

INFANT CAR SEAT CHALLENGE AND PULSE OXIMETRY



Infant risk of respiratory compromise:

Pre-term and low birth weight infants may be subject to an increased risk of oxygen desaturation, apnea, or bradycardia when seated in a semi-reclined position. It is recommended that these infants be monitored for cardiorespiratory stability in their car seat prior to discharge.¹

Infant Car Seat Challenge (ICSC)^{1,2}:

The ICSC observation is performed by hospital staff who are trained in positioning infants properly in a car safety seat and in detecting apnea, bradycardia, and oxygen desaturation.

- Trained hospital staff position the infant in a conventional car safety seat in a semi-upright position, if possible, while monitoring cardiorespiratory status including oxygen saturation and heart rate.
- Status will be noted at baseline and at 15 minute intervals for the full period of observation.
- Total time of observation is suggested to equal a minimum of 90 to 120 minutes or the duration of travel, whichever is longer.
- If cardiorespiratory events are deemed significant by the treating physician or hospital policy, interventions to reduce the frequency of desaturation and episodes of apnea and bradycardia are recommended (e.g., use of car bed, supplemental oxygen, continued hospitalization or further medical assessment).

Nellcor™ Pulse Oximetry

Medtronic offers a full portfolio of Nellcor™ pulse oximetry sensors and monitoring platforms validated for use with neonates and infants. Pulse oxygenation and pulse rate measurements are important components of the ICSC observation.

Performance during motion is also important for an effective car seat challenge test as patient movement may interfere with accuracy.

Nellcor™ Portable SpO₂ Patient Monitoring System, PM10N Performance

Measurement Range

- SpO₂: 1% to 100%
- Pulse rate: 20 to 250 beats per minute (bpm)
- Perfusion range: 0.03% to 20%

Accuracy

- Saturation-neonate: 70% to 100% ± 2 digits (3 digits motion)
- Low saturation: 60% to 80% ± 3 digits
- Low perfusion: 70% to 100% ± 2 digits
- Pulse rate-adult and neonate: 20 to 250 bpm ± 3 digits
- Pulse rate-adult and neonate with motion: 20-250bpm +-5 digits
- Low perfusion: 20 to 250 bpm ± 3 digits



Nellcor™ Portable SpO₂ Patient Monitoring System, PM10N

- Portable, lightweight, ergonomic hand-held monitor may help clinicians move easily with the patient.
- Low saturation accuracy range of 60-80% ± 3 digits when used with Nellcor™ adhesive sensors with OxiMax™ technology.
- FDA-cleared for motion tolerance and compliant with ISO 80601-2-61.

ICSC Sample Protocol*:

Date:	Time:	Car Seat Brand/Model:	
Initial ICSC ☐	Repeat ICSC ☐	Current Gest Age:	Current Weight:
Last Feeding Time:	Volume/Type:	Home O ₂ Settings:	

Patient Parameter	Baseline	15 min	15 min	45 min	60 min	75 min	90 min
Time							
Heart Rate							
Respiratory Rate							
Respiratory Effort							
Unlabored	☐	☐	☐	☐	☐	☐	☐
Labored	☐	☐	☐	☐	☐	☐	☐
Oxygen Sat							
FiO ₂ /Flow							
State							
Asleep	☐	☐	☐	☐	☐	☐	☐
Awake/Quiet	☐	☐	☐	☐	☐	☐	☐
Crying	☐	☐	☐	☐	☐	☐	☐
Events							
Interventions							
Comments							
PASS ICSC ☐	FAIL ICSC ☐ Reason for FAILURE: ☐ Oxygen desaturation below 90 for greater than 10 seconds ☐ Apnea greater than or equal to 20 seconds ☐ Bradycardia less than or equal to 80 bpm						

*This information is intended for general guidance only and should not be interpreted as specific medical, diagnostic, or therapeutic recommendations.

1. Bull, M J, Engle, WA. Safe Transportation of Preterm and Low Birth Weight Infants at Hospital Discharge. Pediatrics. 2009; 1424 – 1429.
2. Davis, N.L. et al., Epidemiology and Predictors of Failure of the Infant Car Seat Challenge. Pediatrics, 2013 April; p. 951-957.

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