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KEY ADVANCES
CLINICAL POLICY ALERT

2020 Update on Neonatal Resuscitation

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Aziz K, Lee HC, Escobedo MB, Hoover AV, Kamath-Rayne BD, Kapadia VS, et al. Part 5: Neonatal Resuscitation: 2020 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2020;142(16 Suppl 2):S524-S550. Available via PubMed at http://pmid.us/33081528

Policy Recommendations and Focus Points in bold

Newborn resuscitation requires anticipation and preparation by providers who train individually and as teams.

- Every birth should be attended by at least one person who can perform the initial steps of newborn resuscitation (i.e., dry, warm, and stimulate) and initiate positive pressure ventilation, and whose only responsibility is the care of the newborn. *Class of Recommendation 1, Strong*
- Before every birth, a standardized risk assessment tool should be used to assess perinatal risk and assemble a qualified team on the basis of risk. *Class of Recommendation 1, Strong*
- Before every birth, a standardized equipment checklist should be used to ensure the presence and function of supplies and equipment necessary for a complete resuscitation. *Class of Recommendation 1, Strong*
- When anticipating a high-risk birth, a pre-resuscitation team briefing should be completed to identify potential interventions and assign roles and responsibilities. *Class of Recommendation 1, Strong*

Most newly born infants do not require immediate cord clamping or resuscitation and can be evaluated and monitored during skin-to-skin contact with their mothers after birth.

- For preterm infants who do not require resuscitation at birth, it is reasonable to delay cord clamping for longer than 30 seconds. *Class of Recommendation 2a, Moderate*
- For term infants who do not require resuscitation at birth, it may be reasonable to delay cord clamping for longer than 30 seconds. *Class of Recommendation 2b, Weak*
- For term and preterm infants who require resuscitation at birth, there is insufficient evidence to make a recommendation on when to clamp the cord. *Class of Recommendation 2b, Weak*
- For infants born at less than 28 weeks of gestation, cord milking is not recommended. *Class of Recommendation 3, No Benefit: Not Recommended*

Inflation and ventilation of the lungs are the priority in newly born infants who need support after birth.

- For newly born infants, after drying, warming, and stimulating, who remain cyanotic and with poor respiratory effort, or with heart rate (HR) <100 bpm, provide positive pressure ventilation at a rate of 40 to 60 inflations per minute. *Class of Recommendation 2a, Moderate*
- In preterm newly born infants, the routine use of sustained inflations to initiate resuscitation is potentially harmful and should not be performed. *Class of Recommendation 3, Harm, Strong*

A rise in HR is the most important indicator of effective ventilation and response to resuscitative interventions.

- In newly born infants who are gasping or apneic within 60 seconds after birth or are persistently bradycardic (HR <100 bpm) despite appropriate initial actions, positive pressure ventilation should be provided without delay. *Class of Recommendation 1, Strong*

Pulse oximetry is used to guide oxygen therapy and meet oxygen saturation goals.

- In term and late preterm newborns (35 weeks or more of gestation) receiving respiratory support at birth, 100% oxygen should not be used because it is associated with excess mortality. *Class of Recommendation 3, Harm*

In the Table below, see the targeted preductal saturations during the first 10 minutes after birth. At 60 seconds, 60% is the target with an increase of 5% every minute until 5 minutes of life when pulse oximetry is 80-85%. Some newborns will have higher pulse oximeter readings, but the table demonstrates acceptable values that are achieved for most newborns.

Time Since Birth	Projected Pulse Oximeter Over Time
1 minute	60-65%
2 minutes	65-70%
3 minutes	70-75%
4 minutes	75-80%
5 minutes	80-85%
10 minutes	85-90%

Chest compressions are provided if there is a poor HR response to ventilation after appropriate ventilation corrective steps, which preferably include endotracheal intubation.

- If HR after birth remains at <60 bpm despite adequate ventilation for at least 30 seconds, initiate chest compressions. *Class of Recommendation 2a, Moderate*

The following Table illustrates actions to be taken during resuscitation of the newly born.

Heart Rate (bpm)	Respiratory Distress/Apnea	Central Cyanosis Present	Intervention
>100	No	Yes	Blow-by oxygen
—	Yes	Yes/No	BMV
60-100	—	—	BMV
<60	—	—	BMV + chest compressions

BMV, bag-mask ventilation.

- The benefit of 100% oxygen compared with 21% oxygen (air) or any other oxygen concentration for ventilation during chest compressions is uncertain. It may be reasonable to use higher concentrations of oxygen when chest compressions are being delivered. *Class of Recommendation 2b, Weak*

The HR response to chest compressions and medications should be monitored electrocardiographically.

- During chest compressions, ECG should be used for the rapid and accurate assessment of HR. *Class of Evidence 1, Strong*

If the response to chest compressions is poor, it may be reasonable to provide epinephrine, preferably via the intravenous (IV) route.

- If HR has not increased to 60 bpm or more after optimizing ventilation and chest compressions, administer intravascular (IV or intraosseous [IO]) epinephrine (0.01 to 0.03 mg/kg). *Class of Recommendation 2b, Weak*

Failure to respond to epinephrine in a newborn with history or examination consistent with blood loss may require volume expansion.

- It may be reasonable to provide volume expansion with normal saline or blood at 10 to 20 mL/kg. *Class of Recommendation 2b, Weak*

If all of these steps of resuscitation are effectively completed and there is no HR response by 20 minutes, redirection of care should be discussed with the team and family.

- In newly born infants receiving resuscitation, if there is no HR and all of the steps of resuscitation have been performed, cessation of resuscitation efforts should be discussed with the team and the family. A reasonable time frame for this change in goals of care is approximately 20 minutes after birth. *Class of Recommendation 1, Strong*
- If a birth is at the lower limit of viability or involves a condition likely to result in early death or severe morbidity, non-initiation or limitation of neonatal resuscitation is reasonable after expert consultation and parental involvement in decision making. *Class of Recommendation 2a, Moderate*
- Non-initiation of resuscitation and discontinuation of life-sustaining treatment during or after resuscitation should be considered ethically equivalent. *Class of Recommendation 1, Strong*

References:

1. Aziz K, Lee HC, Escobedo MB, et al. Part 5: Neonatal Resuscitation: 2020 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. *Pediatrics.* 2020;147(Suppl 1):e2020038505E.
2. Aziz K, Lee HC, Escobedo MB, Hoover AV, Kamath-Rayne BD, Kapadia VS, et al. Part 5: Neonatal Resuscitation: 2020 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. *Circulation*. 2020;142(16 Suppl 2):S524-S550.

Resources for Additional Learning:

Ali N, Sawyer T. Special consideration in neonatal resuscitation. *Semin Perinatol.* 2022;46:1-8.
Emergency Medicine Cases: https://emergencymedicinecases.com/neonatal-resuscitation/
American Heart Association Neonatal Resuscitation Algorithm: https://www.ahajournals.org/doi/10.1161/CIR.0000000000000902

Steps in Neonatal Resuscitation Algorithm; adapted from Aziz et al. (1,2)

Step 1: Dry, Warm, and Stimulate

If term newborn and good tone with good cry and only acrocyanosis—place skin to skin on mother's chest

If central cyanosis present, provide blow-by oxygen; clear airway (suction)

Step 2: Ventilate

If apnea, respiratory distress, central cyanosis persists or HR <100 bpm despite Step 1—initiate positive pressure ventilation with bag-valve-mask

Resuscitate in radiant warmer if available or on warming mattress

Step 3: Evaluate (HR)

If HR between 60 and 100 bpm, continue rescue breathing

Step 4: Resuscitate

If HR <60 bpm, begin chest compressions

If HR remains <60 bpm, administer epinephrine 0.01-0.03 mg/kg IV, IO

Monitor HR, if >100 bpm, provide post-resuscitation care