

CLINICAL PRACTICE GUIDELINE

Cardio-Pulmonary Resuscitation – Neonatal Basic Life Support –

SCOPE (Area): Maternity Unit / Operating Suite/Emergency Department /Paediatric and Adolescent Unit

SCOPE (Staff): Medical, Midwifery and Nursing

BACKGROUND/RATIONALE

- Neonatal cardio-pulmonary resuscitation guidelines are based on the Australian Resuscitation Council guidelines released in March 2006.

DESIRED OUTCOME/OBJECTIVE

- That all staff follow the Australian Resuscitation Guidelines / Newborn Emergency Transport Service (NETS) as adapted by Ballarat Health Services.
- To provide the recommended management in an emergency situation.

DEFINITIONS

- The term “newborn” refers to the infant in the first minutes of life to hours following birth.
- The neonatal period is defined as the first 28 days of life.

INDICATIONS

- For the initial resuscitation of the newborn or in the event of a Respiratory or Cardiac arrest in the neonate.
- This document is intended to apply specifically to newborn infants however principles may be applied throughout the whole neonatal period.

EQUIPMENT

- Gloves
- Suction (low pressure 13 kPa, 133cms water) and suction catheters
- Medical Air and Oxygen
- Laerdal, anaesthetic bag or Neopuff with various sized face masks
- Resuscitation trolley including a light source, overhead warmer, clock with timer in seconds
- Warmed towels, wraps or neowrap for premature infants
- Stethoscope
- Feeding tubes for gastric decompression
- Infant name tags X 2

PROCEDURE

PROCESS STANDARDS:	KEYPOINTS:
<p>1. Check for danger to the patient and to staff.</p> <ul style="list-style-type: none"> ▪ Move patient away from danger if necessary. ▪ Ensure gloves are on. 	<p style="text-align: center;">DANGER:</p> <ul style="list-style-type: none"> ▪ Only move patient away from danger if able to without causing injury to yourself and other staff.
<p>2. Initial assessment should include response to tactile stimulation, breathing, heart rate, tone and colour.</p>	<p style="text-align: center;">RESPONSE:</p> <ul style="list-style-type: none"> ▪ Place neonate in right lateral position to enable secretions to drain. ▪ Gently dry and warm the baby. ▪ If the infant is breathing but not pink & vigorous within 30 seconds of birth apply 4L oxygen to face via tubing cupped in the hand. ▪ An infant with good tone (moving limbs and flexed posture) is unlikely to be severely compromised whereas a floppy infant (not moving and extended posture) is likely to need active resuscitation.
<p>3. Activate closest emergency buzzer.</p> <ul style="list-style-type: none"> ▪ If the neonate does not breathe or has heart rate < 100 beats per minute positive pressure ventilation should be started, call for assistance. 	<p style="text-align: center;">SEND FOR HELP</p> <p style="text-align: center;">Call for medical assistance. Activate Emergency Buzzer AND Dial 94444 Call NEONATAL Code Blue and state location</p>
<p>4. <u>Establish a clear airway</u> - look for signs of obstruction.</p> <ul style="list-style-type: none"> ▪ If the airway needs to be cleared place the neonate on his/her back <ul style="list-style-type: none"> → Open the neonate’s airway by positioning the head in a neutral or “sniff position”, support the lower jaw at the chin, without applying pressure to the soft tissues. → Suction mouth first then the nares, and ensure low-pressure suction is used. Use a size 10 or 12 Fg suction catheter. 	<p style="text-align: center;">AIRWAY:</p> <ul style="list-style-type: none"> ▪ Signs of obstruction include; flaring of the nostrils, use of accessory muscles, retraction or indrawing of the lower ribs and sternum and an audible grunt ▪ Pharyngeal suctioning can cause laryngeal spasm, trauma and bradycardia therefore should be done efficiently and gently and not past the oropharynx. Suction should not exceed 13 kPa or 133cms H20 of pressure or take longer than 5 seconds to complete. ▪ Measure suction tubing from ear to side of mouth which is approximately the same distance from mouth to pharynx.

	<ul style="list-style-type: none"> Suctioning should be performed by an experienced operator only and is not routinely performed in all resuscitation situations.
<p>5. <u>Establish breathing:</u></p> <ul style="list-style-type: none"> Look for a rise and fall of the chest and abdomen. Listen for breathing and feel for the neonates breath by using your hand to feel the chest rise and fall or listen with a stethoscope. If the neonate is <u>breathing adequately</u> place in the lateral position, keep warm, remove wet wraps and replace with dry warm ones. If the neonate is <u>not breathing</u> or is <u>not breathing normally</u> (i.e. taking the occasional gasp), commence positive pressure ventilation one inspiration per second via a Laerdal or Neopuff with medical air initially. If the infants condition, tone and colour does not improve with in the first 90 seconds introduce supplemental oxygen. Commence positive pressure ventilation with 100% if heart rate is low initially. 	<p style="text-align: center;">BREATHING:</p> <ul style="list-style-type: none"> Mouth to mouth rescue breathing is not <u>advocated</u> in the hospital setting. An appropriate airway adjunct such as the Laerdal, Neopuff or anaesthetic bag are to be used for the delivery of breaths. Neopuff (preferred method) <ul style="list-style-type: none"> Set PEEP 5cm PIP 30cm Maximum pressure 50cm Set flow rate at 8 litres/minute. This will deliver 100% oxygen. Bag-valve-masks suitable for neonates have a ventilation bag volume of 240mls. Transfer to resuscitare if requiring positive pressure ventilation. Avoid excessive volumes; deliver only the volume needed to produce visible chest rise. Observe for the rise and fall of the chest while delivering breaths. Optimal thermal control is essential and the infant's temperature should be maintained between 36.5 - 37.2°C. Ensure overheating does not occur. Some babies may not appear to breath very well however if they can maintain their heart rate > 100/min no intervention is required. If the heart rate is not maintained > 100/min positive pressure ventilation is required.
<p>6. <u>Establish circulation:</u></p> <ul style="list-style-type: none"> Quickly reassess for the absence of signs of life. Unresponsive, poor tone, absent or laboured breath sounds, heart rate < 60 BPM. 	<p style="text-align: center;">CIRCULATION:</p> <ul style="list-style-type: none"> Signs of life include the presence of a pulse > than 60 beats / min which is assessed as an apex beat rather than or brachial / femoral pulse. Heart rate may initially be assessed by palpating the base of the umbilical cord however this is not a reliable sign that the heart rate is absent. Spend <u>no longer</u> than 10 seconds determining the absence or presence of a pulse. Counting beats over 6 seconds and multiplying by 10 is a quick and effective method of determining heart rate.

<ul style="list-style-type: none"> ▪ If <u>signs of life are present and the neonate is breathing adequately</u>, then give routine care and observations appropriate for gestation. ▪ If the heart rate is between 60 and 100/min commence positive pressure ventilation. ▪ If there are <u>no signs of life or Heart Rate <60 beats per minute</u> commence chest compressions immediately <p style="background-color: yellow;"><u>Chest Compressions to Ventilation ratio</u></p> <p>A ratio of 3 compressions followed by 1 ventilation is used in the hospital setting when there are two rescuers and air/oxygen is used in the delivery of ventilation.</p> <ul style="list-style-type: none"> ▪ Deliver chest compressions at a rate of 2 per second on the mid sternum and a depth of one third of the neonate's chest wall. ▪ Pause compressions to allow the delivery of a breath. ▪ Chest compressions are ineffective when the rescuer becomes fatigued. ▪ Minimise interruptions to chest compressions. ▪ Reassess for signs of life after every 30 seconds 	<p>If a <u>pulse is present</u> and is > 60 beats/min, <u>but the infant is not breathing</u> deliver 60 breaths per minute and continue to observe circulation. Positive pressure ventilation will usually promote a rise in heart rate.</p> <ul style="list-style-type: none"> ▪ Chest Compressions ▪ Visualise the mid sternum (the centre of the chest just below the nipple line) <ul style="list-style-type: none"> → The preferred method, for small neonates with two rescuers use two-thumb technique. Encircle the infant's chest with both hands; spread your fingers around the thorax and place your thumbs together over the mid sternum. <p style="text-align: center;">OR</p> → With 1 or 2 rescuers use 2 finger technique with the tips on the sternum. <ul style="list-style-type: none"> ▪ One minute of CPR with a 3:1 ratio will achieve 30 cycles. Each cycle is 2 seconds. ▪ The increase or decrease in the infants heart rate is the best sign that the infants condition is improving or deteriorating.
<p>7. Continue CPR until:</p> <ul style="list-style-type: none"> ▪ Signs of life return, heart rate>60 ▪ Advanced life support providers arrive in response to the Neonatal Code Blue to manage care and deliver advanced resuscitation including intubation and medications. Maintain CPR whilst awaiting instruction from the Paediatrician. ▪ Advanced life Support providers instruct you to stop. ▪ OR medical personnel pronounces the patient deceased. 	

NOTES / PRECAUTIONS

1. Distension of the stomach occurs regularly during resuscitation due to the stomach inadvertently being filled with air. Therefore if positive pressure ventilation continues for > 5 mins an oral feeding tube is recommended to decompress the stomach and ensure adequate lung expansion. It may be aspirated and then left open to drain.
2. The rescuer performing the chest compressions should count out loud to assist the rescuer with delivery of the breaths and minimising interruptions to compressions. The recommendation is to count out loud “1 & 2 & 3 & Breathe” and so on.
3. Early effective cardiopulmonary resuscitation increases the chance of survival.
4. Infants less than 28 wks gestation become cold very quickly and should be placed in a polyethylene bag or wrap immediately after birth. Place in the bag wet. Keep the babies head outside the bag and the body completely covered. This effectively reduces heat loss during resuscitation which can improve the infants condition and stabilization after the resuscitation.
5. For infants >28 weeks dry and warm, remove wet wraps and place under radiant heater.
6. After successful resuscitation ongoing monitoring of the infant may include monitoring of temperature, vital signs, oxygen saturation and metabolic control including blood sugar control and blood gas analysis to ensure the ongoing stabilization of the infant to decrease the risk of long term sequelae from birth asphyxia and acidosis. The infant should be assessed by an appropriately qualified doctor/Paediatrician.

RELATED DOCUMENTS

[CPG/C003](#): Cardio-Pulmonary Resuscitation - Children

[CPG/C004](#): Cardio-Pulmonary Resuscitation – Infants

REFERENCES

Australian Resuscitation Council. (2006) *Australian Resuscitation Council Guidelines* Retrieved 15/5/2006 from <http://www.resus.org.au/>

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Reg. Authority: CEO, Executive Directors – Nursing/Residential Services, Medical, Subacute/Community & Mental Health Services. Clinical Director & DON- Women & Children’s Health	Date Effective: April 1994 Date Revised: Sept 2010 Date for Review: Sept 2013
Review Responsibility: Maternity Unit / Resuscitation Committee	

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Updated by: Midwifery Educator (2010)