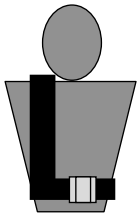
# 2011 State of Colorado CHILD SAFETY RESTRAINT SYSTEM, BOOSTER, AND JUVENILE SEAT BELT SURVEY

## Colorado Department of Transportation



# SEAT BELT STUDY

Colorado State University®

INSTITUTE OF TRANSPORTATION MANAGEMENT

# TABLE OF CONTENTS

# LIST OF TABLES

# PREFACE

The purpose of this project was to conduct a comprehensive survey of child safety restraint systems, booster, and juvenile seat belt usage for the State of Colorado in 2011. Observations were conducted over a two-week period from June 19 through July 2, 2011 immediately following the 2011 Statewide Survey. The study was conducted by the Institute of Transportation Management, College of Business, Colorado State University under the sponsorship of the Colorado Department of Transportation (CDOT), Office of Transportation Safety (OTS). Observational data were collected and analyzed by the Institute of Transportation Management.

The objective of the *Child Safety Restraint System, Booster, and Juvenile Seat Belt Survey* was to obtain an estimate of the usage rate of child safety restraint systems for children (newborn - 4 years), booster seats, and seat belts for juveniles (5 - 15 years). Besides information on children and juveniles, seat beat usage data were collected on the drivers of the vehicles observed.

The results of this study, when combined with data from previous studies, should provide information that will be useful to the OTS in making future transportation safety program decisions.

# EXECUTIVE SUMMARY

The Institute of Transportation Management (ITM) at Colorado State University conducted a comprehensive study of child safety restraint systems (child car and booster seats) and juvenile seat belt usage from June 19 through July 2, 2011. The survey was designed to observe drivers, children (newborn - 4 years), and juveniles (5 - 15 years). Vehicles included in the survey were passenger cars, trucks, vans, and SUVs. Commercial vehicles were not included in the study. Trained observers monitored 50 sites in 20 counties across the State to collect the data. The raw data collected from the survey were entered into the SAS System database and submitted to the Franklin A. Graybill Statistical Laboratory of the College of Natural Sciences for independent analysis. The results of the analyses of the data are presented herein.

The Institute of Transportation Management is pleased to have participated in the 2011 Colorado seat belt usage surveys. The design of this study is representative of the population movements and trends within the State of Colorado and thus provides a useful projection of actual child safety restraint system, booster, and juvenile seat belt usage. The data and the analyses submitted to CDOT/OTS are, to the best of my knowledge, accurate and complete.

G. James Francis
Principal Investigator
Institute of Transportation Management
Colorado State University

# ADMINISTRATIVE EVALUATION

Observers and supervisors received training emphasizing the need for consistency and accuracy in data collection and the survey process. Burt Deines and Brenda Ogden were responsible for conducting the one-day training program. The observers were provided information on how to properly collect, record, and report the data. Each observer was supplied data collection sheets, maps, site locations, and the supervisor's telephone numbers to facilitate completion of the seat belt usage survey.

The *Child Safety Restraint System, Booster, and Juvenile Seat Belt Survey* was conducted June 19 through July 2, 2011. This phase of the study, which was carried out immediately following the *Statewide Seat Belt Survey*, encompassed 50 sites across 20 counties with each site observed on two separate dates.

As in previous seat belt usage surveys conducted by the Institute of Transportation Management, retired Colorado State Highway Patrol Officers were used as observers whenever possible. The troopers' familiarity with interstate and state highways, as well as local and county roads and safety procedures, helped to minimize potential location issues and safety problems. The patrol officers have proven to be very conscientious and reliable and have helped strengthen the validity of the results.

The Franklin A. Graybill Statistical Laboratory of the College of Natural Sciences also played a significant role in this study. Besides contributing to the reliability and validity of usage estimates with statistical analyses, the Statistical Laboratory gives the analyses independence from the survey process. By using these two groups of independent contractors, the Institute has taken measures to ensure the integrity of the survey and analyses while involving individuals in the study who have the most relevant skills.

Overall, the project objectives were accomplished within the time horizon and budget agreed to by CDOT and ITM.

# SUMMARY OF FINDINGS

## Survey

The study was conducted using observational sites selected previously by the CDOT Office of Transportation Safety and modified by the Institute of Transportation Management, Colorado State University, to reflect population growth and shifts within the State.

During this study, 6,964 vehicles were observed. The tables contained in this report detail the results of observations made at the 50 sites across 20 counties. Each of the 50 sites was observed twice (one time during each week) during the course of the study. A summary of key findings is provided below.

**Estimates of Child Restraint, Booster, and Juvenile Seat Belt Usage Statistics**

**Children (newborn - 4 years)**

- In 2010, children (newborn - 4 years) combined front seat and rear seat restraint usage for all vehicles was 85.0. For 2011, there was an improvement to 86.5.

- In 2011, if the vehicle was a car, the combined front seat and rear seat restraint usage for children (newborn - 4 years) was 85.2, which represents a significant improvement over the 76.4 rate of last year. The front seat and rear seat restraint usage for vans remained the highest among vehicle types at 95.2.

**Children in Booster Seats**

- This year was the first attempt to monitor the usage rate of child booster seats. The results, as shown in Table 1, are quite variable ranging from a low of 58.7 in cars to 90.5 in ex-cab pickup trucks.

**Juveniles (5 - 15 years)**

- In 2011, juvenile (5 - 15 years) combined front seat and rear seat belt usage for all vehicles was 81.7, which represents an improvement over 75.5 in 2010.

- In 2011, the combined front seat and rear seat belt usage for juveniles (5 - 15 years) in cars was 81.2 – an increase in the usage rate from last year's 69.9.

- Trucks have the lowest usage rate (71.8) for juveniles. However, this represents an improvement over last year's 70.9.

## 2010 and 2011 Analyses of Estimates of Child Restraint, Booster, and Juvenile Seat Belt Usage Statistics (Table 1)

**TABLE 1a: 2010 and 2011 Estimates of Combined Front and Rear Child Restraint and Juvenile Seat Belt Usage**

| Child Estimate | No. Obs | 2010 Estimate | | Std Err |
|---|---|---|---|---|
| Car | 956 | 76.4 | | |
| Truck | 44 | 70.9 | | |
| x-Cab | 66 | 89.2 | | |
| Van | 385 | 95.4 | | |
| SUV | 693 | 91.6 | | |
| Total | 2144 | | **85.0** | 0.0077 |

| Child Estimate | No. Obs | 2011 Estimate | | Std Err |
|---|---|---|---|---|
| Car | 929 | 85.2 | | |
| Truck | 45 | 81.3 | | |
| x-Cab | 56 | 78.4 | | |
| Van | 302 | 95.2 | | |
| SUV | 621 | 85.4 | | |
| Total | 1953 | | **86.5** | 0.01 |

| Juvenile Estimate | No. Obs | 2010 Estimate | | Std Err |
|---|---|---|---|---|
| Car | 1615 | 69.9 | | |
| Truck | 225 | 70.9 | | |
| x-Cab | 270 | 66.3 | | |
| Van | 810 | 85.0 | | |
| SUV | 1556 | 78.7 | | |
| Total | 4476 | | **75.5** | 0.0064 |

| Juvenile Estimate | No. Obs | 2011 Estimate | | Std Err |
|---|---|---|---|---|
| Car | 1799 | 78.0 | | |
| Truck | 254 | 74.1 | | |
| x-Cab | 308 | 87.0 | | |
| Van | 556 | 86.7 | | |
| SUV | 1478 | 84.9 | | |
| Total | 4395 | | **81.8** | 0.01 |

**2010**

| Restraint Usage | | 95% Confidence Intervals | |
|---|---|---|---|
| | | **Lower** | **Upper** |
| **85.0** | **Child** | 83.5 | 86.5 |
| **75.5** | **Juvenile** | 74.3 | 76.8 |

**2011**

| Restraint Usage | | 95% Confidence Intervals | |
|---|---|---|---|
| | | **Lower** | **Upper** |
| **86.5** | **Child** | 85.0 | 88.0 |
| **81.8** | **Juvenile** | 80.7 | 83.0 |

**TABLE 1b: 2011 Estimates of Booster Seat Belt Usage**

| Child Booster | No. Obs | 2011 Estimate | | Std Err |
|---|---|---|---|---|
| Car | 974 | 58.7 | | |
| Truck | 85 | 40.4 | | |
| x-Cab | 71 | 90.5 | | |
| Van | 267 | 88.5 | | |
| SUV | 520 | 73.9 | | |
| Total | 1917 | | **66.3** | 0.01 |

**2011**

| Child Booster | | 95% Confidence Intervals | |
|---|---|---|---|
| | | **Lower** | **Upper** |
| **66.3** | **Child** | 64.2 | 68.4 |

## 2011 Usage Rates by Vehicle Speed (Table 2)

### Child Safety Restraint (newborn - 4 years)

- When considering speed of vehicles for the child safety restraint system, the usage rate was 97.3 for speeds 0-30 mph and 82.1 for speeds 31-50 mph. This result is somewhat of an anomaly as a higher usage rate is usually associated with higher speeds.

### Child Booster

- For children in booster seats for speeds 0-30 mph, seat belt usage was 68.7. For speeds 31-50 mph, the seat belt usage was 63.2. Note that the standard error for children in booster seats in vehicles traveling less than 30 mph is 6.4, which implies insufficient sample size.

### Juveniles (5 - 15 years)

- Table 2c compares seat belt usage of juveniles in vehicles traveling 30 mph and slower with speeds of 31 to 50 mph. The usage rates of 71.3 for speeds 0-30 mph and 82.1 for speeds 31-50 mph are more consistent with most results regarding the influence of vehicle speed.

**TABLE 2: 2011 Combined Front and Rear Usage Rates by Vehicle Speed**

**TABLE 2a: 2011 Child Restraint Usage by Vehicle Speed (newborn - 4 years)**

| Speed | |
|---|---|
| 0 – 30 MPH | 31 – 50 MPH |
| Observations: 119 | Observations: 221 |
| Estimated Seat Belt Use: 97.3 | Estimated Seat Belt Use: 82.1 |
| Std Error: 1.1 | Std Error: 3.6 |

**TABLE 2b: 2011 Child Booster Seat Belt Usage by Vehicle Speed**

| Speed | |
|---|---|
| 0 – 30 MPH | 31 – 50 MPH |
| Observations: 102 | Observations: 225 |
| Estimated Seat Belt Use: 68.7 | Estimated Seat Belt Use: 63.2 |
| Std Error: 6.4 | Std Error: 4.1 |

**TABLE 2c: 2011 Juvenile Seat Belt Usage by Vehicle Speed (5 - 15 years)**

| Speed | |
|---|---|
| 0 – 30 MPH | 31 – 50 MPH |
| Observations: 130 | Observations: 2 |
| Estimated Seat Belt Use: 71.3 | Estimated Seat Belt Use: 82.1 |
| Std Error: 3.8 | Std Error: 1.6 |

**TABLE 3: 2010 Combined Front and Rear Usage Rates by Vehicle Speed**

**TABLE 3a: 2010 Child Restraint Usage by Vehicle Speed**
**Child (newborn - 4)**

| Speed | |
|---|---|
| 0 – 30 MPH | 31 – 50 MPH |
| Estimated Seat Belt Use: 84.2 | Estimated Seat Belt Use: 82.1 |
| | |
| Std Error: 4.7 | Std Error 4.2 |

**TABLE 3b: 2010 Juvenile Seat Belt Usage by Vehicle Speed**
**Juvenile (5 - 15)**

| Speed | |
|---|---|
| 0 – 30 MPH | 31 – 50 MPH |
| Estimated Seat Belt Use: 77.61 | Estimated Seat Belt Use: 74.0 |
| | |
| Std Error: 3.2 | Std Error: 1.3 |

## 2011 Driver Seat Belt Usage Statistics (Table 4)

- Drivers of vans have the highest seat belt usage rate at 95.3. Trucks were the lowest with a 77.0 usage rate.

- Weekday drivers used seat belts at a slightly higher rate than weekend drivers (89.5 vs. 84.9).

**TABLE 4: 2011 Driver Seat Belt Usage Statistics**

**TABLE 4a: Driver Seat Belt Usage by Weekday and Weekend**

| | Seat Belt Usage | Std Error | Lower Confidence Limit | Upper Confidence Limit |
|---|---|---|---|---|
| Weekday | 89.5 | 1.0 | 87.5 | 91.5 |
| Weekend | 84.9 | 1.1 | 82.6 | 87.1 |

**TABLE 4b: Driver Seat Belt Usage by Vehicle Type**

| Vehicle Type | Seat Belt Estimate | Std Error | Lower Confidence Limit | Upper Confidence Limit |
|---|---|---|---|---|
| Car | 86.0 | 1.2 | 83.6 | 88.4 |
| Truck | 77.0 | 4.1 | 68.9 | 86.1 |
| Ex-Cab | 82.2 | 2.0 | 78.3 | 86.1 |
| Van | 95.3 | 0.9 | 93.6 | 97.0 |
| SUV | 91.8 | 0.8 | 90.3 | 93.3 |

## 2010 Driver Seat Belt Usage Statistics (Table 5)

**TABLE 5: 2010 Driver Seat Belt Usage Statistics**

**TABLE 5a: Driver Seat Belt Usage by Weekday and Weekend**

| | Seat Belt Usage | Std Error | Lower Confidence Limit | Upper Confidence Limit |
|---|---|---|---|---|
| **Weekday** | 84.3 | 1.3 | 81.7 | 86.9 |
| **Weekend** | 82.1 | 1.3 | 79.6 | 84.7 |

**TABLE 5b: Driver Seat Belt Usage by Vehicle Type**

| Vehicle Type | Seat Belt Estimate | Std Error | Lower Confidence Limit | Upper Confidence Limit |
|---|---|---|---|---|
| **Car** | 80.7 | 1.4 | 77.9 | 83.4 |
| **Truck** | 73.4 | 2.4 | 68.5 | 78.2 |
| **Ex-Cab** | 71.5 | 2.4 | 66.6 | 76.3 |
| **Van** | 93.8 | 1.2 | 91.4 | 96.2 |
| **SUV** | 86.7 | 1.4 | 83.9 | 89.6 |

## 2011 Child Restraint and Booster Usage by Vehicle Type (Table 6)

- The restraint usage for children (newborn - 4 years) in the front seat by vehicle type is quite variable due to a small number of observations. There are fewer children sitting in front seats than in previous years so the standard error is higher. Given the small number of front seat observations, the data is less relevant than the results for the rear seat.

- The rear seat restraint usage for children continues to remain high with vans the highest at 97.4 and cars the lowest at 79.6.

- It is interesting to note that the ex-cab pickup has the highest booster seat belt usage rate for front and rear seats combined (front seat = 87.0; rear seat = 90.1).

- The large difference in standard errors between front and rear seat data is due to a much smaller number of children in front seats in all vehicle types; with one exception, cars appear to have more children in the front seats.

**TABLE 6: 2011 Child Restraint and Booster Seat Usage by Vehicle Type**

**TABLE 6a: Front Seat Child Restraint Usage by Vehicle Type**

| Vehicle Type | Seat Belt Estimate | Std Error | Lower Confidence Limit | Upper Confidence Limit |
|---|---|---|---|---|
| **Car** | 96.6 | 2.6 | 91.0 | 99.9 |
| **Truck** | 79.2 | 9.6 | 58.9 | 99.4 |
| **Ex-Cab** | 42.3 | 15.7 | 5.25 | 79.4 |
| **Van** | 100.0 | 0 | 100.0 | 99.9 |
| **SUV*** | | | | |

* Too few observations to make an accurate estimate.

**TABLE 6b: Rear Seat Child Restraint Usage by Vehicle Type**

| Vehicle Type | Seat Belt Estimate | Std Error | Lower Confidence Limit | Upper Confidence Limit |
|---|---|---|---|---|
| **Car** | 85.0 | 4.1 | 76.8 | 93.2 |
| **Truck** | No rear seat | | | |
| **Ex-Cab** | 93.4 | 3.8 | 85.6 | 99.9 |
| **Van** | 94.9 | 1.7 | 91.5 | 99.3 |
| **SUV** | 88.9 | 4.1 | 80.6 | 97.1 |

**TABLE 6c: Front Booster Seat Child Restraint Usage by Vehicle Type**

| Vehicle Type | Seat Belt Estimate | Std Error | Lower Confidence Limit | Upper Confidence Limit |
|---|---|---|---|---|
| **Car** | 57.7 | 4.1 | 49.5 | 65.8 |
| **Truck** | 37.7 | 7.6 | 22.4 | 53.1 |
| **Ex-Cab** | 87.0 | 8.1 | 69.5 | 99.9 |
| **Van** | 81.9 | 9.5 | 62.5 | 99.9 |
| **SUV** | 46.1 | 8.3 | 29.4 | 62.8 |

**TABLE 6d: Rear Booster Seat Child Restraint Usage by Vehicle Type**

| Vehicle Type | Seat Belt Estimate | Std Error | Lower Confidence Limit | Upper Confidence Limit |
|---|---|---|---|---|
| **Car** | 58.8 | 6.3 | 46.2 | 71.3 |
| **Truck** | No rear seat | | | |
| **Ex-Cab** | 90.1 | 5.3 | 79.3 | 99.9 |
| **Van** | 91.5 | 2.0 | 87.5 | 95.5 |
| **SUV** | 78.9 | 3.5 | 71.9 | 85.9 |

## 2010 Child Restraint Usage by Vehicle Type (Table 7)

**TABLE 7: 2010 Child Restraint Usage by Vehicle Type**

**TABLE 7a: Front Seat Child Restraint Usage by Vehicle Type**

| Vehicle Type | Seat Belt Estimate | Std Error | Lower Confidence Limit | Upper Confidence Limit |
|---|---|---|---|---|
| **Car** | 21.4 | 5.9 | 9.33 | 33.4 |
| **Truck** | 54.5 | 7.5 | 39.3 | 69.8 |
| **Ex-Cab** | 75.9 | 10.9 | 53.1 | 98.6 |
| **Van** | 35.7 | 16.3 | 0 | 72.0 |
| **SUV** | 50.0 | 10.0 | 29.8 | 70.2 |

**TABLE 7b: Rear Seat Child Restraint Usage by Vehicle Type**

| Vehicle Type | Seat Belt Estimate | Std Error | Lower Confidence Limit | Upper Confidence Limit |
|---|---|---|---|---|
| **Car** | 79.6 | 4.6 | 70.6 | 88.7 |
| **Truck** | No rear seat | | | |
| **Ex-Cab** | 92.2 | 4.5 | 83.0 | 99.9 |
| **Van** | 97.4 | 1.0 | 95.4 | 99.4 |
| **SUV** | 94.1 | 1.6 | 90.9 | 97.3 |

## 2011 Juvenile Seat Belt Usage by Vehicle Type (Table 8)

- The seat belt usage for juveniles (5 - 15 years) in the front seat of cars was 81.2, and the rear seat belt usage was 73.3. Both are improvements over the results of 2010 (76.5 and 62.7).

- Juvenile occupants of vans displayed the highest rate of seat belt usage with 87.7 for front seat passengers and 83.9 for rear seat passengers.

**TABLE 8: 2011 Juvenile Seat Belt Usage by Vehicle Type**

**TABLE 8a: Front Seat Juvenile Seat Belt Usage by Vehicle Type**

| Vehicle Type | Seat Belt Estimate | Std Error | Lower Confidence Limit | Upper Confidence Limit |
|---|---|---|---|---|
| **Car** | 81.2 | 3.3 | 74.7 | 87.8 |
| **Truck** | 71.8 | 5.4* | 61.1 | 82.5 |
| **Ex-Cab** | 80.1 | 3.4 | 73.2 | 87.0 |
| **Van** | 89.0 | 1.7 | 85.6 | 92.3 |
| **SUV** | 86.6 | 1.3 | 84.0 | 89.2 |

*** Note:** The Std Error is large, denoting the sample size is small.

**TABLE 8b: Rear Seat Juvenile Seat Belt Usage by Vehicle Type**

| Vehicle Type | Seat Belt Estimate | Std Error | Lower Confidence Limit | Upper Confidence Limit |
|---|---|---|---|---|
| **Car** | 73.3 | 3.6 | 66.1 | 80.5 |
| **Truck** | No Rear Seat | | | |
| **Ex-Cab** | 94.8 | 2.7 | 89.4 | 99.9* |
| **Van** | 83.3 | 3.6 | 76.1 | 90.5 |
| **SUV** | 84.4 | 2.1 | 80.2 | 88.5 |

## 2010 Juvenile Seat Belt Usage by Vehicle Type (Table 9)

**TABLE 9: 2010 Juvenile Seat Belt Usage by Vehicle Type**

**TABLE 9a: Front Seat Juvenile Seat Belt Usage by Vehicle Type**

| Vehicle Type | Seat Belt Estimate | Std Error | Lower Confidence Limit | Upper Confidence Limit |
|---|---|---|---|---|
| **Car** | 76.5 | 1.8 | 73.0 | 80.0 |
| **Truck** | 71.3 | 3.4 | 64.5 | 78.1 |
| **Ex-Cab** | 69.1 | 3.6 | 61.8 | 76.3 |
| **Van** | 87.7 | 2.3 | 83.1 | 92.2 |
| **SUV** | 86.6 | 1.3 | 84.1 | 89.1 |

**TABLE 9b: Rear Seat Juvenile Seat Belt Usage by Vehicle Type**

| Vehicle Type | Seat Belt Estimate | Std Error | Lower Confidence Limit | Upper Confidence Limit |
|---|---|---|---|---|
| **Car** | 62.7 | 3.1 | 56.6 | 68.9 |
| **Truck** | No Rear Seat | | | |
| **Ex-Cab** | 65.1 | 5.3 | 54.3 | 75.8 |
| **Van** | 83.9 | 2.8 | 78.3 | 89.5 |
| **SUV** | 72.6 | 2.6 | 67.3 | 77.8 |

## 2011 Colorado County Results (Table 10)

- Seven counties exceeded the 90% seat belt usage level for drivers with four others between 88.5 and 89.9 (Table 10a).

- Overall, 14 counties had improved usage rates over 2010. Only, one county, Las Animas, had a significant drop and was the lowest recorded rate at 64.3 (Table 10a).

**Table 10. 2011 Colorado County Results (95% Confidence Intervals)**

**Table 10a. Drivers Wearing Seat Belts**

| Counties | Seat Belt Estimate | Std Error | Lower Confidence Level | Upper Confidence Level |
|---|---|---|---|---|
| **Adams** | 83.9 | 3.3 | 77.1 | 90.8 |
| **Arapahoe** | 87.5 | 1.8 | 83.9 | 91.1 |
| **Boulder** | 94.7 | 2.1 | 90.4 | 99.0 |
| **Denver** | 89.3 | 1.2 | 86.8 | 91.8 |
| **Douglas** | 89.8 | 1.9 | 85.7 | 93.9 |
| **El Paso** | 88.5 | 1.7 | 85.0 | 91.9 |
| **Fremont** | 90.2 | 2.7 | 84.1 | 96.4 |
| **Jefferson** | 89.9 | 1.8 | 86.4 | 93.4 |
| **Kit Carson** | 74.5 | 3.3 | 67.0 | 82.0 |
| **La Plata** | 85.8 | 5.3* | 73.9 | 97.7 |
| **Larimer** | 97.5 | 0.9 | 95.5 | 99.4 |
| **Las Animas** | 64.3 | 5.4* | 52.0 | 76.6 |
| **Mesa** | 94.0 | 1.8 | 90.4 | 97.7 |
| **Moffat** | 84.1 | 5.8* | 71.1 | 97.1 |
| **Montrose** | 85.5 | 0.8 | 83.6 | 87.3 |
| **Pueblo** | 74.9 | 6.9* | 60.3 | 89.4 |
| **Rio Grande** | 90.8 | 5.9* | 77.1 | 99.9 |
| **Summit** | 97.8 | 0.9 | 95.8 | 99.9 |
| **Weld** | 97.4 | 1.4 | 94.5 | 99.9 |
| **Yuma** | 75.8 | 4.1 | 66.5 | 85.2 |

*Note: Large Std Error (greater than 5.0) indicates small sample size

**Table 10b. Front Seat and Rear Seat Combined (Child newborn - 4)**

| Counties | Seat Belt Estimate | Std Error | Lower Confidence Limit | Upper Confidence Limit |
|---|---|---|---|---|
| **Adams** | 98.3 | 1.3 | 95.6 | 99.9 |
| **Arapahoe** | 68.2 | 7.7* | 52.6 | 83.8 |
| **Boulder** | 98.7 | 1.1 | 96.5 | 99.9 |
| **Denver** | 80.5 | 7.1* | 66.3 | 94.7 |
| **Douglas** | 68.9 | 6.7* | 54.5 | 83.3 |
| **El Paso** | 89.5 | 3.1 | 83.3 | 95.7 |
| **Fremont** | | | . | |
| **Jefferson** | | | | |
| **Kit Carson** | | | | |
| **La Plata** | | | | |
| **Larimer** | 86.8 | 12.1* | 61.8 | 99.9 |
| **Las Animas** | 95.2 | 5.5* | | |
| **Mesa** | 92.1 | 3.5 | 84.6 | 99.7 |
| **Moffat** | 97.8 | 2.8 | 90.6 | 99.9 |
| **Montrose** | 95.3 | 4.6 | 84.6 | 99,9 |
| **Pueblo** | 72.4 | 15.2* | 39.3 | 99.9 |
| **Rio Grande** | 94.0 | 6.2* | 78.1 | 99.9 |
| **Summit** | | | | |
| **Weld** | | | | |
| **Yuma** | | | | |

*Note: Large Std Error (greater than 5.0) indicates small sample size.
Blank cells indicate that because of small sample sizes estimates could not be made.

Of the 20 counties included in the study, seven counties were above 90% usage for child restraint systems with Boulder being the highest at 98.7 and Arapahoe being the lowest at 68.2. Seven counties had so few observations that no credible estimates of seat belt usage could be made. Also those counties (seven) with standard errors above 5.0 had a low number of observations.

It should be noted that this study is designed to determine a state estimate and is not a reliable estimate for those counties with high standard errors.

**Table 10c. Front Seat and Rear Booster Seat Combined**

| Counties | Seat Belt Estimate | Std Error | Lower Confidence Limit | Upper Confidence Limit |
|---|---|---|---|---|
| **Adams** | 87.5 | 2.9 | 81.37 | 93.7 |
| **Arapahoe** | 42.2 | 7.2 | 27.8 | 56.7 |
| **Boulder** | 68.9 | 9.1 | 49.9 | 87.9 |
| **Denver** | 41.5 | 7.8 | 25.7 | 57.4 |
| **Douglas** | 66.1 | 5.8 | 53.4 | 78.7 |
| **El Paso** | 51.9 | 7.5 | 36.8 | 66.9 |
| **Fremont** | 55.6 | 14.1 | 23.1 | 88.1 |
| **Jefferson** | 92.2 | 2.6 | 86.8 | 97.5 |
| **Kit Carson** | | | | |
| **La Plata** | | | | |
| **Larimer** | 77.7 | 7.8 | 61.1 | 94.2 |
| **Las Animas** | 24.5 | 5.5 | 11.0 | 38.0 |
| **Mesa** | 86.4 | 2.4 | 81.3 | 91.4 |
| **Moffat** | 94.9 | 2.4 | 89.2 | 99.9 |
| **Montrose** | 72.9 | 7.8 | 55.2 | 90.5 |
| **Pueblo** | 55.9 | 4.9 | 45.5 | 66.3 |
| **Rio Grande** | 24.6 | 7.1 | 7.2 | 42.1 |
| **Summit** | 64.0 | 1.8 | 59.9 | 68.2 |
| **Weld** | 61.2 | 6.1 | 48.1 | 74.3 |
| **Yuma** | 76.8 | 6.3 | 61.5 | 92.1 |

*Note: Large Std Error (greater than 5.0) indicates small sample size.
Blank cells indicate that because of small sample sizes estimates could not be made.

Caution should be used in interpreting this data since the standard errors for many counties are greater than 5 on these booster seat restraint usage estimates. The results show that relatively few people choose to utilize booster seats for their children.

**Table 10d. Front Seat and Rear Seat Combined (Juvenile 5 - 15)**

| Counties | Seat Belt Estimate | Std Error | Lower Confidence Limit | Upper Confidence Limit |
|---|---|---|---|---|
| **Adams** | 67.6 | 4.7 | 57.9 | 77.2 |
| **Arapahoe** | 72.4 | 2.9 | 66.6 | 78.2 |
| **Boulder** | 86.4 | 2.7 | 80.8 | 92.0 |
| **Denver** | 68.9 | 3.7 | 61.4 | 76.4 |
| **Douglas** | 82.5 | 2.4 | 77.4 | 87.6 |
| **El Paso** | 86.9 | 1.9 | 83.1 | 90.6 |
| **Fremont** | 82.8 | 4.8 | 72.0 | 93.5 |
| **Jefferson** | 85.5 | 3.6 | 78.3 | 92.8 |
| **Kit Carson** | 54.5 | 8.6* | 33.5 | 75.6 |
| **La Plata** | 78.5 | 4.4 | 68.5 | 88.6 |
| **Larimer** | 98.5 | 1.5 | 95.2 | 99.9 |
| **Las Animas** | 55.2 | 8.4* | 35.8 | 74.5 |
| **Mesa** | 85.1 | 2.2 | 80.6 | 89.7 |
| **Moffat** | 90.0 | 1.7 | 86.0 | 93.9 |
| **Montrose** | 83.6 | 3.0 | 77.0 | 90.1 |
| **Pueblo** | 71.1 | 8.9* | 52.2 | 90.0 |
| **Rio Grande** | 79.2 | 2.4 | 73.2 | 85.1 |
| **Summit** | 84.4 | 7.4* | 66.9 | 99.9 |
| **Weld** | 98.8 | 0.8 | 97.2 | 99.9 |
| **Yuma** | 43.2 | 11.8* | 14.3 | 72.2 |

*Note: Large Std Error (greater than 5.0) indicates small sample size.

Weld County was reported as having the highest combined front seat and rear seat belt usage for juveniles at 98.8 followed closely by a 98.5 usage rate for Larimer County. Although Yuma had the lowest rates of 43.2, this in part can be explained by the study design in that the survey was meant to collect data representative of statewide usage. Thus, the sample size in rural counties is too small to draw accurate conclusions.

# CONCLUSIONS

The 2011 child/juvenile study resulted in overall higher usage rates than in past years. The restraint system usage of 86.5 for children this year is an improvement over the rate of 85.0 in 2010. The combined front and rear seat usage rate for juveniles in 2011 is 81.8 compared to 75.5 in 2010. This is a significant improvement as in past years the juvenile usage rate has been consistently below the statewide rates. This year the rates are essentially the same (81.8 vs. 82.1).

This was the first year for the inclusion of booster seats in the survey. As noted earlier in the report, the results were quite variable. The primary reason for the statistical variability is the small sample size. It appears that there are not as many booster seats being used as should be, given the current law and the demographics. In this regard, perhaps there could be greater emphasis placed upon education on the use of booster seats

While most data fall within acceptable ranges, some rural counties due to relatively low numbers of observations, the standard errors were fairly high, i.e., did not have good, reportable data greater than 5.0. There are some situations in this year's survey where there are concerns. For example, for children (newborn - 4 years) in the front seat of vehicles, as shown in Table 6a, the standard errors are so large that the estimate of seat belt usage is somewhat suspect. These results in and of themselves are not necessarily in error since most drivers are placing children in the rear seat, and therefore fewer children are observed in the front seat of vehicles. In fact, in nearly 7,000 total observations, only 102 children of the age and size to be in either car seats or boosters were in the front seat of vehicles.

Juvenile seat belt usage across the 20 counties improved from 2010. Weld County's juvenile seatbelt usage jumped to 98.8 from the 2010 estimate of 80.9. Yuma County was again the lowest in 2011 but as explained earlier, the 43.2 usage rate is in part due to the survey design and the small number of observations in this rural county.

Generally, the county data for drivers observed is fairly consistent with the statewide findings in that more urban counties have higher usage rates than rural counties. However, of the 20 counties included in this study, 16 had usage rates well above the statewide figure of 82.1. The range for these 16 counties was from 83.9 to 97.8. The four counties lower than the statewide average ranged from 64.3 to 75.8. The high rate of seat belt usage among drivers who have children in the vehicle supports the hypothesis that adults are usually more likely to wear seat belts when they have juvenile passengers.

Overall, the educational efforts are paying dividends as there remains an upward trend in the use of child restraint safety systems and juvenile seat belts. The improvements over the past five years have been significant and should be viewed as a major accomplishment.