

# Summary of Major Changes to the 2005 AAP/AHA Emergency Cardiovascular Care Guidelines for Neonatal Resuscitation: Translating Evidence-Based Guidelines to the NRP

## Use of oxygen during neonatal resuscitation

Current evidence is insufficient to resolve all questions regarding supplemental oxygen use during neonatal resuscitation.

For babies born at term,

- The Guidelines recommend use of 100% supplemental oxygen when a baby is cyanotic or when positive-pressure ventilation is required during neonatal resuscitation.
- However, research suggests that resuscitation with something less than 100% may be just as successful.
- If resuscitation is started with less than 100% oxygen, supplemental oxygen up to 100% should be administered if there is no appreciable improvement within 90 seconds following birth.
- If supplemental oxygen is unavailable, use room air to deliver positive-pressure ventilation.

To reduce excessive tissue oxygenation if a very preterm baby (less than approximately 32 weeks) is being electively delivered at your facility:

- Use an oxygen blender and pulse oximeter during resuscitation.
- Begin PPV with oxygen concentration between room air and 100% oxygen. No studies justify starting at any particular concentration.
- Adjust oxygen concentration up or down to achieve an oxyhemoglobin concentration that gradually increases toward 90%. Decrease the oxygen concentration as saturations rise over 95%.

- If the heart rate does not respond by increasing rapidly to > 100 beats per minute, correct any ventilation problem and use 100% oxygen.

If your facility does not have use of an oxygen blender and pulse oximeter in the delivery room, and there is insufficient time to transfer the mother to another facility, the resources and oxygen management described for a term baby are appropriate. There is no convincing evidence that a brief period of 100% oxygen during resuscitation will be detrimental to the preterm infant.

## Meconium

No longer recommend that all meconium-stained babies routinely receive intrapartum suctioning (i.e., before delivery of shoulders). Other recommendations about post delivery neonatal suctioning remain unchanged.

## Bag-and-mask ventilation

- Call for assistance when beginning PPV.
- After beginning ventilation at appropriate rate and pressure, ask the assistant to report heart rate and breath sounds as indicators of effective ventilation. Heart rate is assessed first, and if not improving, assess chest movement and ask about breath sounds.

## Devices for assisting ventilation

Flow-controlled pressure limited mechanical devices (e.g., T-piece resuscitators) are recognized as an acceptable method of administering positive-pressure ventilation during resuscitation of the newly born and in particular the premature infant;

however, self-inflating and flow-inflating bag-and-mask equipment and techniques remain the cornerstone of achieving effective ventilation in most resuscitations.

## Effectiveness of assisted ventilation

Increasing heart rate is the primary sign of effective ventilation during resuscitation. Other signs are:

- Improving color
- Spontaneous breathing
- Improving muscle tone

Check these signs of improvement after 30 seconds of PPV. This requires the assistance of another person.

## Laryngeal mask airway

The laryngeal mask airway has been shown to be an effective alternative for assisting ventilation of some newborns who have failed bag-and-mask ventilation or endotracheal intubation.

## Use of CO<sub>2</sub> detector

An increasing heart rate and CO<sub>2</sub> detection are the primary methods for confirming ET tube placement.

## Epinephrine

If the endotracheal route is used, doses of 0.01 or 0.03 mg/kg will likely be ineffective. Therefore, IV administration of 0.01 to 0.03 mg/kg per dose is the preferred route (Class IIa). While access is being obtained, administration of a higher dose (up to 0.1 mg/kg) through the endotracheal tube may be considered (Class Indeterminate), but the safety and efficacy of this practice have not been evaluated.

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## Recommended dose

IV: 0.1 to 0.3 mL/kg of 1:10,000 solution. Draw up in 1-mL syringe

ET: 0.3 to 1.0 mL/kg of 1:10,000 solution. Draw up in 3-mL or 5-mL syringe

## Naloxone

Naloxone is not recommended during the primary steps of resuscitation

The indications for giving naloxone to the baby require both of the following to be present:

- Continued respiratory depression after positive-pressure ventilation has restored a normal heart rate and color, and
- A history of maternal narcotic administration within the past 4 hours.

There are no studies reporting the efficacy of endotracheal naloxone. This route is not recommended.

- Intravenous route preferred.
- Intramuscular route acceptable, but delayed onset of action.

## Temperature control

Polyethylene bags may help maintain body temperature during resuscitation of very low birth weight (VLBW) infants.

## Therapeutic hypothermia

- Hypothermia may reduce the extent of brain injury following hypoxia-ischemia.
- There is insufficient data to recommend routine use of selective and/or systemic hypothermia after resuscitation of infants with suspected asphyxia. Further clinical trials are needed to determine which infants

benefit most and which method of cooling is most effective.

## Hyperthermia

- Hyperthermia may worsen the extent of brain injury following hypoxia-ischemia.
- The goal should be to achieve normothermia and to avoid iatrogenic hyperthermia in resuscitated newborns.

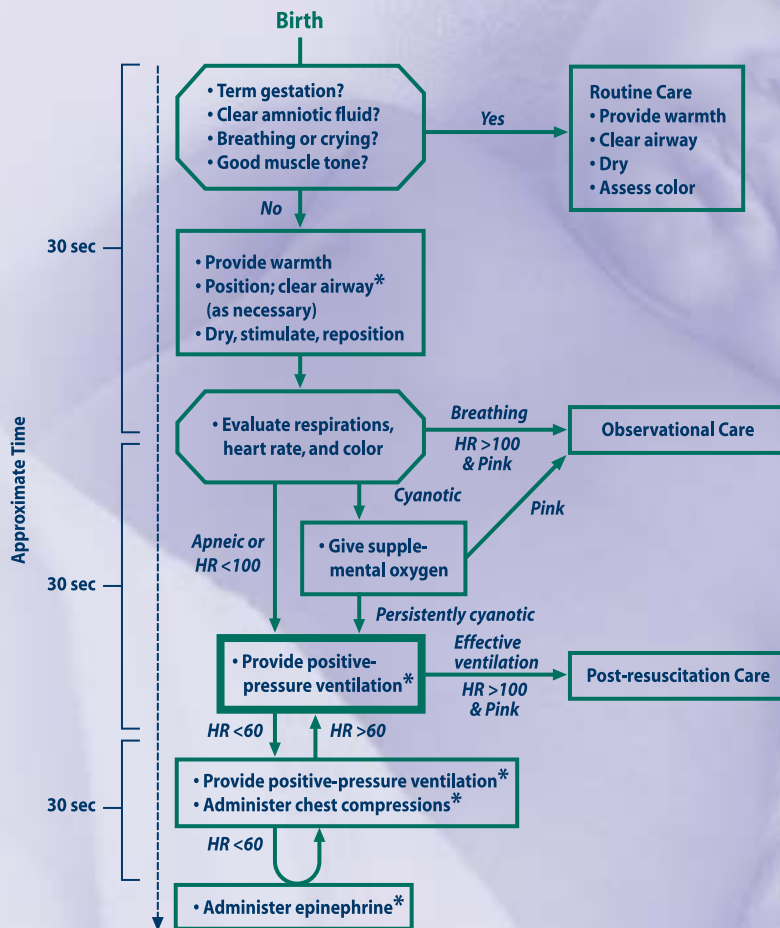
## Withholding or withdrawing resuscitation

A consistent and coordinated approach to individual cases by the obstetric and neonatal teams and the parents is an important goal. Noninitiation of resuscitation and discontinuation of life-sustaining treatment during or after resuscitation are ethically equivalent, and clinicians should not hesitate to withdraw support when functional survival is highly unlikely. The following guidelines must be interpreted according to current regional outcomes:

- In conditions associated with a high rate of survival and acceptable morbidity, resuscitation is nearly always indicated. This will generally include babies with gestational age  $\geq 25$  weeks (unless there is evidence of fetal compromise such as intrauterine infection or hypoxia-ischemia) and those with most congenital malformations.
- In conditions with uncertain prognosis in which survival is borderline, the morbidity rate is relatively high, and the anticipated burden to the child is high, parental desires concerning initiation of resuscitation should be supported.

## Discontinuing resuscitation efforts

After 10 minutes of continuous and adequate resuscitative efforts, discontinuation of resuscitation may be justified if there are no signs of life (no heart beat and no respiratory effort).



\* Endotracheal intubation may be considered at several steps.