Children in Air Bag Crashes

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Topics

- Collecting Data on Air Bag Fatalities
- Crisis and Response
- Where are the Children?
- Conclusions

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Collecting Data on Air Bag Crashes

- The Special Crash Investigations (SCI) program is a component of the the National Center for Statistics and Analysis (NCSA) in the National Highway Traffic Safety Administration (NHTSA)
- SCI researchers perform special, intensive investigations of crashes selected for high interest
- Airbag-related fatal and serious injury cases are of particularly high interest

Special Crash Investigations (SCI)

- Cases of interest located through:
  - Fatality Analysis Reporting System (FARS)
  - National Automotive Sampling System (NASS)
  - Other DOT and NHTSA research components, regional offices, and hotlines
  - Police and fire/rescue personnel
  - Auto manufacturers

SCI files are believed to contain a near-census of airbag-related fatalities in crashes of minor to moderate severity (delta-V < 25 mph) .

Crisis And Response

Air bags were introduced to save lives – and NHTSA estimates 10,271 lives saved by air bags as of January 1, 2002.

BUT

In some crashes of minor to moderate severity, a deploying air bag has been an injury **SOURCE**.

Crisis And Response

Of special concern have been fatal passenger air bag (PAB) injuries to infants and children under 12:

- 1993: 1 - the first child PAB fatality
- 1994: 5
- 1995: 8
- 1996: 25
- 1997: 31

Crisis And Response

Fleet size was also growing...

Number of passenger air bag-equipped cars/light trucks in fleet grew from:

600,000 in 1992
to
40,000,000 in 1997

(Source: R.L. Polk registration data)

Crisis And Response

Responses to the crisis:

- Public education
  - 1996: Safety campaigns launched by NHTSA and its partners – manufacturers, insurance companies, and other organizations
    - A primary message:

      Children 12 and under are safer in the back

Crisis And Response

Responses to the crisis:

- Rulemaking
  - March 1997: NHTSA rule allows manufacturers to reduce force at which air bags deploy

    ➔"Redesigned Air Bags"

    More accurately called "Sled-Certified Air Bags"

    Optional sled test vs. previously required barrier test

    Vehicles certified to new standard enter fleet throughout 1998 model year

  - May 2000: Final Rule, Advanced Air Bags

Crisis And Response

Were the measures effective?

To answer, compare counts across years:

- Align fatality counts into Sept-Aug production years
- Divide by "Million Registered Vehicle Years" (MRVY):

  Estimated number of (driver/pass.) airbag-equipped vehicles on road during production year (in millions)

  -adjusted for attrition and gradual release

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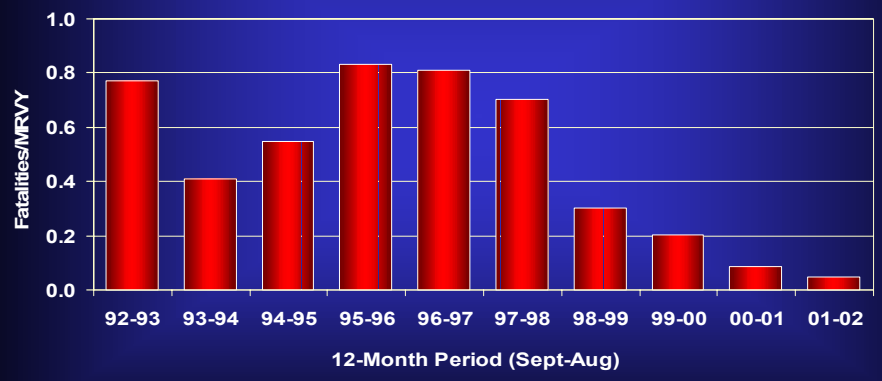
Crisis And Response

Children Fatally Injured by a Passenger Air Bag Normalized by Million Registered Vehicle Years

12-Month Period (Sept-Aug)	Child PAB Fatals	MRVY	Fatals/ MRVY	12-Month Period (Sept-Aug)	Child PAB Fatals	MRVY	Fatals/ MRVY
92-93	1	1.294	.773	97-98	34	48.303	.704
93-94	2	4.893	.409	98-99	19	63.018	.302
94-95	7	12.797	.547	99-00	16	78.718	.203
95-96	19	22.801	.833	00-01	8	94.140	.085
96-97	28	34.562	.810	01-02	5	108.701	.046

Crisis And Response

Children Fatally Injured by a Passenger Air Bag Normalized by Million Registered Vehicle Years



Source: NCSA, NHTSA

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Separating the Effects

- Is the observed reduction an effect of

public education
or
sled-certified air bags?

To assess, control for air bag type - compare since 1997:

Separating the Effects

Children Fatally Injured by a PAB: Barrier-Certified vs. Sled-Certified
Normalized by MRVY

Non-Redesigned				Redesigned			
12-Month Period (Sept-Aug)	Child PAB Fatals	MRVY	Fatals/ MRVY	12-Month Period (Sept-Aug)	Child PAB Fatals	MRVY	Fatals/ MRVY
97-98	33	42.006	0.786	97-98	1	6.297	0.159
98-99	15	42.429	0.354	98-99	4	20.588	0.194
99-00	14	41.689	0.336	99-00	2	37.029	0.054
00-01	7	40.685	0.172	00-01	1	53.455	0.019
01-02	4	39.395	0.102	01-02	1	69.306	0.014

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Separating the Effects

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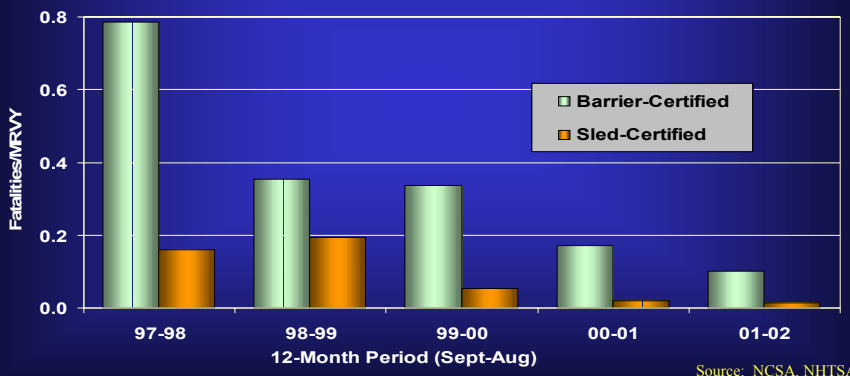

Source: NCSA, NHTSA

Separating the Effects

- Public education effect – across years
- Redesign effect - within years
- Graph suggests both effects are positive.

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Where are the children?

- Reductions in air bag fatalities suggest "back seat" message has been heeded – but can't tell us to what extent
- Can other data sources help?

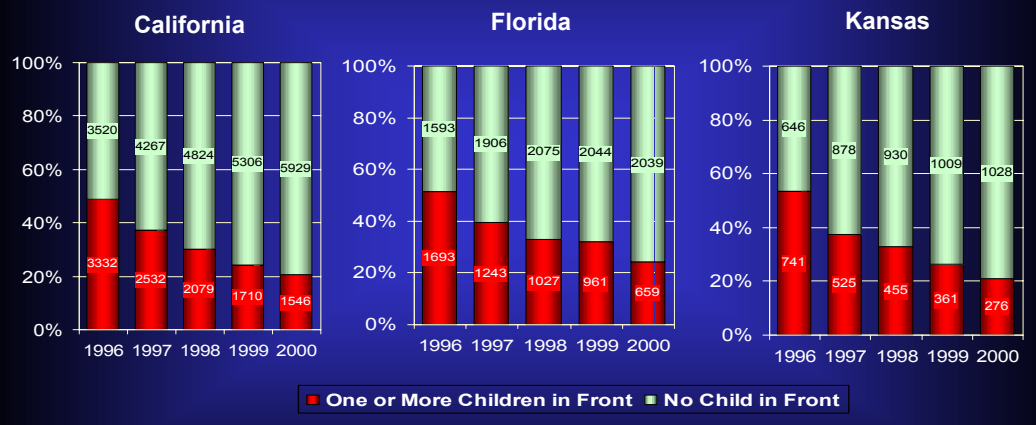
Where are the children?

- The NHTSA State Data System holds data on all police-reported crashes from 18 participating states
- Can be useful for tracking seating patterns
  - To look at changes over time, can control for
    - child age group
    - Number of adults and children in vehicle

Examples follow:

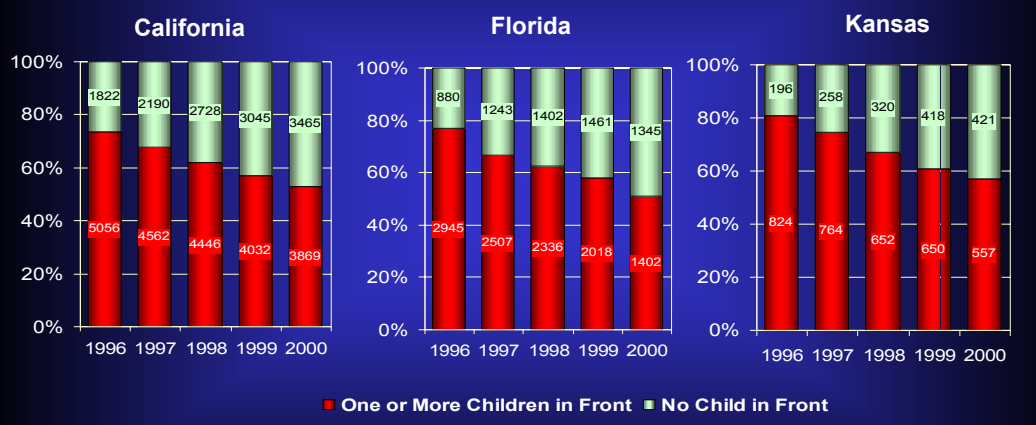
California, Florida, Kansas

Children Age 0-3
Percent Vehicles with a Child in Front Seat Among Vehicles With 1 Adult and 1 or 2 Children In 1996-2000 Police-Reported Crashes



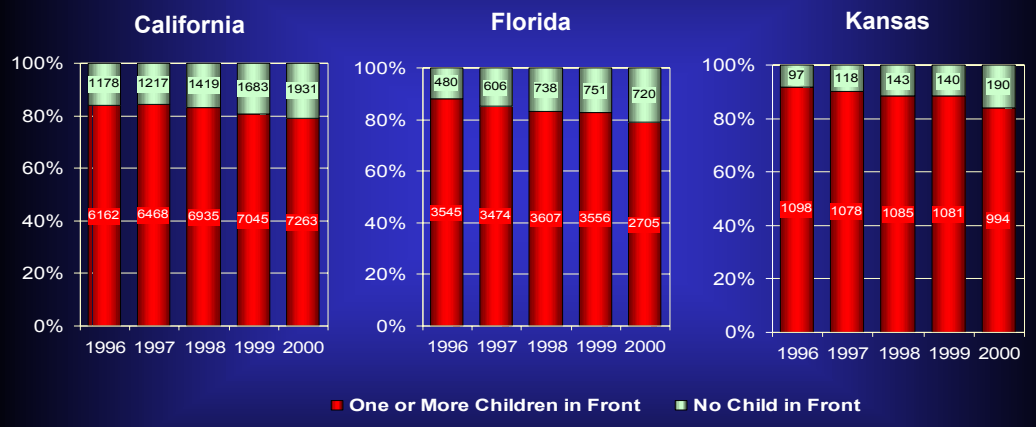
Source: NCSA State Data System, NHTSA

Children Age 4-7
Percent Vehicles with a Child in Front Seat Among Vehicles With 1 Adult and 1 or 2 Children In 1996-2000 Police-Reported Crashes



Source: NCSA State Data System, NHTSA

Children Age 8-12
Percent Vehicles with a Child in Front Seat Among Vehicles With 1 Adult and 1 or 2 Children In 1996-2000 Police-Reported Crashes



Source: NCSA State Data System, NHTSA

Concerns for the Future

NHTSA on watch for possible rise in rates –

- as used first-generation air bag vehicles are bought by drivers who previously owned cars without air bags -

– and thus may not have given attention to air bag safety messages

Conclusions

- Child air bag-related fatalities as a rate per air bag-equipped vehicle have dropped every year since 1996
- Sled-certified air bags have had a lower rate of child fatal injury than barrier-certified air bags in each year since they were introduced
- Child air bag fatality reduction for both barrier- and sled-certified air bags in the years since 1996 suggests positive effect of public education efforts
- Crash data from selected states show drivers are moving infants and toddlers to the back, but room for improvement remains
- State crash data show older children are still commonly in front seats

NHTSA SCI Web Site

http://www-nrd.nhtsa.dot.gov/departments/nrd-30/ncsa/SCI.html

- Summary tables and quarterly charts
- Full case studies for all published cases
- Query interface