

## Transporting Premature Infants Lifesavers 2009



Betsey Mowery, CPSTI  
Safe from the Start CPS Program  
University of Arkansas for Medical Sciences  
Little Rock, Arkansas

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## Presentation Objectives

### Review

- Definition, frequency and risks of prematurity
- Considerations when transporting a premature/low birthweight infant
- "Period of observation" in car seat
- Car seats that are appropriate for premature/low birthweight infants

Preemie, 2

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## Premature infants



- **Definition**
  - Born <37 weeks EGA
- **Frequency**
  - 2006: 12.8% of babies born in U.S. were premature
    - 4,265,555 births
    - 545,991 born <37 weeks (87,017 <32 weeks)
    - 1 in 8 babies born prematurely
  - Rate has increased more than 30% since 1981
  - 71% born 34-36 wks EGA (late preterm births)

Preemie, 3

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**Premature infants**

EGA at birth: 22 wks  
 Weight: <10 oz  
 Length: 9.5 inches  
*This line is 9.5 inches*

**Common issues**

- Breathing problems that require supplemental oxygen or ventilator
- Temperature regulation
- Feeding problems
- Apnea
- Jaundice



**Long Term Challenges**

- Cerebral palsy
- Developmental delays
- Vision/hearing problems
- Bronchopulmonary dysplasia (BPD)
- Respiratory syncytial virus (RSV)
- ...and more.

Premie, 4

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**Pre-discharge considerations**

**Trend:**  
 Base readiness for discharge on development and growth, not solely weight/age.

**•Not ready for discharge:**  
 Frequent color changes, uneven heart rate, gags easily, worn out by interaction with caregiver

**•Ready for discharge:**  
 Maintain stable temp in open crib, on complete breast/bottle feeds, gaining weight, no apneas



Premie, 5

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**Transportation issues**

**• General**

- Babies being discharged smaller/ earlier
- Some babies not yet able to tolerate riding in a semi-reclined position
- Some (not all) CSS designed/ rated for <5 lbs babies

**• Parents**

- May or may not be able to select/ provide appropriate CSS
- Appropriate CSS may not be available locally
- Available funds
- Access to internet

Premie, 6

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### Recommended hospital policies

- Discharge in *correctly used, appropriate CSS*
- Teach staff and expectant parents about CSS
- ID who can assess infants with special transp. needs and who can implement hospital policy
- Develop policies with CPST; regularly review
- Make appropriate CSS available (loan, gift, sale)
- Standing MD order to teach parents about CSS use
- Assess CSS appropriateness before discharge
- **Period of observation** for infants born <37 wks EGA in CSS before discharge to monitor for apnea, oxygen desaturation, or bradycardia.<sup>1</sup>

→ Covered in presentation

Premie, 7

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### The "period of observation"



- Some small and/or premature infants may be at risk for complications when placed in semi-reclined position<sup>2</sup>
  - Airway occlusion or restriction can lead to periodic breathing, apnea, bradycardia, desaturation or hypoxia
  - A small airway, low muscle tone, neurological issues, chronic lung disease, and gastroesophageal reflux may be predisposing factors
- May be called car seat test, car seat challenge, car seat screening, or angle tolerance test; will use *angle tolerance test (ATT)* in presentation
- Done in actual CSS to be used at discharge.

Premie, 8

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### Appropriate CSS



- A CSS may be appropriate if it has:
  - Not been recalled for a safety reason (and can be used until repaired)
  - Not been in a serious crash
  - Not expired (seat life per manufacturer)
  - All its parts, is assembled correctly, and in good repair (clean)



- And if...
  - The infant meets height/weight limits and fits the CSS (per the manufacturer)
  - Not appropriate: overhead shields or trays<sup>3</sup>



Premie, 9

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**Staff role**

- Level of staff involvement and training vary by institution.
  - Parent expected to provide car seat and check for recalls
  - Trained staff available to help parents
    - Check CSS and provide basic instruction to parents
    - Available to teach installation in the family vehicle
- Examples of staff training:
  - CPS Advocate Training (4 hours)
  - CPS Technician Training (4 days)

Preemie, 13

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**Staff education (competencies)**

**Assess car seat**

- Appropriate
- Recall status
- Age
- Condition
- Assembled correctly

**Teach parents how to**

- Select appropriate CSS
- Correctly secure infant
- Limit travel/time in CSS
- Correctly install CSS (CPST)

**ATT**

- Criteria/Alarm Limits
- Apply leads, use monitors and recognize adverse events
- Procedure
- Pass/Fail

**Use of Resources**

- Recall list
- Pictorial Guide
- SRN Handouts
- Staff Resources (CPST, Program Coordinator)

Preemie, 14

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**Patient education**

**Special Delivery:  
Safe Transportation  
of Premature and  
Small Infants**



The 15-minute DVD provides an overview of car safety seat guidelines for premature and small infants.

**Cost:** \$100 plus 5% shipping and handling

**To order:** Call 1-800-KID-N-CAR or visit [www.preventinjury.org](http://www.preventinjury.org), click on Literature.

View or purchase the video:  
Merritt Manufacturing Booth 604

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**Back to ATT**

- **Monitors and leads**
  - Cardiorespiratory monitor with apnea delay
  - Pulse oximeter
- **Car seat to be used at discharge**
- **Safe place for car seat during ATT**
  - Vehicle seat simulator
  - Wagon/cart
  - Crib, warmer, or table
- **Receiving blankets and washcloth**

Preemie, 16

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**"Need to know" info**

<b>Size</b>	Birth weight Current weight
<b>Age</b>	Est. gestational age at birth Current age (day of life)
<b>Feeding schedule</b>	Last feed Next feed
<b>Home town</b>	Length of travel home

Relevant for pre-discharge hospital consults and/or if ATT has been ordered

Preemie, 17

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**When to do**

- **Verify that infant meets ATT criteria:**
  - Within 1 week of discharge
  - In open crib and able to maintain stable temperature
  - All PO feeds
  - Appropriate CSS at bedside and ready for ATT

If possible, complete ATT before day of discharge and before couplet care

Preemie, 18

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### ATT - getting started

- Determine ATT duration (min./max.)
- Secure infant in seat. Helpful to give parents hands-on instruction with return demo before discharge<sup>4</sup>
- Set lower alarm limits
  - Example parameters: HR 80 BPM
  - Apnea limit 20 seconds
  - Pulse ox 90%
- Record vital signs (O<sub>2</sub>, HR, respirations) per policy
  - 1<sup>st</sup> set baseline: In crib
  - 2<sup>nd</sup> set baseline: When secured in CSS

Preemie, 19

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### CSS angle

- CSS angle is important
  - Verify at correct angle (don't over recline)
  - At UAMS:
    - CSS correctly secured on vehicle seat simulator by CPST (if available) for ATT
    - CPS Advocates assess CSS, give basic info to parents and fit baby in CSS
    - Only CPST can install CSS/teach parent how to install CSS (per hospital protocol)



SCI Automotive Division  
Vehicle Seat Simulator  
with Dial-a-Belt (DB-605)  
\$1340 + freight  
<http://sciproducs.com>

Read and follow the manufacturer's instructions to determine the correct angle of recline for CSS.

Preemie, 20

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### During and after ATT

- Leave infant undisturbed throughout ATT
- Interpret any alarms; document changes
  - Events (A/B/D's) and/or color changes
  - Artifact may be caused when infant cries or moves
  - Discontinue if meets fail criteria (per protocol)
- Observe hospital policy pass/fail parameters
- Document result (P/F) on flow sheet or progress notes
- Notify physician
- Notify parents
  - Limit time in CSS (or other seating device)<sup>5,6</sup>
  - Future problem in CSS still possible
  - Adult should monitor infant during travel

Sample Pass/Fail Parameters:  
Pass: No apnea, brady, or desat  
Fail: Apnea >20 seconds  
HR < for >10 sec.  
Desat. <90% for >30 sec.

Preemie, 21

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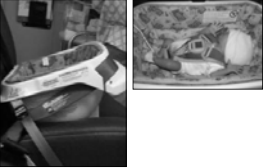
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### After a fail

#### Retesting

- Infant may be retested (per policy) in same CSS or alternate CSS may be recommended
- Timing of repeat ATT will vary by institution



#### Car bed

- Appropriate for some infants, but not all<sup>7,8</sup>
- If possible, CPST should teach parents how to install car bed
- Conduct ATT in car bed; some infants cannot tolerate laying flat
- Infant's head positioned toward center of vehicle
- Follow all manufacturer's instructions

Preemie, 22

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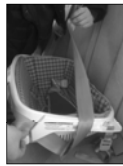
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### After discharge in car bed

- Infants discharged in a car bed, may have a follow up (post-discharge) to determine whether it's time to transition from car bed into car seat
- Infant should travel in car bed until follow-up ATT
- Follow up ATT:
  - Conducted using traditional car seat
  - Approximately 4-6 weeks after discharge
  - Location will vary by institution (i.e. pediatric clinic, hospital unit, home)



Parent installing car bed in vehicle

Preemie, 23

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### Transporting premature infants

- **Remember:**
  - Have a plan
  - Know your seats
  - Boy Scout motto
    - Anticipate sticky situations
    - Be prepared
  - It's all about the babies!

Preemie, 24

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## References

- <sup>1</sup> Safe transportation of newborns at hospital discharge. *Pediatrics*. October 1999;104:986-7. Reaffirmed in 2006.
- <sup>2</sup> DeGrazia, M. Stability of the infant car seat challenge and risk factors for oxygen desaturation events. *Journal Obstet Gynecol Neonatal Nurs*. 2007 (July-Aug); 36(4):300-7.
- <sup>3</sup> Safe transportation of premature and low birthweight infants. *AAP* May 1996
- <sup>4</sup> Lane WG, Liu GC, Newlin E. The association between hands-on instruction and proper child safety seat installation. *Pediatrics*. 2000 Oct (Supplement);106(4):924-30.
- <sup>5</sup> Apparently life threatening events in child safety seats. Tonkin SL. *BMJ* 2006;333:1205-6.
- <sup>6</sup> Sudden infant deaths in sitting devices. Cote A et al. *Arch Dis Child*. doi: 10.1136/adc.2007.119180.
- <sup>7</sup> Car seat or car bed for very low birthweight infants at discharge home. Salhab WA et al. *J Pediatr* 2007;150:224-8.
- <sup>8</sup> Comparison of respiratory physiologic features when infants are placed in car seats or car beds. Kinane TB et al. *Pediatrics* 2006;118:522-527.

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## Contact information

**Betsey Mowery, CPSTI**  
Coordinator, *Safe from the Start* CPS Program  
Maternal/Infant Division  
University of Arkansas for Medical Sciences  
4301 W. Markham, Slot 526 Little Rock, AR 72205  
(501) 351-2436  
[moweryelizabeth@uams.edu](mailto:moweryelizabeth@uams.edu)



Premie, 26

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