

Newborn Critical Care Center (NCCC) Clinical Guidelines

Guidelines for the Use of Pulse Oximetry and Oxygen for Neonatal Resuscitation

INTRODUCTION

Current AAP, AHA and guidelines for neonatal resuscitation (NRP) recommend initial resuscitation with 21% oxygen for infants \geq 35 weeks' gestation, or 21% to 30% oxygen in infants $<$ 35 weeks' gestation. Preterm and term babies who need resuscitation at birth should optimally attain an oxygen saturation value in the interquartile range of pre-ductal saturations measured in healthy term babies following vaginal birth at sea level. The use of a pulse oximeter is therefore recommended to achieve this goal. The following guidelines were developed based on the best available evidence regarding the benefits and risks of the use of oxygen.

APPLICATION OF PULSE OXIMETRY

For all infants requiring more than routine suction and stimulation for resuscitation, a pulse oximeter will be placed. This would include any infant who requires respiratory support, including the use of "blow-by" oxygen for central cyanosis. The pulse oximeter must be set to the lowest averaging time (2 minutes) with the highest sensitivity in order to ensure fast and accurate monitoring. These adjustments should be made prior to the delivery of the infant. The nurse in attendance at the delivery will ensure placement of the probe in a **pre-ductal** position (right hand or wrist) as soon as it is determined that respiratory support will be necessary, or on all infants for whom respiratory support (including the administration of supplemental oxygen) is anticipated (e.g. depressed or premature infants). After the sensor is placed and monitor turned on, the sensor should be connected to the monitor.

USE OF SUPPLEMENTAL OXYGEN

For ALL infants, regardless of gestational age, beginning oxygen concentration will be 21%.

The need for supplemental oxygen, whether administered by blow-by or in conjunction with other types of respiratory support (i.e., CPAP or manual ventilation), will be determined by pulse oximetry (SpO₂). The following guidelines/goals should be used to determine the need for initiating supplemental oxygen or increasing/decreasing its concentration. SpO₂ readings should increase at a rate to ensure a SpO₂ reading higher than or equal to the minimal targets outlined in the table below:

Targeted Preductal SpO₂ After Birth

1 min	60% - 65%
2 min	65% - 70%
3 min	70% - 75%
4 min	75% - 80%
5 min	80% - 85%
10 min	85% - 95%

If an infant fails to achieve one of these goals, oxygen should be administered beginning at an FiO₂ of 0.4. Clinical judgment must be used when SpO₂ cannot be determined

accurately, or when the infant is not responding to routine resuscitation. The need for adjustment of FiO₂ to achieve the above goals should be determined at approximately 60 second intervals. FiO₂ should be adjusted in increments of 0.1, or as determined by clinical response.

AFTER RESUSCITATION

Once resuscitation is complete, the infant's disposition will be determined by the NCCC team. If the infant is to be transferred to the NCCC, pulse oximetry will be continued. If the infant is to remain in the Labor and Delivery suite, pulse oximetry will be discontinued once SpO₂ is greater than 90%.

References:

1. Goldsmith, J.P., & Kattwinkel, J. (2012). The role of oxygen in the delivery room. *Clinics in Perinatology*. 39(4): 803-815.
2. Harc T. (2013). Room air Resuscitation and Targeted Oxygenation for infants at birth in the delivery room. *JOFNN* 42(2): 227-232.
3. Rabi Y, W Yee, SY Chen, N Singhal. (2006). Oxygen saturation trends immediately after birth. *J Pediatrics*. 148:590.
4. Aziz K, Lee C, Henry C, Escobedo MB, Hoover AV, Kamath-Rayne, BD, Kapadia V, Magid DJ, Niermyer S, Szlyd E, Weiner GM, Wykof MH, Yamada NK, Zaichkin JG. (2021). Part 5: Neonatal resuscitation 2020 American Heart Association (AHA) guidelines update for cardiopulmonary resuscitation and emergency cardiovascular care. *Pediatrics*. 147(supple 1): e2020038505E