Purpose
Identify infants experiencing hypoxic episodes when placed in their child restraint seat. Determine the optimal position to prevent the increased risk of hypoxic episodes.

Policy Statement
Car seat evaluations are done for the following infants:
- All infants born at less than 37 weeks gestational age
- Term infants who are at risk of respiratory compromise (e.g. Pierre-Robin Sequence)

Ideally, the evaluation is at least 24 hours before discharge home.

The infant is evaluated for 90 minutes, preferably between feeds while the infant is sleeping.

Evaluation is done earlier if the infant is to be transported via a car seat for any reason.

Evaluation is completed in infant's own newborn car seat whenever possible.

Infants who do not tolerate the car seat evaluation require an evaluation in a crib.
- Non-tolerance is defined as 2 or more significant events of desaturation (Saturation below 88% for greater than 10 seconds) or bradycardia (heart rate less than 70% of baseline heart rate for at least 3 seconds) OR any event requiring intervention.

Infants, especially preterm infants, should not be placed in any seating device such as a car seat, swing, or stroller for long periods.

In the event that an infant is transferred between healthcare institutions, a car bed or incubator will be used if the infant has not passed a car seat evaluation.

Treatment Options
Did not tolerate car seat evaluation but tolerates evaluation in a crib:
- Discharge with use of car bed for eight weeks. No further follow-up

Did not tolerate car seat or crib evaluation:
- Drug and/or oxygen therapy.
- Consider delaying discharge and re-study in 2-3 days.
- Refer to the Royal Alexandra Hospital for a recorded evaluation.

Equipment
Car seat – Should be infant’s own seat and not a convertible seat
Cardiac Monitor with cardiorespiratory graph capabilities
Pulse Oximeter – Use the car seat evaluation designated monitor when available.
Procedure

Evaluation study is done shortly before discharge or before transfer in a car seat. Clinical monitoring is continued until after the car seat evaluation is completed and the infant has successfully passed.

**ACTION**

1. Gather equipment

2. Attach ECG leads and saturation probe to allow for heart rate, respiratory impedance, and oxygen saturation monitoring

3. Set alarm limits for Significant events
   - **Bradycardia** - Set the heart rate low limit for 70% of baseline heart rate. Calculate this number based on the infant’s resting heart rate over the last four hours. A true bradycardia lasts for at least 3 seconds and is not a “blip” on the screen.
   - **Desaturation** – Low saturation level at 88%.
   - Percent change in heart rate is more meaningful than “below 100 beats per minute”. If the baseline heart rate was 135, the lower limit should be set at 95 beats per minute.
   - The saturation monitors have a 5 second delay for mild desaturations and no delay for critical alarms. To prevent confusion in determining length of events for the study, the delay will be set to zero. With the delay at zero, the length of the alarm.

4. Place the infant in the car seat as per AAP recommendations.
   - Select a car seat with a distance of 5 ½ inches or less from the crotch strap to seat back. A car seat with this distance is preferred but this may be compensated with the use of rolls.
   - Select a car seat with a distance of 10 inches or less from the lower harness strap to the seat bottom.
   - The car seat’s retainer clip should be positioned on the infant’s chest, not on the abdomen or in the neck area.
   - The shoulder straps are tightened to allow only a two finger width between the infant’s shoulder and the harness.
   - The infant’s head position may be stabilized with rolls on the side. No extra fabric, rolls, blankets, or clothing should be placed between the infant and the back of the car seat. This includes Reduces the potential of a low-weight infant slumping forward.
   - A small rolled diaper or blanket between the crotch strap and the infant may be added to reduce slouching.
   - Reduces the potential of harness straps crossing the infant’s ears.

If a designated car seat monitor is not available, change the time delay on the Sat monitor to 0 for the duration of the car seat evaluation. (Go to the alarm menu, scroll to “Delay 5 sec”, highlight, and use down arrow to change 5 to 0. Confirm the change and return to the main screen.)
bunting bags, snow suits, and commercial head restraints.

5. Observe the infant closely for the entire 90 minutes of sleep. The head and face should not be covered, curtains should not impair the view of the infant, and monitors should be clearly visible to staff.

6. Record significant events
   - Bradycardia – Heart rate below 70% of baseline for a minimum of 3 seconds
   - Desaturation – Pulse oximeter reading below 88% for greater than 10 seconds
   - Bradycardia or desaturation requiring intervention such as stimulation or increased oxygen

An unfavourable car seat evaluation (not tolerated) occurs when the infant has **2 significant events** or **any event requiring intervention**. If these events occur before the end of the 90 minute study, the car seat evaluation shall be discontinued and the infant is removed from the car seat.

Babies exhibit periodic breathing with dips in saturation that may have low values. As long as the episode is not longer than 10 sec, they are not significant events. However, if the baby desaturates frequently and to a degree that the saturation is below 88% more than above, even if the event is less than 10 sec, there is a reluctance to discharge the baby in a car seat. Isolated apnea (no bradycardia or desaturation) is **NOT** a significant event.

7. The time the infant is placed in the seat, the start of the study, the end of the study, and removal from the seat should be noted on the nursing flow sheet. Infants are not left in the seat longer than 90 minutes, even if sleeping and monitored. Problems with positioning are noted as well as any instructions given to the parents.

“Results” of the evaluation are noted on the kardex, documented in the nursing flowsheet and reported to the Charge Nurse.

8. If the infant did not tolerate the car seat evaluation, alternate plans are made as specified in the Policy.

9. Parent Instruction – Parents of preterm babies are instructed to limit the time spent in the sitting position as much as possible for the first 4-8 weeks at home. This includes swings, cuddle seats and bouncy chairs. It also means that the car seat is used for travel only and the baby is removed from the

   Care-givers can find information regarding the car seat study easily.

   It is important to model behaviour for parents, so infants should not remain in car seats when they are not traveling in a vehicle. Premature babies should have sitting time limited for the first 4-8 weeks.

   Preterm babies do not tolerate the sitting position well.
seat (even if asleep) once travel is terminated.

**Related Documents**
Adapted with permission from Stollery Children's Policy and Procedure Manual:
http://www.intranet2.capitalhealth.ca/nicu/pages/policiesprocedures/policiesprocedures_new.htm
Car Seat Evaluation Policy & Procedure, March 2009

**References**


**Revisions**
March 1998
September 2002
October 2003
November 2005
Signing

Original Signed

GAIL CAMERON
DIRECTOR
MATERNAL, NEONATAL & CHILD HEALTH PROGRAMS
COVENANT HEALTH
GREY NUNS & MISERCORDIA HOSPITALS

DATE
March 14, 2011

Original Signed

DR. SANTIAGO ENSENAT
MEDICAL DIRECTOR
NEONATAL PROGRAM
COVENANT HEALTH
GREY NUNS HOSPITAL

DATE
April 1, 2011

Original Signed

DR. ABRAHAM PELIOWSKI
MEDICAL DIRECTOR
NEONATAL PROGRAM
COVENANT HEALTH
MISERCORDIA HOSPITAL

DATE
April 8, 2011