

FREQUENTLY ASKED QUESTIONS: NEWBORN RESUSCITATION

When resuscitating a newly born infant, which guidelines should we be using?

The Australian Resuscitation Council (ARC) *Neonatal Guidelines* 2010: Section 13: Guidelines 13.1 – 13.10 are used to guide initial care and resuscitation of newly born infants in Australia. The ARC guidelines are based on the International Liaison Committee on Resuscitation (ILCOR, 2010) guidelines. The NeoResus program has been developed from the ARC and ILCOR guidelines.

Where can I buy/find the Australian Resuscitation Council (ARC) guidelines?

The guidelines are freely available on the ARC website at <http://www.resus.org.au>. Individuals/organisations no longer need to be a registered subscribers to download the guidelines. However, for a fee of \$66 per year, subscribers gain access to the “Subscriber’s only” area of the ARC website which holds an extensive document library. Go to the “[How to subscribe](#)” link on the ARC website.

We would like to display a laminated copy of the Neonatal Resuscitation Flow Chart on every resuscitaire. Where can we access a copy of this flow chart?

The Newborn Life Support flow chart can be downloaded free of charge from the [ARC web site](#).

Pedi-Cap CO₂ DETECTORS

Where can we purchase the Pedi-Cap CO₂ detectors and how much do they cost?

The Pedi-Cap CO₂ detectors are supplied through Covidien in Australia. They cost approximately \$71.10 for a box of 6.

A teaching resource on the use of the Pedi-Cap is available on the NeoResus website.

PLASTIC BAGS FOR NEWBORNS <28 WEEKS’ GESTATION &/or <1500 g

The ARC 2010 Neonatal Guidelines recommend that infants <28 weeks’ gestation or <1500 g birth weight should be placed immediately after birth into a polyethylene bag. Where can we buy these bags?

A polyethylene bag is a food grade, heat resistant bag. PIPER-Neonatal (NETS) purchase “Magic Seal” bags, supplied by Venus Hartung. The cost is \$100.88 for 1000 bags. NETS purchase the 11 inch by 15 inch bags. Contact Venus Hartung on (03) 9428 1652.

You can purchase a box of Glad™ “zip lock” bags or similar from the supermarket. *Do not purchase* roasting bags (“chook” bags), which are made from polyurethane.

OXYGEN/AIR FOR RESUSCITATION

We have a Neopuff, but we don't have medical air in our birth suites and operating theatres. If the ARC recommends commencing resuscitation with air, should we go back to using the Laerdal bag (without gas flowing through it) for resuscitation or continue to use the Neopuff with 100% oxygen?

The ARC (2010) guidelines state:

“If a blend of oxygen and air is not available, resuscitation should be initiated with air. In all cases, the first priority is to ensure adequate inflation of the lungs, followed by increasing the concentration of inspired oxygen only if needed”.

(Guideline 13.4, page 11).

While it is acknowledged that some maternity units do not have piped medical air in the birth suites, a cylinder of medical air can be attached to a resuscitaire beside the oxygen cylinder with ease. Your neonatal equipment provider will be able to assist with setting up air and oxygen on the resuscitaire.

Gas from the air and the oxygen cylinders can be blended to enable use of a T-piece device (Neopuff™ or similar) and a self-inflating bag with oxygen concentrations of 21% to 100%. In the absence of a blender, a “Y” connector attached to the green argyle (oxygen) tubing can be used to blend gas from the air and the oxygen cylinders using the following mix of flows:

Desired oxygen concentration	Oxygen flow (L/min)	Air flow (L/min)
21% (Air)	0	8
30%	1	7
40%	2	6
50%	3	5
60%	4	4
70%	5	3
80%	6	2
90%	7	1
100%	8	0

Alternately, a self-inflating bag (e.g. Laerdal™) can be used to provide positive pressure ventilation in room air (21%) without needing a gas source.

Another option is to use a self-inflating bag with 1 L/min of oxygen flow. This will provide less than 100% O₂ but still greater than 40% O₂ and can be used as an intermediate step before weaning to air. (Reference: Thio, van Kempen, Rafferty *et al.*

Neonatal resuscitation in resource-limited settings: Titrating oxygen delivery without an oxygen blender. *The Journal of Pediatrics* 2014 165(2):256-260.

Each hospital must develop and implement a consistent policy based on their current equipment profile.

Remember: The most important part of any resuscitation is adequate ventilation. If the baby's heart rate remains less than 100 beats/min, ensure ventilation is effective: i.e. making sure there is a good mask seal and/or increasing the peak inflating pressure before increasing the oxygen concentration.

Should we be using pulse oximetry to titrate the concentration of oxygen administered to the newly born infant in the birth suite/theatre?

The Australian Resuscitation Council (2010) guidelines state:
“Oximetry is recommended when the need for resuscitation is anticipated, when positive pressure is administered for more than a few breaths, when persistent cyanosis is suspected, or when supplemental oxygen is used”. (Guideline 13.4, Page 10).

Since publication of the 2006 ILCOR and ARC Neonatal Guidelines there has been strong evidence to support using oximetry to titrate the concentration of supplemental oxygen against a newly born infant's requirements, bearing in mind the normal changes seen in the first minutes of life.

At birth, the SpO₂ of a normal healthy newborn is approximately 40-60%. Many normal healthy newborns take at least ten minutes to achieve an oxygen saturation of 90%. Therefore, during the first minutes after birth, a SpO₂ between 60% – 90% (in the presence of a heart rate above 100 beats per minute) is not an indication to commence supplemental oxygen. Hyperoxia should be avoided, especially in the preterm infant. The concentration of oxygen should be weaned once the pre-ductal (right hand or wrist) SpO₂ is greater than 90% in the first ten minutes after birth.

A major benefit of using pulse oximetry in the birth suite/theatre is that it provides a continuous display of the baby's heart rate within about a minute of birth. To obtain the fastest display, the pulse oximeter should be turned on first, the sensor should be placed on the right hand or wrist (pre-ductal) and **then** plugged into the oximeter cable. An obviously increasing or decreasing heart rate is the best sign that the newborn's condition is improving or deteriorating.

When do you change the compression/ventilation ratio from 3:1 to 15:2?

There is a paucity of evidence to guide practice in this area. The 3:1 ratio emphasises the importance of ventilation in the fluid-containing, unexpanded lung at birth.

Given apnoea/compromised respiratory effort is the commonest cause of severe bradycardia/circulatory arrest in the first weeks of life it is not unreasonable to use the 3:1 ratio outside the newborn period.

One approach may be to choose a cut off time for the change over. For example, the time of discharge home from hospital after birth. Hospitals must develop their own policy regarding compression: inflation ratios, taking into consideration the different areas of the hospital where newborns, neonates and infants are nursed and the specific areas of the hospital in which staff work. A ratio of compressions to inflations of 15:2 is recommended for health professionals skilled in advanced resuscitation techniques.

The ARC have addressed this question in their *Frequently Asked Questions* stating:

“Given the shortage of evidence for compression to ventilation ratios at any age, it is more important that resuscitation teams perform continuous effective CPR according to their usual training, than spending time negotiating what ratio should be used”. (Australian Resuscitation Council, August 2012)

For further information regarding compression to ventilation ratios, refer to the [“Frequently Asked Questions”](#) section on the ARC website. The ARC discuss compression to ventilation ratios for children, infants and newborns in some detail.

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