</tr>
<tr>
<td>3.5</td>
<td>2000-3000 gm</td>
<td>35-38 wks</td>
</tr>
<tr>
<td>4.0</td>
<td>&gt;3000 gm</td>
<td>&gt; 38 wks</td>
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*ID=Internal Diameter*
Preparing endotracheal tube

- Shorten the tube to 13 cm
- Replace ET tube connector
- Insert stylet (optional)
Additional items

**Tape**
- For securing the tube

**Suction equipment**
- DeLee mucus trap or mechanical suction

**Oxygen**
- For free flow oxygen during intubation
- For Use with the resuscitation bag

**Resuscitation Bag and Mask**
- To ventilate the infant in between intubation
- To check tube placement
Positioning the infant

- On a flat surface, head in midline and neck slightly extended
- Optimal viewing of glottis
Visualizing the Glottis with Laryngoscope

Preparing for insertion

- Stand at the head end of the infant
  Hold the laryngoscope in your left hand
  Stabilize the infant’s head with right hand

Introducing Blade

- Slide it over the tongue with the tip of the blade resting on the vallecula

Visualizing Glottis : Lift Blade

- Lift it slightly, thus lifting the tongue out of the way to expose the pharyngeal area
Vocal cord guide

- Vocal cord guide
- Vocal cords middle third of trachea
- ET tube inserted with vocal cord guide at level of vocal cords
### Tip to lip distance (6+wt. in kg)

<table>
<thead>
<tr>
<th>Weight</th>
<th>Distance</th>
</tr>
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<tbody>
<tr>
<td>1 kg</td>
<td>7 cm</td>
</tr>
<tr>
<td>2 kg</td>
<td>8 cm</td>
</tr>
<tr>
<td>3 kg</td>
<td>9 cm</td>
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</table>
Confirming ET tube placement

Correct placement
- $ETCO_2$ - the recommended method

Signs
- Bilateral breath sounds
- Equal breath sounds
- Rise of the chest with each ventilation
- No air heard entering stomach
- No gastric distention

Confirmation of tip position in trachea
- Chest X-ray: tip at $T_2$
Tube in Rt. Main bronchus

- Breath sounds only on right chest
- No air heard entering stomach
- No gastric distention

*Action: Withdraw the tube, recheck*
Tube in esophagus

- No breath sounds heard
- Air heard entering stomach
- Gastric distention may be seen
- No mist in tube
- No CO$_2$ in exhaled air

Action: Remove the tube, oxygen the infant with a bag and mask, reintroduce ET tube
Three actions after intubation

1. Note the cm. Mark on the tube at level of the upper lip

2. Secure the tube to the infant’s face

3. Shorten tube 4 cm. from the lip margin
Complications of intubation

- Hypoxia
- Bradycardia
- Apnea
- Pneumothorax
- Soft tissue injury
- Infection
Minimizing hypoxia during intubation

- Providing free-flow oxygen (Assistant’s responsibility)
- Limiting each intubation attempt to 20 seconds
LMA – its role in neonatal resuscitation

- Effective for ventilation during resuscitation in term and near term newborns
- Used by trained care providers
- NOT TO BE USED IN:
  - In the setting of meconium stained amniotic fluid
  - When chest compression is required
  - In VLBW babies
  - For delivery of medications