



**REGION 11
CHICAGO EMS SYSTEM
PROTOCOL**

Title: Neonatal Resuscitation – BLS/ALS
Section: Obstetrics
Approved: EMS Medical Directors Consortium
Effective: June 1, 2023

NEONATAL RESUSCITATION – BLS/ALS

I. PATIENT CARE GOALS

1. Plan for resources based on number of anticipated patients (e.g., mother and newborn or multiple births).
2. Provide care to the newly born infant.
3. Perform a neonatal assessment.
4. Rapidly identify newly born infants requiring resuscitative efforts.
5. Provide appropriate interventions to minimize distress in the newly born infant.
6. Recognize the need for additional resources based on patient condition and/or environmental factors.

II. PATIENT PRESENTATION

A. Inclusion Criteria

1. Newly born infants.
2. Concepts may be extended to newborns in the neonatal period (birth – 28 days).

B. Other Considerations

1. Regardless of gestational age, all newborns should be assessed for signs of life including responsiveness, breathing, and pulse with a cardiac monitor. Newborns with signs of life should be resuscitated and transported.
2. In situations where the estimated gestational age is less than 20 weeks (usually calculated by date of last menstrual period), the newborn is typically not viable. The newborn should have the cardiac monitor applied and resuscitation withheld if asystole.
 - a. If any doubt about accuracy of gestational age, initiate resuscitation and transport.
3. In situations where the estimated gestational age is more than 20 weeks (usually calculated by date of last menstrual period), the newborn should be resuscitated and transported.
4. Physical examination findings that indicate less than 20 weeks gestation may include:
 - a. Fused eyelids
 - b. Transparent skin



REGION 11 CHICAGO EMS SYSTEM PROTOCOL	Title: Neonatal Resuscitation – BLS/ALS
	Section: Obstetrics
	Approved: EMS Medical Directors Consortium
	Effective: June 1, 2023

- c. Underdeveloped anatomy
- d. No lanugo: fine soft hair covering the body and limbs

III. PATIENT MANAGEMENT

A. Assessment

1. History

- a. Date and time of birth
- b. Onset of any symptoms
- c. Prenatal history including prenatal care, mother's pregnancy status (gravida, para) substance abuse, multiple gestation, maternal illness
- d. Birth history including maternal fever, presence of meconium, maternal bleeding, difficult delivery (e.g., shoulder dystocia, prolapsed or nuchal cord, breech)
- e. Estimated gestational age (may be based on last menstrual period)

2. Exam

- a. Respiratory rate and effort (strong, weak, or absent; regular or irregular)
- b. Signs of respiratory distress (grunting, nasal flaring, retractions, gasping, apnea)
- c. Heart rate (fast, slow, or absent)
 - i. Precordium, umbilical stump, or brachial pulse may be used (auscultation of chest is preferred since palpation of umbilical stump is less accurate)
- d. Muscle tone (poor or strong)
- e. Color/appearance (central cyanosis, acrocyanosis, pallor, normal)
- f. APGAR score (Appearance, Pulse, Grimace, Activity, Respiratory effort) – may be calculated for documentation, but not necessary to guide resuscitative efforts
- g. Estimated gestational age
- h. Pulse oximetry should be considered if resuscitative efforts are initiated or if supplemental oxygen is administered

B. Treatment and Interventions

1. Assess the newborn.

2. **Dry, warm, and stimulate**

- a. Wrap infant in dry towel or thermal blanket to keep infant as warm as possible during resuscitation; keep head covered if possible.
- b. If strong cry, regular respiratory effort, good tone, and term gestation, infant should be placed skin-to-skin with mother and covered with dry linen.
- c. If no resuscitation is required, warm/dry/stimulate the newborn, and then cut/clamp the cord after 60 seconds or the cord stops pulsating. If immediate resuscitation is



REGION 11 CHICAGO EMS SYSTEM PROTOCOL

Title: Neonatal Resuscitation – BLS/ALS
Section: Obstetrics
Approved: EMS Medical Directors Consortium
Effective: June 1, 2023

- required and the newborn is still attached to the mother, clamp the cord in two places and cut between the clamps.
3. If weak cry, signs of respiratory distress, poor tone, or preterm gestation then position airway (sniffing position) and clear airway as needed - if signs of respiratory distress with airway obstruction, suction mouth then nose; routine suctioning is not recommended.
 4. If heart rate greater than 100 beats per minute:
 - a. Monitor for central cyanosis.
 - b. Monitor for signs of respiratory distress. If apneic or in significant respiratory distress:
 - i. **Ventilate:** Bag-valve-mask ventilation with room air at 40-60 breaths per minute.
 1. Positive pressure ventilation (PPV) with bag-mask device may be initiated with room air (21% oxygen).
 2. Goal: Oxygen saturation at 10 minutes is 85-95%.
 5. **Evaluate:** If heart rate less than 100 beats per minute:
 - a. Initiate bag-valve-mask ventilation with room air at 40-60 breaths per minute for 90 seconds with room air.
 - i. Primary indicator of effective ventilation is improvement in heart rate.
 - ii. Evaluate heart rate every 30 seconds.
 - iii. Rates and volumes of ventilation required can be variable, only use the minimum necessary rate and volume to achieve chest rise and a change in heart rate; can control rate and volume by saying “squeeze, release” – squeeze the bag just until chest rise is visualized then release to allow for exhalation.
 - b. If no improvement after 90 seconds, add supplemental 100% oxygen to BVM until heart rate normalizes.
 - c. Insert i-gel supraglottic airway if BVM ineffective.
 6. **Resuscitate:** If heart rate less than 60 beats per minute:
 - a. Ensure effective ventilations with supplementary oxygen and adequate chest rise.
 - b. Initiate chest compressions - two-thumb-encircling hands technique is preferred.
 - c. Coordinate chest compressions with positive pressure ventilation (3:1 ratio, 90 compressions and 30 breaths per minute).
 - d. Insert i-gel supraglottic airway if not already in place and attach waveform capnography.
 - e. Administer epinephrine (0.1 mg/mL) 0.3 ml IV/IO every 3 to 5 min if heart rate remains less than 60 beats per minute.
 7. Consider checking a blood glucose for ongoing resuscitation, maternal history of diabetes, ill appearing or unable to feed. If blood sugar < 45 mg/dL administer D10 using buretrol.
 8. Administer 10 mL/kg normal saline IV/IO for signs of shock or post-resuscitative care.



REGION 11 CHICAGO EMS SYSTEM PROTOCOL

Title: Neonatal Resuscitation – BLS/ALS

Section: Obstetrics

Approved: EMS Medical Directors Consortium

Effective: June 1, 2023

C. Patient Safety Considerations

1. Hypothermia is common in newborns and worsens outcomes of nearly all post-natal complications
 - a. Ensure heat retention by drying the infant thoroughly, covering the head, and wrapping the baby in dry cloth.
 - b. When it does not interfere with the necessary assessment or required interventions, “kangaroo care” (i.e., placing the infant skin-to-skin directly against mother’s chest and wrapping them together) is an effective warming technique.
 - c. Newborn infants are prone to hypothermia, which may lead to hypoglycemia, hypoxia, and lethargy. **Aggressive warming techniques should be initiated including drying, swaddling, and warm or mylar blankets covering body and head.** When available, radiant warmers or other warming adjuncts are suggested for babies who require resuscitation, especially for preterm babies. Check blood glucose and treat as appropriate.
2. During transport, neonate should be appropriately secured (with approved child restraint system) and mother should be appropriately secured.
3. Transport to the closest most appropriate hospital after contact with online medical control
 - a. Full term newborns (39 weeks estimated gestation age (EGA) or more) should be transported to a Level II or Level III Perinatal Hospital.
 - b. Preterm newborns (less than 39 weeks) should be transported to a Level III Perinatal Hospital.

IV. NOTES/EDUCATIONAL PEARLS

A. Key Considerations

1. Approximately 10% of newly born infants require some assistance to begin breathing at birth and 1% require resuscitation to support perfusion.
2. Most newborns require only drying, warming, and stimulating to help them transition from fetal respiration to newborn respiration. **The resuscitation sequence can be remembered as Dry, Warm, and Stimulate – Ventilate – Evaluate – and Resuscitate.**
3. Deliveries complicated by maternal bleeding (placenta previa or placental abruption) place the infant at risk for hypovolemia secondary to blood loss.
4. Low birth weight infants are at high risk for hypothermia due to heat loss.



REGION 11 CHICAGO EMS SYSTEM PROTOCOL	Title: Neonatal Resuscitation – BLS/ALS
	Section: Obstetrics
	Approved: EMS Medical Directors Consortium
	Effective: June 1, 2023

- Measuring the pulse oximetry on the right hand provides the most accurate oxygen saturation in infants that are transitioning from fetal to normal circulation. 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%.

Targeted Pulse Oximetry in Infants Over Time

Time Since Birth	Projected Increase in 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	85-95%

- Both hypoxia and excess oxygen administration can result in harm to the infant. If prolonged oxygen use is required, titrate to maintain an oxygen saturation of 85-95%.
- While not ideal, a larger facemask than indicated for patient size may be used to provide bag-valve-mask ventilation if an appropriately sized mask is not available - avoid pressure over the eyes as this may result in bradycardia.
- Increase in heart rate is the most reliable indicator of effective resuscitative efforts.
- A multiple gestation delivery may require additional resources and/or providers.
- APGAR scoring is not critical during the resuscitation, but can be assessed at 1 minutes and 5 minutes after birth

APGAR Score

	0	1	2
Appearance	Blue, Pale	Body pink, extremities blue	Completely pink
Pulse	Absent	Slow (less than 100)	Rate of 100 or greater
Grimace	No response	Grimace	Cough or Sneeze
Activity	Limp	Some flexion	Active motion of extremities
Respirations	Absent	Slow, irregular	Good, crying

The Apgar score, American College of Obstetricians and Gynecologists, www.acog.org.

B. Pertinent Assessment Findings

- It is difficult to determine gestational age in the field – if there is any doubt as to viability, resuscitation efforts should be initiated.



REGION 11 CHICAGO EMS SYSTEM PROTOCOL	Title: Neonatal Resuscitation – BLS/ALS
	Section: Obstetrics
	Approved: EMS Medical Directors Consortium
	Effective: June 1, 2023

2. Acrocyanosis, a blue discoloration of the distal extremities, is a common finding in the newly born infant transitioning to extrauterine life – this must be differentiated from central cyanosis.

V. NEONATAL RESUSCITATION ALGORITHM (SEE NEXT PAGE)



1(21\$7\$/ 5(686&,7\$7,21 \$/*25,7+0

