Crash Medical Outcomes Data Project

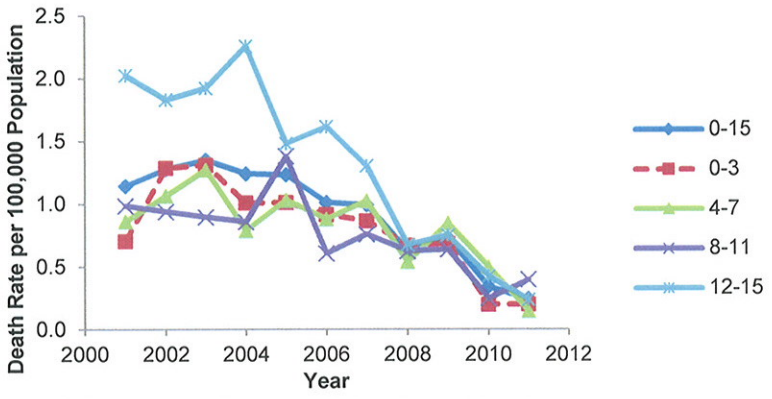
California Department of Public Health ▪ Safe and Active Communities Branch ▪ September 2013

California Child Passenger Safety: Restraint Use and Injury Patterns

The death or serious injury of any child in a motor vehicle crash is a tragic event, one that negatively impacts families, communities and society. We know that proper restraint use is vital to reducing occupant injuries and deaths (1). California's safety belt laws coupled with ongoing education and enforcement have contributed significantly to improved child passenger safety. Effective January 1, 2012, California child passenger safety laws require all children under 8 to be in a car or booster seat in the rear seat and all children under 16 to be in a car, booster, or vehicular seat belt properly restrained. For the period 2001 to 2011, deaths and serious injuries have declined markedly (Figures 1 and 2). However, vehicle occupant injuries remain a leading cause of unintentional injury and death among children (2). In this fact sheet, we highlight passenger injuries among 0-15 year old children with a focus on restraint use and injury patterns.

Child passenger restraint use saves lives and reduces serious injuries in California!

Figure 1. Death rates among 0-15 year old motor vehicle passengers, California, 2001-2011

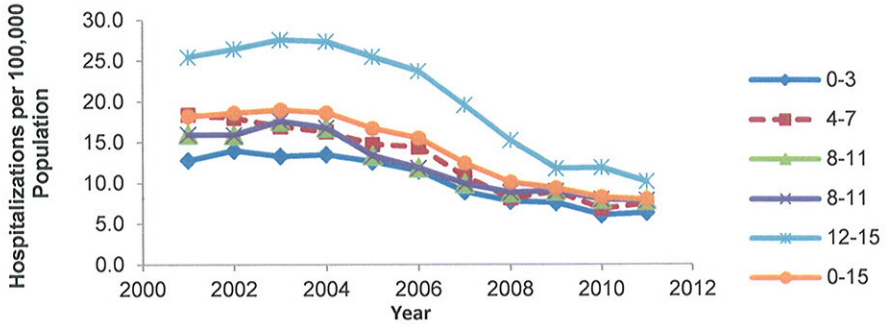


Data Source: California Department of Public Health, Death Records

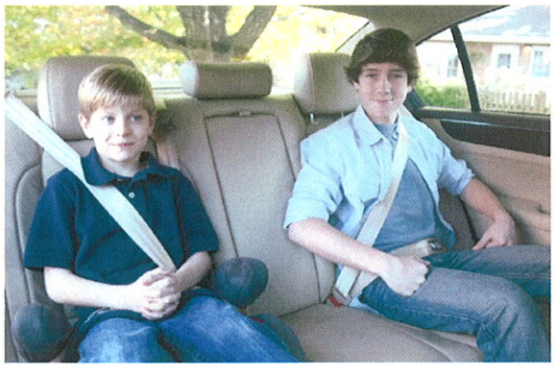
Death rates for child passengers declined an average of 79% from 2001 (1.2 deaths/100,000 children) through 2011 (.3 deaths/100,000 children) (Figure 1). Death rates for 12-15 year old passengers declined more dramatically than for other age groups until 2008.

For the period 2001 through 2011, hospitalization rates for child passengers declined markedly (by 56%) from 18.2 deaths/100,000 to 8.0 deaths/100,000. The 12-15 year old age group, hospitalized at greater rates than younger children, had the greatest percentage decrease (Figure 2). On average for these years, for every child passenger admitted to the hospital almost 22 were treated and released from the Emergency Department (ED). ED visits from 2006 through 2011 showed similar downward trends.

Figure 2. Rates of nonfatal hospitalizations among 0-15 year old motor vehicle passengers, California, 2001-2011



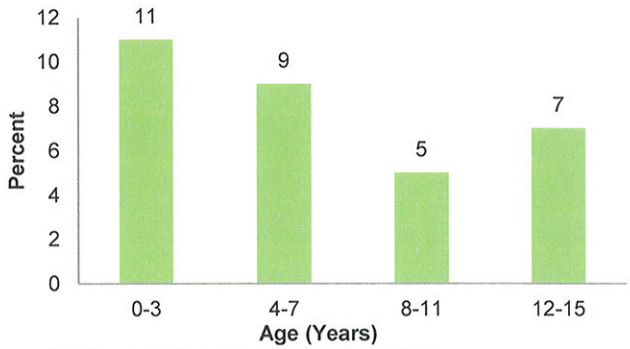
Data Source: Office of Statewide Health Planning and Development, Hospital Discharge Data



Although rates of deaths and serious injuries have decreased, sadly 305 child passengers ages 0-15 were killed and over 47,000 were injured in California during the four-year period 2007-2010.

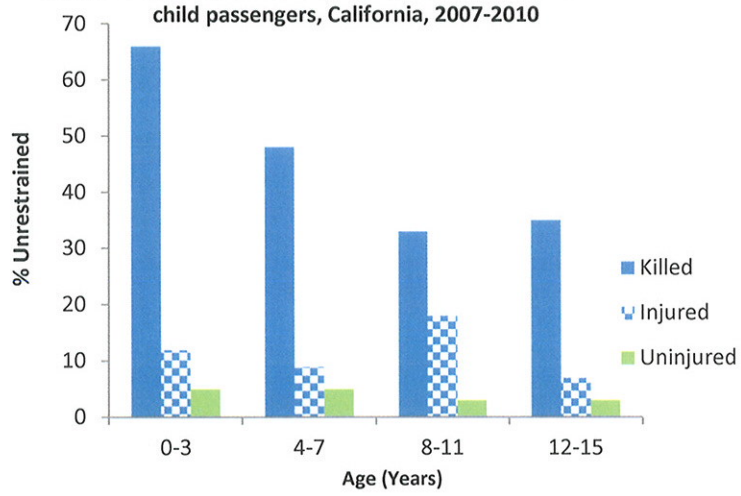
The percentage of child passengers 0-15 years old who were restrained in California was moderately high (92.8%), and improved slightly (1.9%) from 2007 to 2010. Yet, during this time period, over 11% of 0-3 year olds in fatal or non-fatal injury crashes were unrestrained (Figure 3). Boys ages 0-15 years were slightly more likely to be unrestrained than girls (9.7% versus 8.4%).

Figure 3. Percent unrestrained in crashes among child passengers by age, California, 2007-2010



Data Source: California Highway Patrol, SWITRS Data

Figure 4. Severity of injury by age group and % unrestrained child passengers, California, 2007-2010



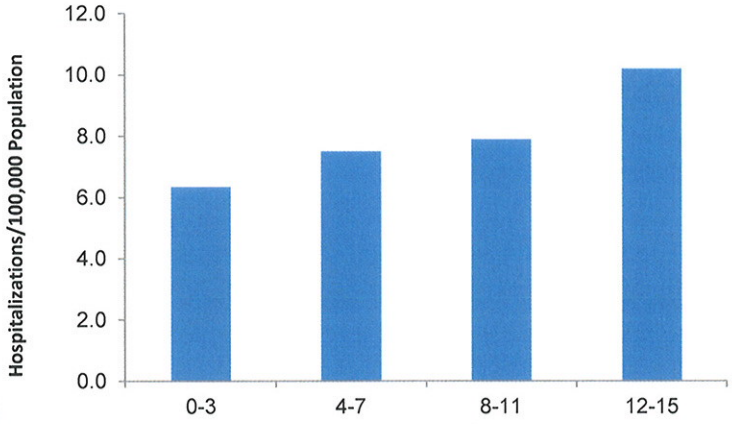
Data Source: California Highway Patrol, SWITRS Data

In injury-related motor vehicle crashes, the severity of children's injuries was strongly related to restraint use. Overall, child passengers 0-15 years old who were killed in car crashes were almost 10 times more likely to be unrestrained than those injured, and nearly 19 times more likely than those uninjured. For example, child passengers 0-3 years old who were killed were almost 15 times more likely to be unrestrained than those who were injured, and 12-15 year olds who died were 7 times more likely to be unrestrained (Figure 4).*

Linked crash-medical data revealed that unrestrained children requiring medical care were three times more likely to be hospitalized than to be treated and released from the ED, an indication of the increased severity of the injuries.

*Odds Ratios (95% CI): 9.8(7.8-12.3), 18.7(15.0-23.6) for 0-15 year olds, 14.8(8.9-24.6) for 0-3 year olds, 7.0(4.6-10.6) for 12-15 year olds

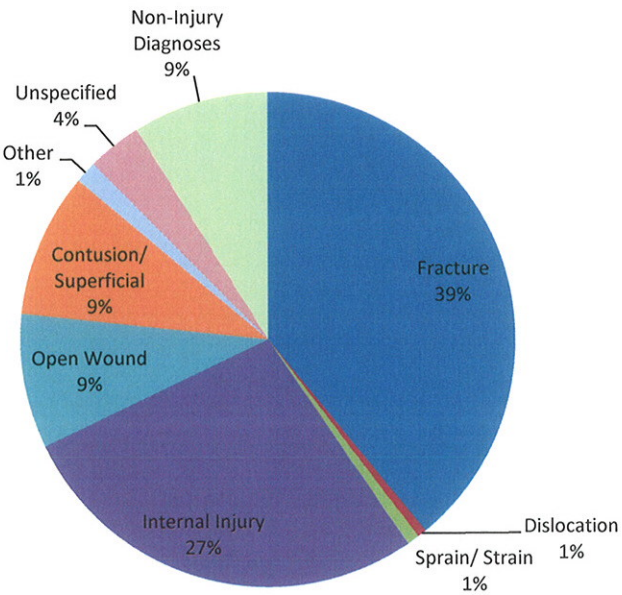
Figure 5. Nonfatal hospitalization rate by age group, California, 2011



Data Source: Office of Statewide Health Planning and Development, Hospital Discharge

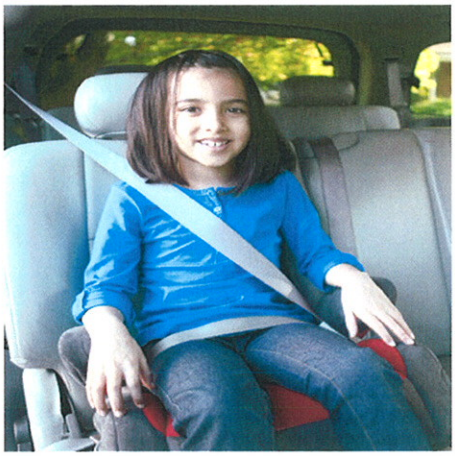
The risk of 0-15 year old passengers being hospitalized increased as children got older (Figure 5). The average length of stay in the hospital was 4.3 days for age 0-15 year old passengers. During 2011, hospital charges associated with treating nonfatal motor vehicle injuries totaled over $54 million in California. Average charges per hospitalization were more than two times higher among the 0-3 year olds compared to older children.

Figure 6. Hospitalizations among 0-15 year olds by nature of injury, California, 2007-2011



Data Source: Office of Statewide Health Planning and Development, Hospital Discharge

Two-thirds of serious injuries treated in the hospital were fractures and internal injuries (Figure 6). The most common injuries treated and released from the ED were sprains, strains, and bruises. Twenty-eight percent of hospitalized children had a traumatic brain injury, which were mostly fractures and internal injuries.



California's safety belt laws, coupled with ongoing education and enforcement have led to improved child passenger safety!

Summary

- From 2007 through 2010, 305 motor vehicle passengers ages 0-15 years old were killed and over 47,000 were injured in California.
- Rates of child restraint use were generally high (92.8%) in California and appear to have increased slightly.
- In injury-related motor vehicle crashes, the severity of children's injuries is strongly related to restraint use: child passengers 0-15 years old who were killed in car crashes were almost 19 times more likely to be unrestrained than those uninjured.
- Among those children injured, 12-15 year olds were more likely to be hospitalized than younger children.
- Charges for nonfatal hospitalizations were highest in the 0-3 year-old group.
- Hospitalizations were primarily for fractures and internal injuries and were more serious and costly than the sprains, strains, and bruises treated in the ED.

Conclusions

Restraint use was strongly associated with fewer deaths and serious injuries. Although deaths and injuries to children ages 0-15 years old have declined, much work still needs to be done to sustain this success and continue reducing the numbers of children killed or injured in motor vehicle crashes. Strengthening California child passenger safety laws and continued enforcement efforts have been shown to be effective in reducing fatalities and serious injuries; however, future research is needed to identify effective strategies to improve proper restraint use.

References

1. Eichelberger AH, Chouinard AO, Jermakian JS. Effect of booster seat laws on injury risk among children in crashes. Traffic Inj Prev 2012; 13(6):631-9.
2. Web-based Injury Statistics Query and Reporting System (WISQARS). National Center for Injury Prevention and Control Website. Unintentional MV injuries, children ages 19 and under, and leading causes of death, children ages 19 and under. Available from: http://www.cdc.gov/injury/wisqars/index.html. Accessed on July 3, 2013.

About the data

This fact sheet uses various sources (death records, hospital emergency department and inpatient data, and police collision reports) to describe the injuries among 0-15 year old child vehicle passengers. Each source captures a different aspect of the overall burden of these injuries. In addition to the overall surveillance provided by these sources, we use linked crash-medical data to describe the relationship between restraint use and injury severity.

Information for persons injured in crashes may be accessed through the CMOD online query Linked Crash-Medical Data. This query is part of the EpiCenter California Injury Data Online accessed at http://EpiCenter.cdph.ca.gov. There you may create tables, using any of the 25 variables to see how victim characteristics and crash circumstances affect the victim's medical outcome. For technical assistance on using the online query or for other questions related to the CMOD project, contact Lynn.Walton-Haynes@cdph.ca.gov.

This fact sheet was developed under the guidance of the CMOD Project, Safe and Active Communities Branch. For further information about this fact sheet contact Cathy.Saiki@cdph.ca.gov.

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