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### Pediatrician and Parent CPS Knowledge and Practices Following Revised AAP Policy

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### OUTLINE

- Burden of motor vehicle crash-injury in children and youth
- Current best-practice recommendations for child restraints, with corresponding evidence base
- Pediatricians' knowledge, attitudes, and beliefs about child passenger safety
- Parental child passenger safety attitudes and practices

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 THE CHILDREN'S HOSPITAL OF PHILADELPHIA RESEARCH INSTITUTE

- **Comprehensive**  
 From *Before-the-injury prevention* To *After-the-injury healing*
- **Interdisciplinary**  
 Clinical medicine, public health, epidemiology, behavioral science and engineering
- **Engaged**  
 Large network of partnerships with universities, government, industry
- **Translational**  
 Tangible tools & recommendations grounded in science, designed for impact

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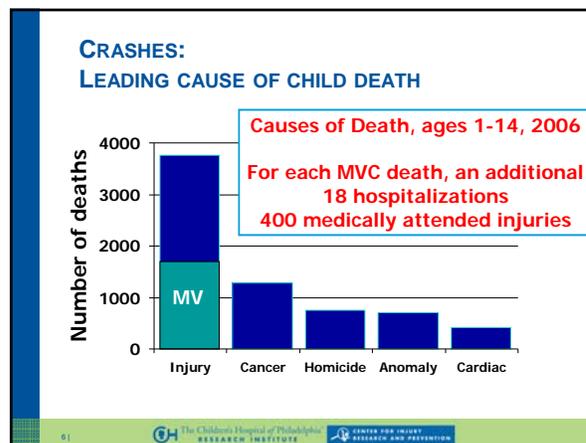
### CIRP Pediatric Injury Research Priorities:

- Child Road Traffic Safety
- Young Driver Safety
- Pediatric Biomechanics
- Post-injury Care & Recovery
- Strengthening Communities to Prevent Injury/Promote Health

### Leading causes of injury deaths in 2010

Rank	<1	1-4	5-9	10-14	15-24
1	Unintentional Suffocation 905	Unintentional Drowning 436	Unintentional MV Traffic 354	Unintentional MV Traffic 452	Unintentional MV Traffic 7,024
2	Homicide Unspecified 154	Unintentional MV Traffic 343	Unintentional Drowning 134	Suicide Suffocation 168	Homicide Firearm 3,889
3	Homicide Other Spec. classifiable 82	Homicide Unspecified 163	Unintentional Fire/Burn 85	Unintentional Drowning 117	Unintentional Poisoning 3,183
4	Unintentional MV Traffic 76	Unintentional Fire/Burn 151	Homicide Firearm 58	Homicide Firearm 107	Suicide Firearm 2,046
5	Undetermined Suffocation 39	Unintentional Suffocation 134	Unintentional Suffocation 31	Suicide Firearm 80	Suicide Suffocation 1,824
6	Unintentional Drowning 39	Unintentional Pedestrian, Other 103	Unintentional Other Land Transport 26	Unintentional Suffocation 48	Unintentional Drowning 656

CDC 2012



## Motor Vehicle Injuries: A Winnable Battle

- 1of 10 'Winnable Battles' from the CDC, which includes
  - Child occupant protection
  - Teen Driving



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## TRAFFIC INJURY PREVENTION

Disease	↓Risk ↓Crash	↓Injury incidence & severity	↑Survival ↑Recovery ↓Recurrence
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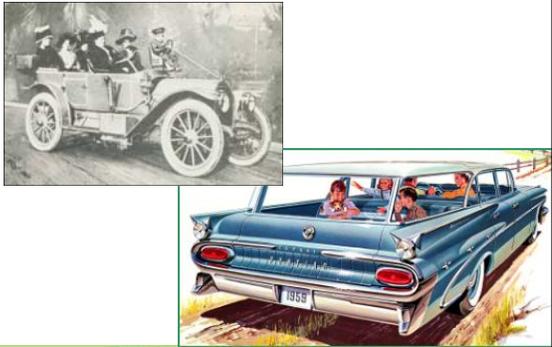
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## THE 'E'S OF INJURY PREVENTION

- Engineering
- Education
- Enforcement
- Economics

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## A HISTORY OF CHILD PASSENGER SAFETY



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## A HISTORY OF CHILD PASSENGER SAFETY



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## FIRST CHILD RESTRAINTS



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### BEST PRACTICE RECOMMENDATIONS

*New Algorithm for Pediatricians to Use with Families*

Durbin & AAP, 2011

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### CHOOSING THE RIGHT RESTRAINT FOR YOUR CHILD

NHTSA 2012

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### CHOOSING THE RIGHT RESTRAINT FOR YOUR CHILD

Rear-facing car seats for infants up to 2 years, or when exceed weight/height limit of seat

NHTSA 2012; Durbin and AAP. *Pediatrics*. 2011

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### CHOOSING THE RIGHT RESTRAINT FOR YOUR CHILD

Forward-facing car seats until exceed the weight/height limit of the seat

NHTSA 2012; Durbin and AAP. *Pediatrics*. 2011

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### CHOOSING THE RIGHT RESTRAINT FOR YOUR CHILD

Belt-positioning booster seats until belt properly fits, typically ~57" and between 8-12 years old

NHTSA 2012; Durbin and AAP. *Pediatrics*. 2011

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### CHOOSING THE RIGHT RESTRAINT FOR YOUR CHILD

Seat belt only when properly fits. Stay in the rear of the vehicle until 13 years old.

NHTSA 2012; Durbin and AAP. *Pediatrics*. 2011

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### WHERE DO WE GO FROM HERE? FUTURE PRIORITIES

- Increase restraint use among harder-to-reach populations
- Increase age-appropriate restraint use
  - Role of pediatricians in providing evidence-based recommendations to families
- Optimizing the rear seat

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### CHOOSING THE RIGHT RESTRAINT FOR YOUR CHILD

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### FORWARD FACING CHILD RESTRAINTS FATALITY REDUCTION

- 54% fatality reduction – compared to unrestrained (Hertz 1996)
- Fatalities from Fatality Analysis Reporting System, non-fatalities from National Automotive Sampling System
  - Crashes from '98 to '03, children 2-6 years

Elliott et al. *Arch Pediatr Adol Med.* 2006

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### FORWARD FACING CHILD RESTRAINTS AIS2+ INJURY REDUCTION

12 to 47 months old

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### RELATIVE RISK OF INJURY IN A FORWARD-FACING RESTRAINT COMPARED TO A REAR-FACING RESTRAINT

	Frontal Crashes	Side Crashes	All Crashes
All Ages	1.23 (0.95 to 1.59)	5.53 (3.74 to 8.18)	1.76 (1.40 to 2.20)
0-11 mo	Small sample	2.75 (1.81 to 4.18)	1.79 (1.18 to 2.72)
12-23 mo	6.16 (3.98 to 9.51)	Small sample	5.32 (3.43 to 8.24)

Henary et al. *Injury Prevention.* 2007

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### RELATIVE RISK OF INJURY IN A FORWARD-FACING RESTRAINT COMPARED TO A REAR-FACING RESTRAINT

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Henary et al. *Injury Prevention.* 2007

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### SWEDISH DATA

- Current practice
  - Rear facing up to 4 years
  - Transition directly to booster seat
- Study of 454 children, age 0 to 4 years (Jakobsson 2005)
  - 5 clinically significant injuries
  - Injury reducing effect of rear facing child restraints – 90%



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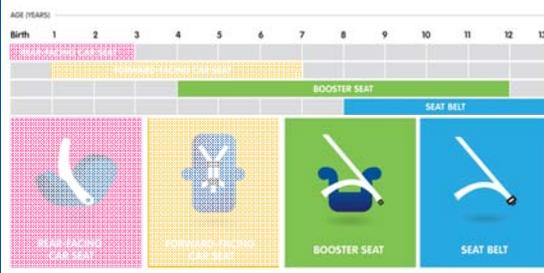
### CHOOSING THE RIGHT RESTRAINT FOR YOUR CHILD



NHTSA 2012

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### CHOOSING THE RIGHT RESTRAINT FOR YOUR CHILD



NHTSA 2012

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### INJURIES TO CHILDREN IN BELTS SEAT BELT SYNDROME

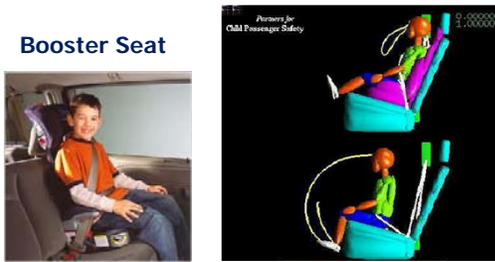
- Poorly positioned lap and shoulder belts
- Submarining or flexion about belt
- Injuries
  - Spine
  - Abdomen



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### THE SOLUTION

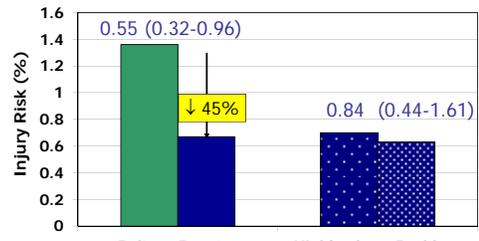
#### Booster Seat



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### BELT-POSITIONING BOOSTER SEATS AIS2+ INJURY REDUCTION

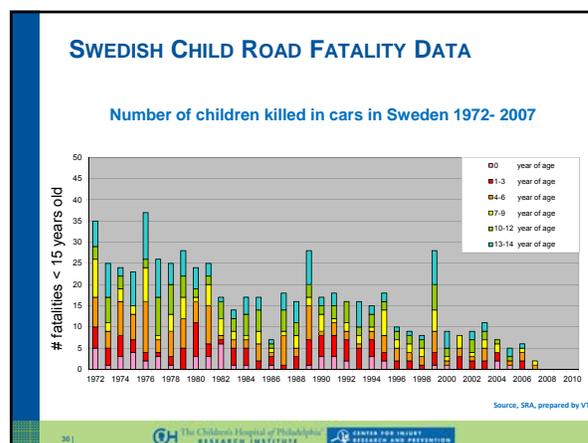
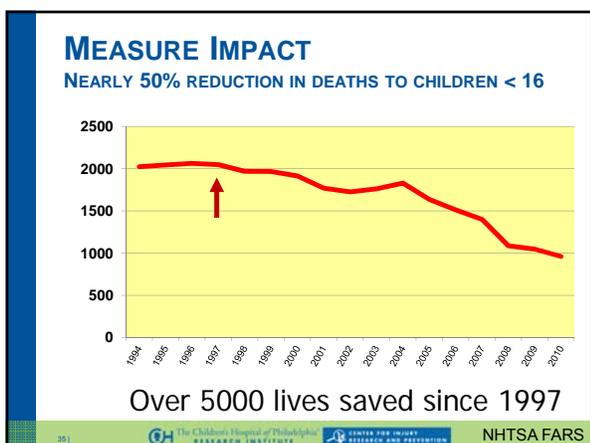
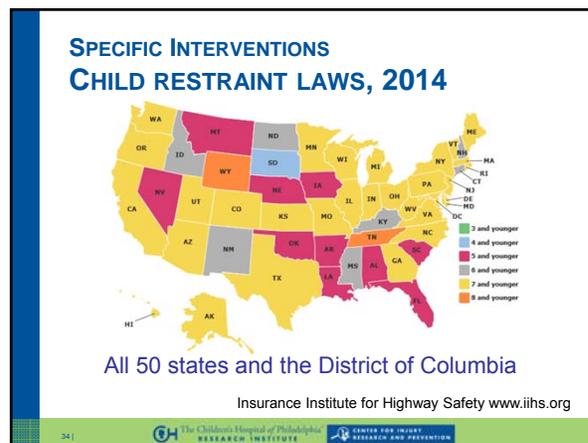
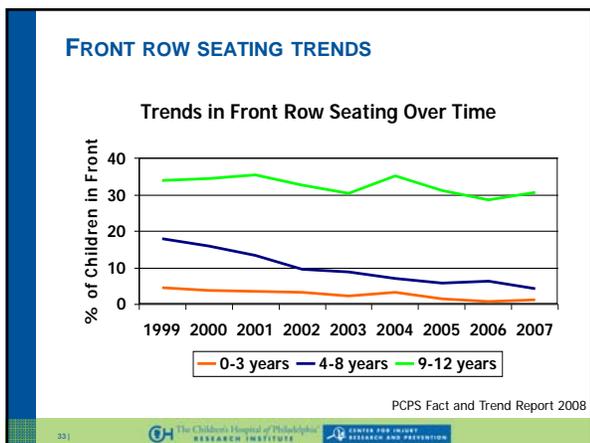
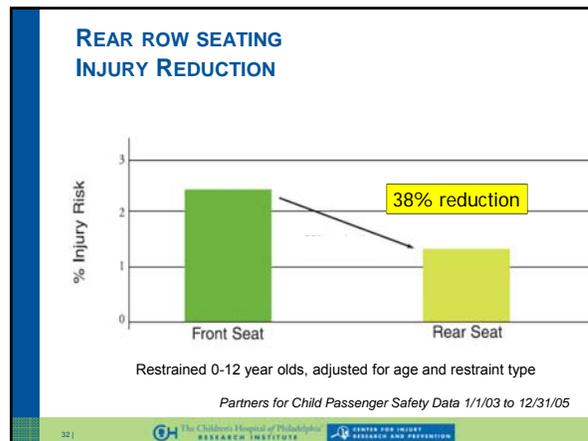
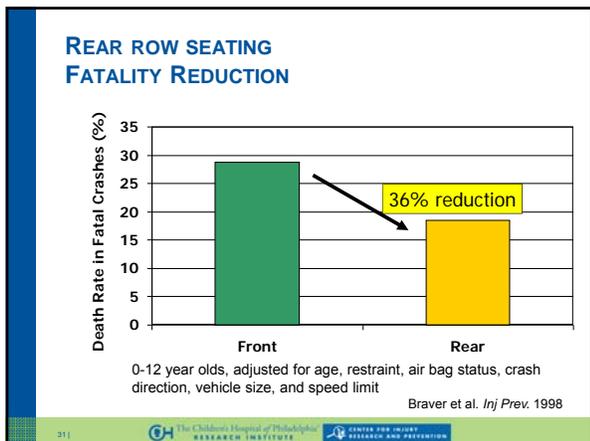
4 to 8 year olds



Comparison	Injury Risk (%)	Reduction
Belt vs. Booster	0.55 (0.32-0.96)	45%
Highback vs. Backless	0.84 (0.44-1.61)	-

Arbogast et al. *Pediatrics*. 2009

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### ROLE OF ANTICIPATORY GUIDANCE

- Pediatricians among primary sources cited by parents for information on CPS (Morrongiello 1995; O'Neil 2013)
- High parental knowledge about age and size/specific restraints associated with more appropriate restraint use (Bilston 2008)

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### ROLE OF ANTICIPATORY GUIDANCE

- Prior research has shown that pediatric primary care providers have variable knowledge and attitudes regarding road traffic safety
  - More frequent practices and beliefs about effectiveness of efforts for infants and toddlers (Brixey 2009; Rothenstein 2004)

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### ROLE OF ANTICIPATORY GUIDANCE

- Injury prevention anticipatory guidance in the clinical setting has a positive effect on parental knowledge and behavior, especially for CPS (Bass 1993; DiGiuseppi 2000)

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### ROLE OF PEDIATRICIANS

- Pediatricians' self-reported knowledge, attitudes, and practices about child passenger safety
- Objective
  - To evaluate pediatricians' self-reported knowledge, attitudes, and dissemination practices regarding the new American Academy of Pediatrics' (AAP) child passenger safety (CPS) policy recommendations.

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### ROLE OF PEDIATRICIANS

- Study Design
  - Survey distributed to pediatric primary care physicians via American Academy of Pediatrics (AAP) email distribution lists
  - Knowledge, attitudes, and practices related to current AAP CPS recommendations and the revised policy statement were ascertained

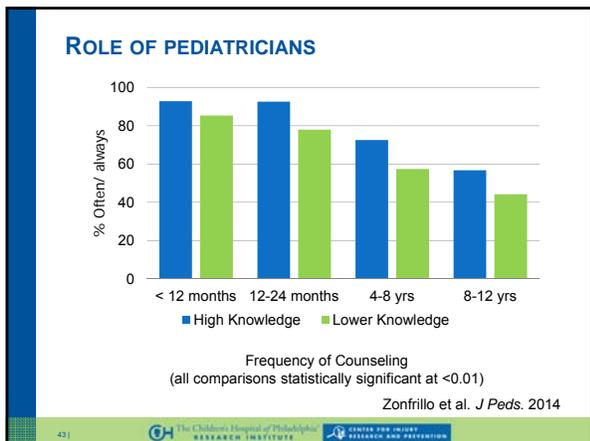
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### ROLE OF PEDIATRICIANS

- 533 respondents completed the survey
- All 6 CPS knowledge and scenario-based items answered correctly by 52.9% of the sample: identified as "high knowledge" group
  - More likely to be female ( $P < 0.001$ ), to have completed a pediatrics residency ( $P = 0.03$ ), and have a child between 4-7 years old ( $P = 0.001$ )

Zonfrillo et al. *J Peds.* 2014

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- ### ROLE OF PEDIATRICIANS
- | Most Common Barriers to evidence-based counseling  | Most Common strategies used to provide counseling   |
|--|---|
| <ul style="list-style-type: none"> <li>Inadequate time- 45%</li> <li>Office staff not trained- 24%</li> <li>Competing priorities- 20%</li> <li>Parents not interested- 20%</li> <li>No resources available- 15%</li> <li>Inadequate understanding- 8%</li> </ul> | <ul style="list-style-type: none"> <li>Prompts in health record- 56%</li> <li>Educational resources from national organization- 34%</li> <li>Adequate time- 25%</li> <li>Information provided by office staff- 18%</li> <li>Incentive plan- 3%</li> </ul> |
- Zonfrillo et al. *J Peds.* 2014

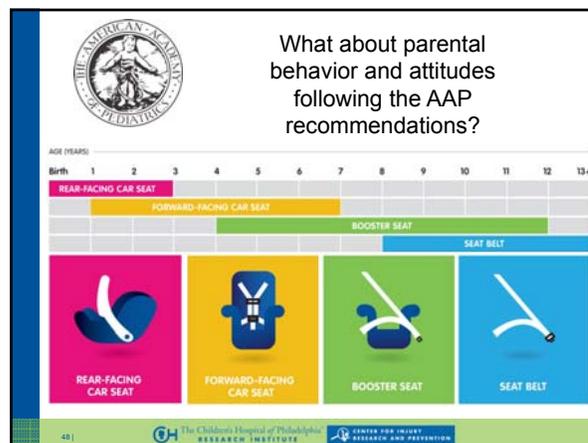
### Confidence about providing recommendations for various child passenger safety topics

Topic	Lower knowledge	High knowledge	P value
Rear-facing car seats	87.1%	95.4%	0.001
Convertible and forward-facing car seats	74.1%	91.1%	<0.001
Booster seats	68.6%	85.7%	<0.001
When a child can use an adult seat belt without a booster seat	66.9%	86.1%	<0.001
When a child can sit in the front seat	62.4%	89.0%	<0.001

Zonfrillo et al. *J Peds.* 2014

- ### OVERCOMING IDENTIFIED BARRIERS
- Inadequate time
    - Utilize technology and screening
      - Kiosks in waiting room (targeted messages)
      - Prompts in electronic health records (age/size appropriate advice; 'just-in-time' education)
- Zonfrillo et al. *J Peds.* 2014

- ### CONCLUSIONS
- Although CPS knowledge is generally high among pediatricians, knowledge gaps still exist
  - Knowledge associated with attitudes, practices, barriers, and facilitators of CPS guideline dissemination
  - Opportunities to increase knowledge and implement strategies to routinely disseminate CPS information in primary care setting



### PARENTAL BEHAVIOR (O'NEIL ET AL 2013)

- **Are parents following the recommendations for keeping children younger than 2 years rear facing during motor vehicle travel?**
- Objective
  - Reports the effect of new recommendations on the observed direction of travel for infants and toddlers transported in motor vehicles between 2007 and 2012

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### PARENTAL BEHAVIOR (O'NEIL ET AL 2013)

- Methods
  - Observational, cross-sectional survey of drivers transporting children collected at 25 convenience locations selected in Indiana during summer 2007 through 2012
  - Observations were conducted by Certified Child Passenger Safety Technicians

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### PARENTAL BEHAVIOR (O'NEIL ET AL 2013)

- Methods
  - Drivers completed written survey
  - CPS Technician recorded the vehicle seating location, type of restraint, CSS direction and use of the CSS harness or safety belt as appropriate, and demographic data
  - Child's age and weight were collected

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### PARENTAL BEHAVIOR (O'NEIL ET AL 2013)

#### % rear-facing

	2007-2009	2012
Birth-23 months	44.2%	59.1%
Birth-11 months	85.1%	91.6%
12-23 months	3.3%	18.2%

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### PARENTAL BEHAVIOR (O'NEIL ET AL 2013)

- Conclusions
  - Counseling by primary care providers should continue and be strengthened to increase parent and caregiver awareness of the latest child passenger safety recommendations

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### PARENTAL BEHAVIOR (MACY ET AL 2014)

- Objective
  - Determine, at the time of the release of the 2011 CPS guidelines and then 30 months later
    - Age at which parents first turned their child's car seat to face forward
    - Information sources used to make that decision

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### PARENTAL BEHAVIOR (MACY ET AL 2014)

- **Methods**
  - 2 separate cross-sectional Web-based surveys of nationally representative panels of US parents in May 2011 and November 2013.
  - Survey participation rate was 54% in both years (n = 495 in 2011; n = 521 in 2013)
  - Parents of children ≤4 years old responded to questions about transitioning from rear-facing to forward-facing car seats

### PARENTAL BEHAVIOR (MACY ET AL 2014)

Parents of 1- to 4-year old children who had been turned to face forward	2011 (N=409)	2013 [N=413]
Before 12 months	33%	24%
At 2 years or older	16%	23%

### PARENTAL BEHAVIOR (MACY ET AL 2014)

- **Results**
  - Car seat packaging and clinicians were the most common information sources.
  - Demographic characteristics associated with turning to face forward at or before 12 months of age in 2011 (parent age, education, household income, rural residence) were not significantly associated with transitioning at or before 12 months in 2013

### PARENTAL BEHAVIOR (MACY ET AL 2014)

- **Conclusions**
  - Waiting to transition to forward-facing car seat still represents an opportunity to improve passenger safety
  - Clinicians may be influential in a parents' CPS decision-making processes

### PARENT SURVEY - SAFEKIDS

- Survey of 1,002 parents and caregivers with children ages 10 and under
  - Use of restraints
  - Situations when they might keep
  - What they think other parents do
  - 32 questions
  - Fielded June 2013

### PARENT SURVEY - SAFEKIDS

Table 1: I have at least once (or occasionally, or often) driven with my child(ren) not fully buckled in their car seat or booster in certain circumstances.

Gender		Education	
Women	23%	High School and Below	19%
Men	26%	High School to College	23%
Age		Graduate School	36%
18-29	28%	Ethnicity	
30-49	22%	White	22%
Income		African-American	27%
Under \$35k	21%	Other	30%
\$35k-\$49.9k	21%	Latino	26%
\$50k-\$74.9k	28%	Overall	
\$75k-\$100k	19%	23%	
\$100k+	33%		



- ### PARENT SURVEY - SAFEKIDS
- Differences in responses by gender, age group, education, income, race/ethnicity
  - In several scenarios, men almost twice as likely as women to say that it is acceptable for a child to ride unrestrained
    - 23% of men said that it was acceptable as a 'reward' for the child, compared to 12% of women (p=0.000).

- ### RESULTS
- Highest income bracket (\$100,000+)
    - More frequently responded that it was acceptable for a child to ride unrestrained
    - Situation that greatest proportion of respondents found acceptable was not driving far (34%), compared to 15% of respondents in the under \$35,000 income group (p=0.000)

- ### PARENT SURVEY - SAFEKIDS
- Acceptable for a child to ride unrestrained if not driving far
    - 27% of parents 18-29 years vs 19% of parents 30-49 years (p<0.001)

- ### PARENT SURVEY - SAFEKIDS
- Acceptable for a child to ride unrestrained if they were in a rush
    - 22% with \$100,000+ income vs. 9% with <\$35,000 (p=0.002)
    - 20% with graduate school vs 10% with high school education or less (p=0.011)

- ### CHILD PASSENGER SAFETY: FUTURE DIRECTIONS
- Current goals similar to historic goals
    - Minimize/eliminate child occupant death
    - Attenuate short- and long- term disability
    - Mitigate injuries requiring medical attention
  - Future advances must be data driven
    - Surveillance data
    - Technical data ('black box')
    - 'Big' data (administrative data, social networking)

**SUMMARY**

- Motor vehicle crashes leading cause of death and disability in children
- Proper restraint selection and installation can reduce injury and fatalities
- Increased knowledge of and adherence to newest AAP/NHTSA recommendations by both pediatricians and parents
- Knowledge gaps and non-adherence to best-practice both still exist
- Continued education and tested intervention to overcome barriers to knowledge and behavior

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**QUESTIONS?**

**[injury.research.chop.edu](http://injury.research.chop.edu)**



- Child Passenger Safety  
[www.chop.edu/carseat](http://www.chop.edu/carseat)  
[www.safercar.gov/parents](http://www.safercar.gov/parents)  
[www.safekids.org/car-seat](http://www.safekids.org/car-seat)
- Teen driving  
[www.teendriversource.org](http://www.teendriversource.org)  
[www.nhtsa.org/Teen-Drivers](http://www.nhtsa.org/Teen-Drivers)  
[www.teendriving.aaa.com](http://www.teendriving.aaa.com)

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