FY 2010
PROBLEM IDENTIFICATION

IN THIS REPORT:

IDENTIFICATION OF HIGH-RISK DRIVERS / NEIGHBORHOOD EFFECTS / HIGH-RISK COUNTIES / FY 2011 FOCUS

Colorado Department of Transportation
Office of Transportation Safety

FFY 2010
PROBLEM IDENTIFICATION

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Purpose and Objective

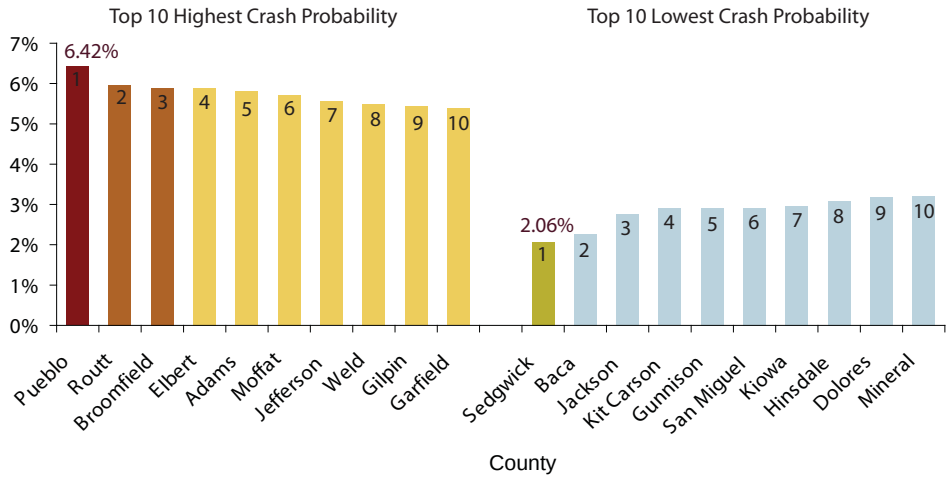
The Office of Transportation Safety (OTS) is tasked with developing behavioral and enforcement-based programs that will improve traffic safety in Colorado by reducing the number and severity of traffic crashes. The OTS's programs target specific high-risk driving behaviors, such as impaired driving or drivers who do not use occupant protection, and high-risk populations, such as teenagers and motorcycle riders. Because the OTS will use the analytical results to develop location-based programs, as presented in this report, most of the analyses focus on the zip code or county of residence of high-risk drivers.

Analytical Approach

The 2010 Problem Identification project continues and expands on the analysis of the annual crash experiences of Colorado drivers first introduced in the 2008 report. It characterizes each Colorado resident with an active Colorado drivers license or ID card based on all available information about that individual and then imputes the probability that each individual will be involved as a driver in a crash during the two subsequent years, 2007 and 2008. These imputed probabilities can then be aggregated to identify demographic groups or geographic areas which contain high concentrations of at-risk drivers. For the first time, individuals who have surrendered their Colorado drivers license to some other state are excluded from the analysis, on the presumption that they are not regular drivers in Colorado. In addition, among those individuals included, the analysis distinguishes between those who have Colorado drivers licenses and those who have some other form of Colorado ID.

The quality of the 2007-2008 crash data is noticeably higher than that of the crash data for previous years. However, some crashes in November and December of 2008 are omitted from the available data.

1. Counties Whose Licensed Drivers Have the *Highest* and *Lowest* Probability of Crashing
Source: 2007 - 2008 Crash Model



2. Young Drivers' Probability of Crashing, by Zip Code of Residence

Source: 2007 - 2008 Crash Model

	Rank	City	Zip	Odds of Crash
Top 20 *Worst Zip Codes*	1	**Pueblo**	**81006**	**11.00%**
	2	**Pueblo**	**81005**	**10.40%**
	3	**Pueblo**	**81008**	**10.40%**
	4	Henderson	80640	9.90%
	5	**Pueblo**	**81001**	**9.80%**
	6	**Pueblo**	**81007**	**9.70%**
	7	Arvada	80005	9.30%
	8	**Pueblo**	**81004**	**9.30%**
	9	Arvada	80003	9.10%
	10	Arvada	80004	9.10%
	11	Thornton/Denver	80229	9.10%
	12	Lakewood/Denver	80232	9.10%
	13	Northglenn/ Thornton/Denver	80233	9.00%
	14	Grand Junction	81504	9.00%
	15	Craig	81625	9.00%
	16	Commerce City	80022	8.90%
	17	Federal Heights/ Thornton/Westminster	80221	8.90%
	18	Morrison	80465	8.90%
	19	Kersey	80644	8.90%
	20	Arvada	80007	8.80%
Top 20 *Best Zip Codes*	1	**United States Air Force Academy**	**80840**	**4.60%**
	2	Colorado Springs/Fort Carson	80913	4.90%
	3	Gunnison	81230	4.90%
	4	Limon	80828	5.00%
	5	Burlington	80807	5.10%
	6	Avon	81620	5.10%
	7	Boulder	80302	5.20%
	8	Wray	80758	5.30%
	9	Holyoke	80734	5.40%
	10	Fort Collins	80521	5.40%
	11	Dillon	80435	5.50%
	12	Silverthorne	80498	5.50%
	13	Breckenridge	80424	5.50%
	14	Edwards	81632	5.50%
	15	Yuma	80759	5.70%
	16	Dolores	81323	5.70%
	17	Pagosa Springs	81147	5.70%
	18	Granby	80446	5.80%
	19	Akron	80720	5.90%
	20	Glendale/Denver	80246	5.90%

This report also includes results from the 2009 Statewide Seat Belt Survey, the 2009 Child/Juvenile Restraint Survey, the 2009 Teen Seat Belt Survey, the 2009 RETAC Seat Belt Survey, the 2009 Nighttime Seat Belt Survey and the 2009 Neighborhood Seat Belt Survey. These observational surveys of occupant protection use were conducted by the Institute of Transportation Management at Colorado State University.

Selected Results

In Colorado in 2008, 548 people died in traffic crashes. Exhibit 1 on the previous page presents the probability that a driver will be in a crash, based on the driver's county of residence. Drivers from Pueblo County had the highest probability of crash involvement, followed by Routt and Broomfield counties.

Young Drivers

In an analysis of the probability that a young driver (under age 21) would be involved in a crash by zip code of residence, the majority of the most dangerous zip codes were in Pueblo, Adams and Jefferson counties (Exhibit 2). The zip codes for Pueblo comprise the entire county, while the zip codes in Adams county are located in the more urban portions of the county. In Jefferson County, the most dangerous zip codes for young drivers are located primarily in the City of Arvada.

The zip codes where young resident drivers had the lowest probability of crashing are distributed across the state and include small towns on the Eastern Plains such as Burlington, mountain towns such as Dillon and Breckenridge, and college towns such as Boulder, Fort Collins, Gunnison and Greeley.

Impaired Drivers

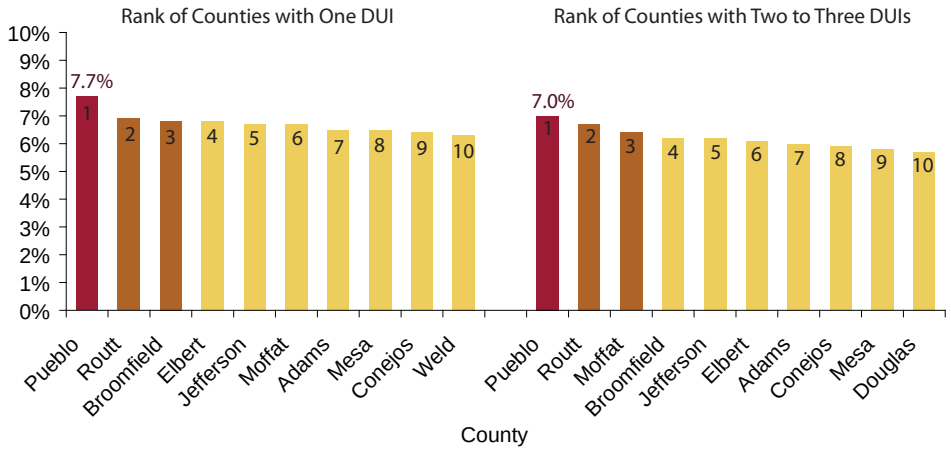
After controlling for all other factors, the combination of county of residence and prior DUI records increases the likelihood that a driver is involved in a crash. Exhibit 3 shows the ten worst counties, measured by the increase in probability of a crash when drivers have one or two-to-three DUIs on their citation record. Drivers living in Pueblo County with one DUI on their record are 7.7% more likely to be involved in a crash.

Occupant Protection

Exhibit 4 presents county-level seat belt use rates. Clear Creek and Eagle counties had the highest observed seat belt use and Kit Carson, Logan and Montrose had the lowest. The counties with the lowest observed seat belt use rates are generally rural. Mesa and Pueblo counties are the most populous counties with below average seat belt use rates.

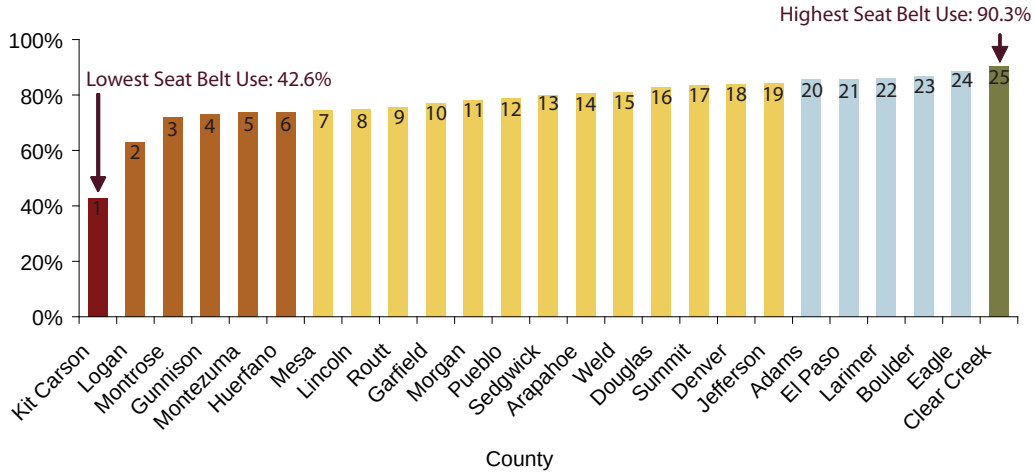
3. 10 Worst Counties: Probability of Crash by DUI Records

Source: 2007 - 2008 Crash Model



4. Observed Seat Belt Use - 25 County Ranking

Source: Colorado State University Annual Seat Belt Survey



Recommendations

Primary Counties to Focus On

Based on the results of the 2007-2008 Crash model and the 2009 seat belt surveys, the study team recommends that the OTS Educational Programs team consider developing, supporting or expanding traffic safety programs in the following communities:

- Adams County
- Pueblo County
- Jefferson County

Adams County. Residents under age 21 in Adams County have the second highest probability of crashing statewide. Juvenile and teen seat belt use rates are relatively low. The probability of crashing for residents with prior DUI records are among the 10th highest. On-going occupant protection programs should be continued and strengthened. Support for DUI and general traffic enforcement is encouraged.

Jefferson County. Jefferson County residents had the 7th highest probability of crash involvement overall. Residents under the age of 21 had the 3rd highest probability of crashing. Four Arvada zip codes ranked among the 20 most dangerous statewide for resident young drivers. Consider developing young driver programs, particularly in the city of Arvada. Law enforcement efforts targeting DUI enforcement and general traffic enforcement should be expanded.

Pueblo County. Pueblo County has on-going, deep and persistent traffic safety problems that have been observed for years. Just as in past analyses, the 2007-2008 model demonstrated that Pueblo County and its resident drivers are among the most dangerous in the state. On nearly every measure, Pueblo ranks the worst. This includes measures of probability of crashing for young drivers, drivers with prior DUI records and drivers in general. The County's seat belt use rates are all low. In addition to supporting and reinforcing on-going community-based traffic safety programs, the study team strongly encourages that a concentrated law enforcement component be developed and funded. While DUI enforcement is important, it is apparent that rigorous enforcement of other risky driving behaviors such (e.g., speed) need to be enhanced to reinforce the on-going behavioral projects. Pueblo needs to get tough (or tougher) on traffic enforcement.

Secondary Counties to Focus On

Routt County. Out of Colorado's 64 counties, Routt County ranked 3rd worst in measures of the probability of crashing. The county's seat belt use rate (76%) is below the state average. On many other measures, Routt ranks among the 20 worst counties.

Moffat County. This county ranked 2nd worst out of all counties on measures of county-only effects. This indicates that something about the county itself, for example its roads, traffic volumes or other environmental factors raise the risk of crashes. The County also has low juvenile and teen seat belt use rates. For resident drivers under age 21, Moffat County is the second most dangerous county.

Occupant Protection Focus

The more extensive observational seat belt surveys identified several counties with very low seat belt and child occupant

protection use rates, and if resources are available, should be considered for program development.

- Kit Carson, Logan and Montrose counties had the lowest overall adult seat belt use rates. As such, developing programs focused on increasing adult seat belt use rates, perhaps with a focus on drivers of light trucks are recommended, if resources are available. It is important to point out that Kit Carson and Logan counties both rank among the best counties with respect to probability of crashing, while Montrose County's ranking on most measures falls in the middle.

- Las Animas County had the lowest observed child occupant protection use rate and the third lowest juvenile seat belt use rate.

- Arapahoe County had the second lowest child occupant protection use rate and the 6th lowest juvenile seat belt use rate.

Data Efforts to Continue

Expanded Occupant Protection Data. The addition of statistically rigorous seat belt surveys of teens, rural counties and nighttime seat belt use greatly expanded the pool of information about occupant protection in Colorado. These additions added a richness of information that should be continued, if funds allow.

Current Crash Data. The timeliness of crash data availability has long been a challenge. That this effort included the entire 2007 dataset and the nearly complete 2008 file demonstrates the OTS's significant progress toward accomplishing its goal of providing crash records in a timely fashion.

Request for Additional Data

Original Citation File. The ordered probit model estimated the probability of crashing using a wide array of data from the Motor Vehicle Division. Chief among these databases is the adjudicated citation file. If possible to obtain, the original citation file in addition to adjudicated citations would provide a rich dataset and would allow the study team to vastly expand its analyses.

Recommended Analytical Focus for FY2011

The study team recommends that future Problem Identification reports continue to emphasize place-based analyses and expand those analyses whenever possible. We suggest that efforts be made to incorporate prior crash experiences, to the extent that they are available, among predictors of current crash propensities.

Purpose and Objective

The Office of Transportation Safety (OTS) is tasked with developing behavioral and enforcement-based programs that will improve traffic safety in Colorado by reducing the number and severity of traffic crashes. The OTS's programs target specific high-risk driving behaviors, such as impaired driving or drivers who do not use occupant protection, and high-risk populations, such as teenagers and motorcycle riders. Because the OTS will use the analytical results to develop location-based programs, most of the analyses focus on the zip code or county of residence of high-risk drivers.

Analytical Approach

The 2010 Problem Identification project continues and expands on the analysis of the annual crash experiences of Colorado drivers first introduced in the 2008 report. It characterizes each Colorado resident with an active Colorado drivers license or ID card based on all available information about that individual as of December 31, 2006. It then imputes the probability that each individual will be involved as a driver in a property-damage-only, possible injury, non-incapacitating injury, incapacitating injury or fatal crash during the two subsequent years, 2007 and 2008. These imputed probabilities can then be aggregated to identify demographic groups or geographic areas which contain high concentrations of at-risk drivers. The foundation for these imputations is the data held by the Colorado Department of Revenue (DOR) in its various files regarding drivers licenses, traffic violations and sanctions. These files yield measures of age, sex, height, weight, county of residence, residential mobility, numbers of and points from past citations, duration since last citation, numbers of DUI records and BAC scores. These measures, matched with actual crash experiences in 2007 and 2008 in an ordered probit analysis, yield estimates of how each measured characteristic affects the probability of experiencing a crash of any given severity.

The analysis in this report expands on that in the 2009 Problem ID report by augmenting the individual driver characteristics there with additional information from the DOR. For the first time, individuals who have surrendered their Colorado drivers license to some other state are excluded from the analysis, on the presumption that they are not regular drivers in Colorado. In addition, among those individuals included, the analysis distinguishes between those who have Colorado drivers licenses and those who have some other form of Colorado ID. The original file of individuals involved in crashes contains 491,312 records. Of these, 124,718 were not drivers. Of the 366,594 records representing drivers, 55,877 had invalid driver license numbers. Of those that remain, 21,500 represent multiple

crashes for the same driver. Consequently, the crash files identify 289,217 individual drivers who were involved in at least one crash during 2007 and 2008, and who have drivers license numbers which are potentially valid. The quality of the 2007-2008 crash data is noticeably higher than that of the crash data for previous years. However, some crashes in November and December of 2008 are omitted from the available data. More importantly, there remains some uncertainty as to the identity of some of the remaining crash drivers. Of the 289,217 with potentially valid license numbers, 49,923 do not appear in the other DOR files necessary for the analysis. Therefore, the analysis is based on 239,294 fully-identifiable individuals involved as drivers in crashes in 2007 and 2008, and 4,636,412 fully-identifiable individuals not involved as drivers in crashes in these years.

This report also includes results from the 2009 Statewide Seat Belt Survey, the 2009 Child/Juvenile Restraint Survey, the 2009 Teen Seat Belt Survey, the 2009 RETAC Seat Belt Survey, the 2009 Nighttime Seat Belt Survey and the 2009 Neighborhood Seat Belt Survey. These observational surveys of occupant protection use were conducted by the Institute of Transportation Management at Colorado State University.

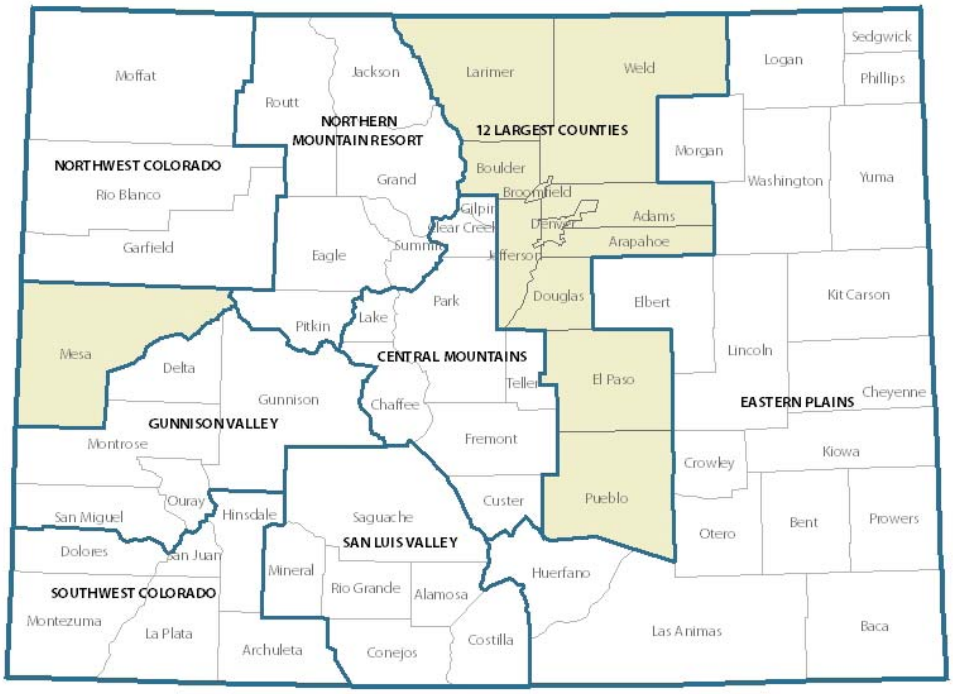
Colorado Counties and Regions

Exhibit 1 maps Colorado's 64 counties and regions of interest.

Acknowledgements

The study team would like to acknowledge the leadership of Mike Nugent, Carol Gould and Glenn Davis and the assistance of Bryan Allery, Don DeVeux and Robert Weltzer in developing this report.

1. | **Colorado Counties and Regions**
Source: Colorado Department of Transportation



In Colorado in 2008, 548 people died in 473 fatal traffic crashes.

CDOT's Office of Transportation Safety (OTS), Safety and Educational Programs team educates and works to reduce the number and severity of traffic crashes through a combination of engineering, law enforcement, education and emergency services programs across the state. The OTS also works with the CDOT engineering staff to develop solutions to highway safety problems. Learning more about those drivers who are more likely to be involved as a driver in a crash helps the OTS staff develop more effective programs. This section provides an overview of the driver characteristics associated with increased risk of crash involvement.

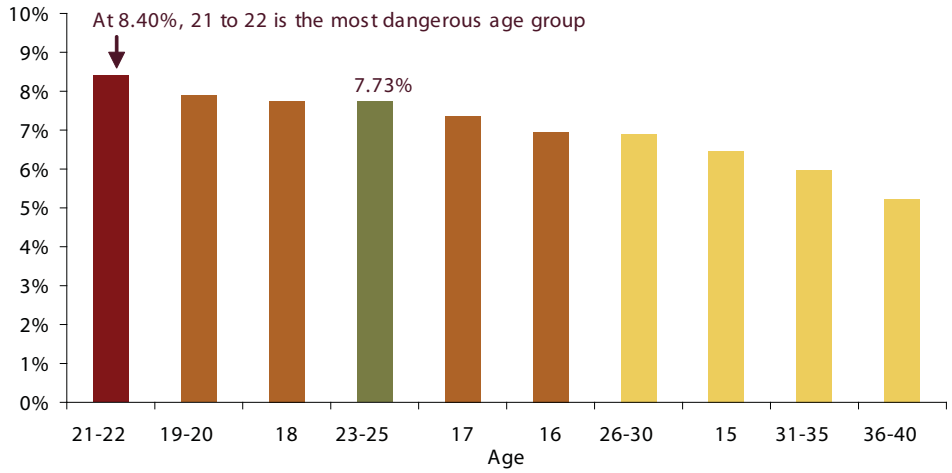
Driver Age and Gender

Age of Driver. The probability of being involved in a crash varies widely by driver age. It's not surprising that younger drivers have higher probability of crashing than older drivers. Exhibit 1 below demonstrates that drivers ages 21 to 22 have the highest probability of crashing among all age cohorts, followed closely by drivers ages 19 to 20, 18, and 23 to 25.

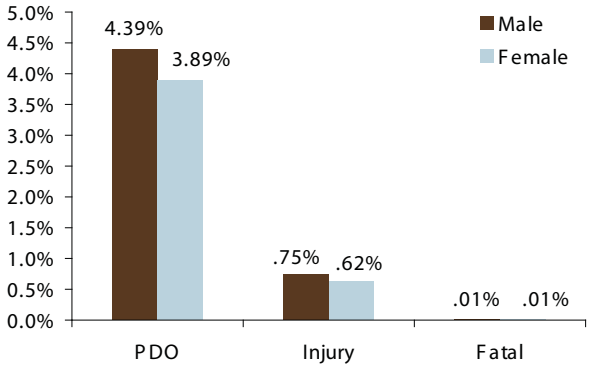
It is possible that the higher probability of crashing for drivers in their early 20s is influenced by lifestyle. It's not an unreasonable hypothesis to attribute the higher probability of crashing associated with teen drivers to their inexperience.

Gender of Driver. Exhibit 2 on the following page compares the probability of crash involvement of men and women based on the severity of the crash. Men have a slightly greater probability of being involved in a property damage-only (PDO) crash, but the gender difference shrinks as the crashes become more severe. There is no gender difference in crash probability for fatal crashes.

1. The Ten Most Dangerous Ages
Source: 2007 - 2008 Crash Model



2. **Probability of Crashing: Role of Gender**
Source: 2007 - 2008 Crash Model



3. **Probability of Crashing: Role of Prior Number of DUI Records**
Source: 2007 - 2008 Crash Model

Number of DUI Records	Odds of PDO Crash	Odds of Injury Crash	Odds of Fatal Crash
Zero	4.11%	0.68%	0.01%
1	**4.87%**	**0.85%**	**0.01%**
2	**4.59%**	**0.79%**	**0.01%**
3	**4.25%**	**0.71%**	**0.01%**
4	3.92%	0.63%	0.01%
5	3.63%	0.56%	0.00%
6	3.38%	0.51%	0.00%
7	3.07%	0.45%	0.00%
8	2.89%	0.42%	0.00%
9	2.62%	0.35%	0.00%
10	2.54%	0.32%	0.00%
>10	1.84%	0.22%	0.00%

4. **Probability of Crashing: Role of Maximum Recorded BAC Level on the Driver's Record**
Source: 2007 - 2008 Crash Model

Maximum Recorded BAC	Odds of a Crash		
	PDO	Injury	Fatal
No Test	4.12%	0.68%	0.01%
0.0 to 0.10	**4.71%**	**0.82%**	**0.01%**
0.10 to 0.20	**4.58%**	**0.76%**	**0.01%**
0.20 to 0.30	3.59%	0.53%	0.00%
0.30 to 0.40	3.08%	0.43%	0.00%
0.40 to 0.50	3.36%	0.48%	0.00%

Impaired Drivers

Exhibits 3 and 4 examine the influence of prior alcohol-related records on a driver's probability of crash involvement.

Drivers with one, two or three prior DUI records have higher probability of being involved in PDO or injury crashes than drivers with no prior DUI record (Exhibit 3). Drivers with four or more prior DUI records have lower probability of crash involvement, suggesting some deterrence or rehabilitation effects.

These results are consistent with analyses from prior years of crash data. The citations on the driver record reflect the adjudicated outcome. It is possible that some drivers were initially stopped under suspicion of DUI, but through the legal process were not actually cited with a DUI offense. As such, access to the original citation records would allow for a richer analysis of the connection between DUI stops and the probability of crashing.

Exhibit 4 presents the probability of crashing based on the highest maximum BAC level on a driver's record. It's not surprising that drivers with no prior recorded BAC levels have lower crash probability than drivers with some BAC levels on record. In particular, drivers whose maximum BAC level ranged from greater than 0.00 up to 0.20 have the highest probability of crashing. However, probability of future crash involvement drop when the highest BAC on record was greater than 0.20. This result lends itself to the hypothesis that the more stringent penalties associated with such high BAC scores may have a future deterrent effect.

Occupant Protection

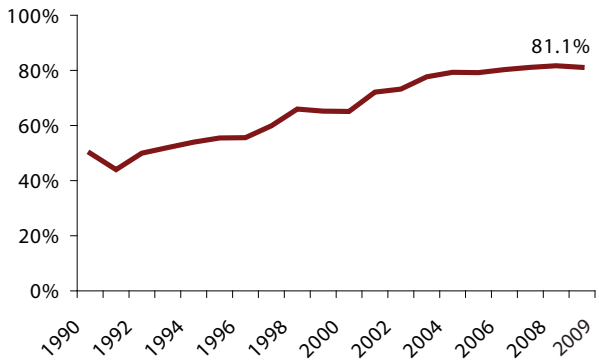
Each year the OTS funds several scientifically rigorous observational surveys of seat belt use statewide.

In 2009, Colorado's overall seat belt use rate was 81.1%, a slight decline from 2008. As shown in Exhibit 5, the overall rate has flattened in recent years. Front seat occupants of light trucks have always been less likely to use seat belts than drivers of passenger cars. Exhibit 6 presents the observed seat belt use by front seat occupants of light trucks. Their seat belt use is 13 percentage points below the state average. Enforcement and education efforts targeting drivers of these vehicles is advised.

Exhibits 7 and 8 present observed seat belt use by juveniles and car seat/booster seat use by the youngest children. About one in four juveniles were observed not using a seat belt. Slightly more than one in ten of the youngest children were not properly restrained.

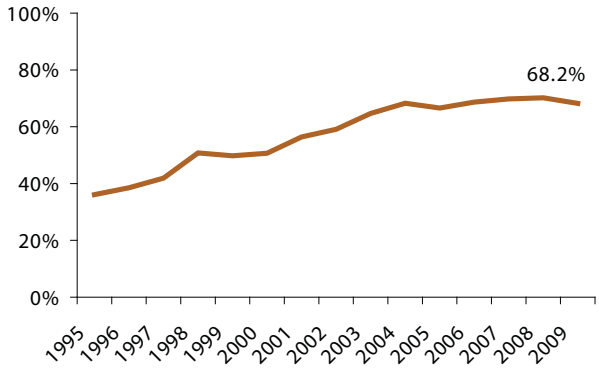
5. Statewide Overall Seat Belt Usage

Source: Colorado State University Annual Seat Belt Survey



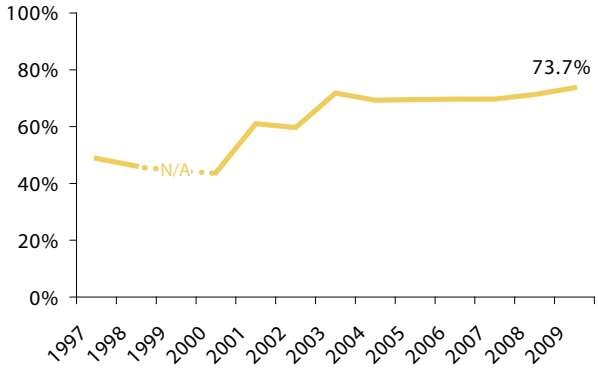
6. Use of Seat Belts by Front Seat Occupants of Light Trucks

Source: Colorado State University Annual Seat Belt Survey



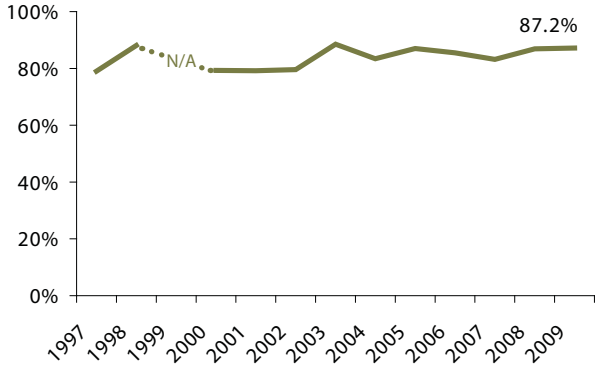
7. Use of Seat Belts by Juveniles Ages 5 to 15

Source: Colorado State University Annual Seat Belt Survey



8. Use of Car Seat/Booster Seats by Youngest Children

Source: Colorado State University Annual Seat Belt Survey



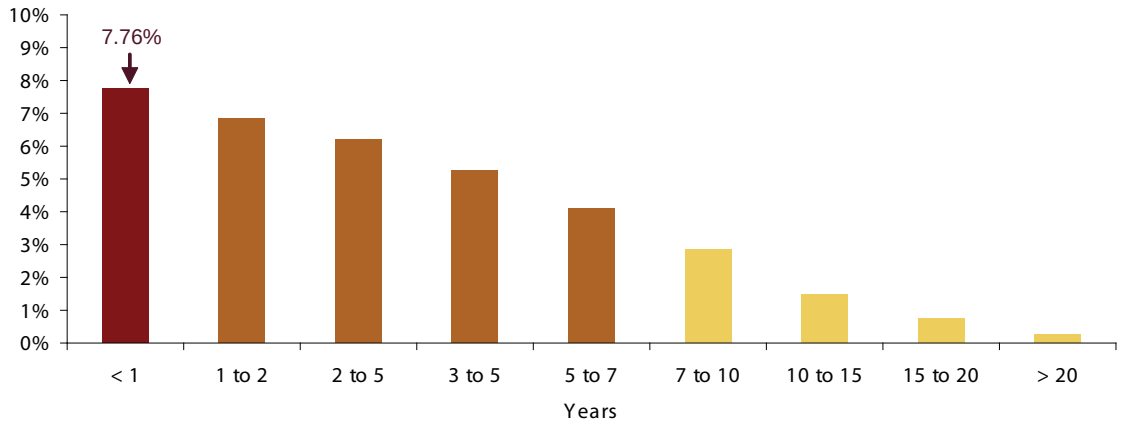
Other Factors

The analysis of high-risk drivers examined the effects of the years since a driver most recently changed their address as well as the years since a driver's most recent traffic citation.

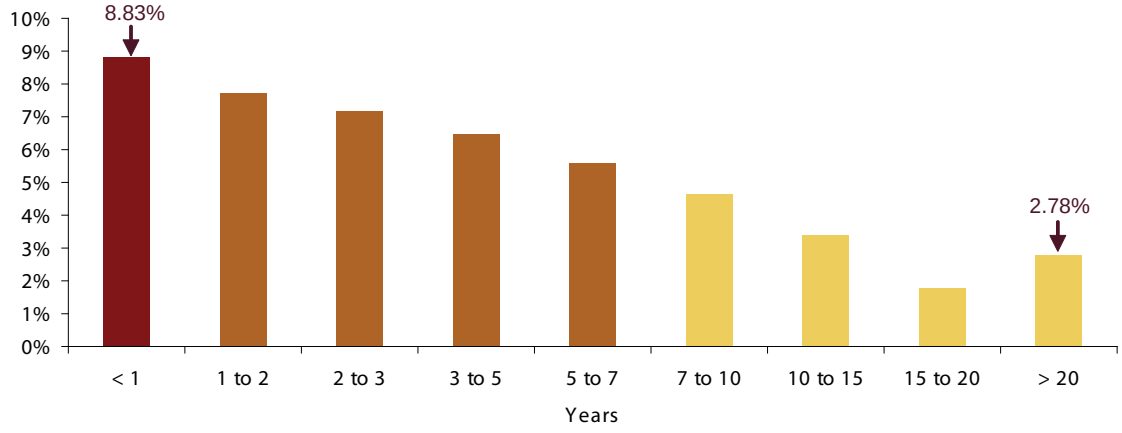
Consistent with prior analyses, drivers who have changed their address have much higher probability of crashing than drivers who have not changed their address in many years (Exhibit 9). It may be the case that familiarity with an area reduces distractions that may lead to crashes.

Drivers who have been cited for a traffic offense in the past year have significantly higher probability of future crash involvement than drivers who have not had a citation in many years. These drivers may be engaging in risky driving behaviors (e.g., speeding) that increase the probability of crashing.

9. **Probability of Crashing: Years Since Last Address Change**
Source: 2007 - 2008 Crash Model



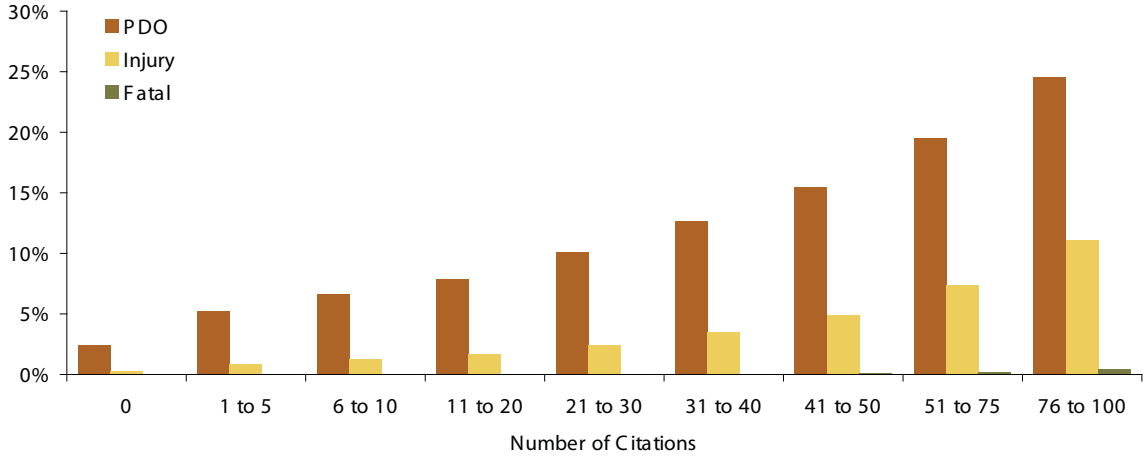
10. **Probability of Crashing: Years Since Last Driving Citation**
Source: 2007 - 2008 Crash Model



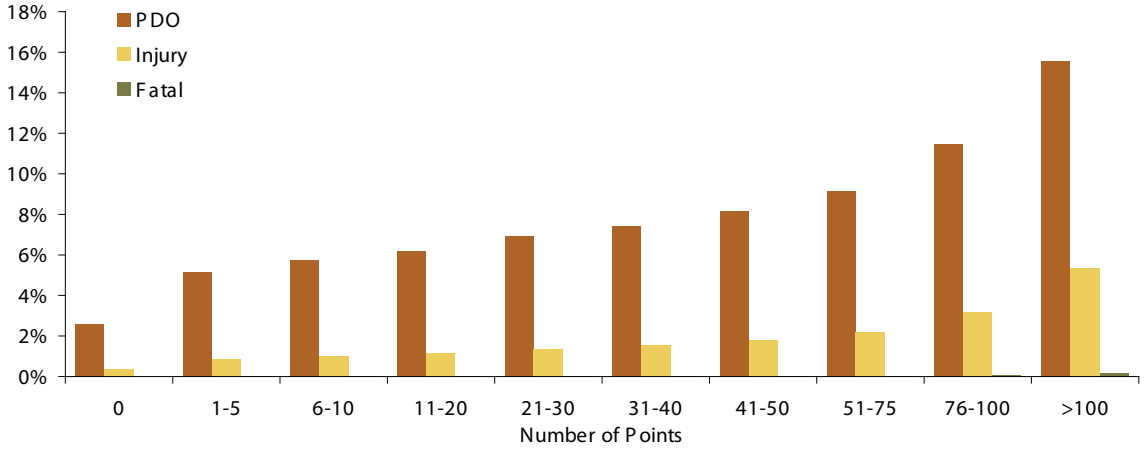
As the number of prior citations on the driver records increases, so do the probability of future crash involvement. It is not surprising that drivers with a history of numerous traffic citations are more likely than others to be involved in a crash (Exhibit 11).

Similarly, drivers with a greater number of points on their record, indicating either frequent citations or citations with high points, have much higher probability of crashing than drivers with a low number of points on record (Exhibit 12).

11. Probability of Crashing: Number of Prior Citations on Driver Record
Source: 2007 - 2008 Crash Model

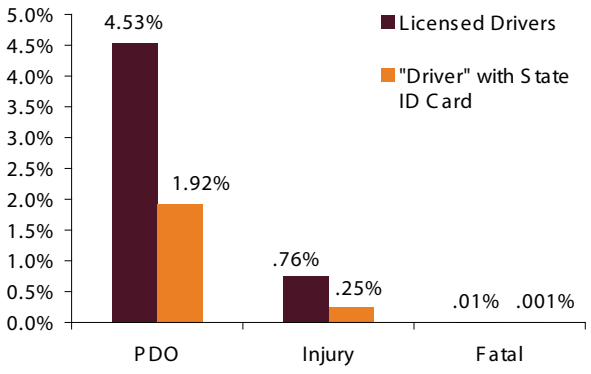


12. Probability of Crashing: Number of Points on Driver's Record
Source: 2007 - 2008 Crash Model



13. Probability of Crashing: Licensed Drivers and Drivers with State ID Cards

Source: 2007 - 2008 Crash Model



Again, these measures of prior interactions with traffic enforcement suggest that these drivers regularly engage in risky driving behaviors that increase their probability of involvement in crashes.

For the first time, the study team was able to differentiate between individuals with driver licenses and Colorado ID cards. Exhibit 13 compares the crash probability of these two classes of drivers. It's not surprising that drivers with Colorado ID cards have lower rates of crash involvement since they are not supposed to be driving.

This section examines the influence of neighborhood (zip-code level) effects on crash outcomes, using data from the 2000 Census of Population and Housing. Driver incomes and most demographic characteristics are not reported in DOR records. Information about these characteristics among the population of the zip code of driver residence serves as approximations to these characteristics for individual drivers. This information also describes the community of driver residence, and helps identify community characteristics that are associated with differential risks of crash involvement.

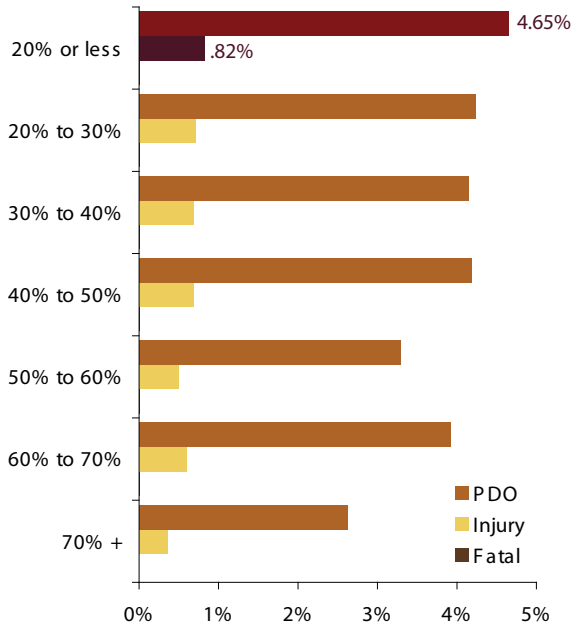
Previously Lived in a Different County

Drivers who live in zip codes with high population mobility have higher probability of crashing (Exhibit 1).

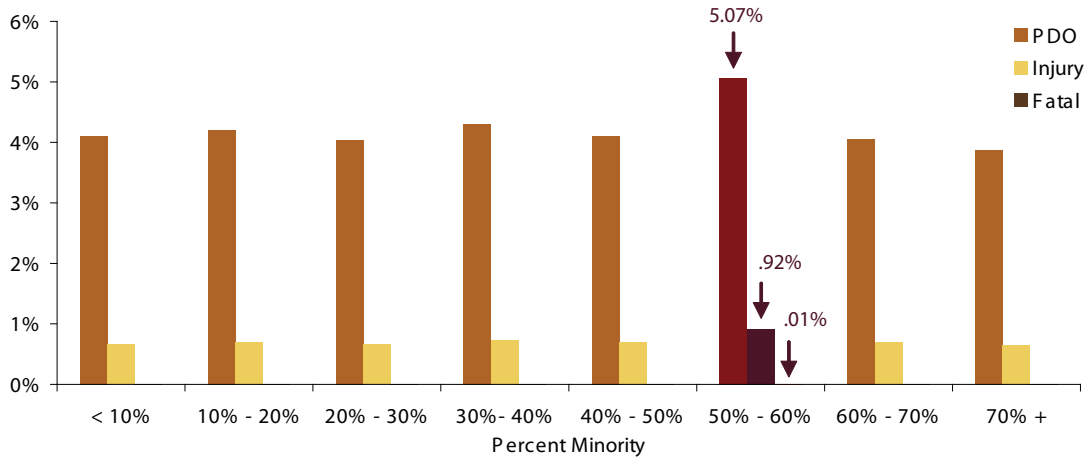
Minority Population Proportion

As shown in Exhibit 2, probability of crashing vary regardless of the percentage of minority residents in a zip code.

1. **Probability of Crashing for Percent of Zip Code Population Living in a Different County in 1995**
Source: 2007 - 2008 Crash Model



2. **Probability of Crashing and Neighborhood Effects: Minority Percentage of Zip Code Population**
Source: 2007 - 2008 Crash Model



3. Probability of Crashing and Neighborhood Effects: Zip Code Median Rent

Source: 2007 - 2008 Crash Model

	Odds of Crash		
Median Rent	PDO	Injury	Fatal
Less than $300	3.27%	0.50%	0.00%
$300 - $400	3.73%	0.59%	0.01%
$400 - $500	4.04%	0.68%	0.01%
$500 - $600	4.12%	0.68%	0.01%
$600 - $700	4.02%	0.67%	0.01%
$700 - $800	4.29%	0.71%	0.01%
$800 - $900	**4.71%**	**0.79%**	**0.01%**
$900 - $1000	4.21%	0.68%	0.01%
$1,000 +	4.31%	0.69%	0.01%

4. Probability and Neighborhood Effects: Percent of Owner Occupied Housing Units

Source: 2007 - 2008 Crash Model

	Odds of Crash		
Owner Occupation	PDO	Injury	Fatal
10% or less	2.62%	0.36%	0.00%
10% to 20%	2.92%	0.43%	0.00%
20% to 30%	3.53%	0.55%	0.00%
30% to 40%	2.93%	0.45%	0.00%
40% to 50%	3.36%	0.52%	0.00%
50% to 60%	3.57%	0.57%	0.01%
60% to 70%	4.11%	0.68%	0.01%
70% to 80%	4.33%	0.73%	0.01%
80% to 90%	4.79%	0.81%	0.01%
90% to 100%	**4.86%**	**0.81%**	**0.01%**

5. Probability and Neighborhood Effects: Vacancy Rates

Source: 2007 - 2008 Crash Model

	Odds of Crash		
Vacancy Rate	PDO	Injury	Fatal
3% or Less	**4.54%**	**0.77%**	**0.01%**
3% to 6%	4.09%	0.68%	0.01%
6% to 10%	3.83%	0.61%	0.01%
20% to 30%	3.62%	0.55%	0.00%
30% to 40%	3.32%	0.49%	0.00%
40% to 60%	3.21%	0.46%	0.00%
60% +	2.69%	0.36%	0.00%

Median Rent

As the median rent in a zip code increases, so does a driver's probability of crash involvement. Drivers living in zip codes with median rents of $800-$900 have the highest probability of crashing (Exhibit 3). Drivers who live in zip codes with median rents of less than $300 have the lowest crash probability. It may be the case that drivers in these areas are more likely to use public transportation than drivers in more affluent areas, as reflected in the median rent.

Owner-Occupied Housing Units

As the percentage of owner-occupied housing units in a zip code increases, the probability of crash involvement also increase. Zip codes with 90%-100% owner-occupied housing had the highest probability of crashing. Many factors may drive this result and could include the fact that renters living in dense urban environments may drive less frequently than drivers living in suburban, single-family home communities with few rental properties (Exhibit 4).

Vacancy Rates

Drivers living in zip codes with the lowest vacancy rates had the highest probability of crash involvement. As vacancy rates increase, the probability of crashing decrease. Drivers who live in zip codes with vacancy rates of less than 3% have the highest probability of crash involvement. This may be related to either the increased density of a tight rental housing market or the affluence associated with a more desirable area. Similarly, drivers who live in zip codes with vacancy rates of 60% or more have the lowest crash probability, as shown in Exhibit 5.

Poverty Rate

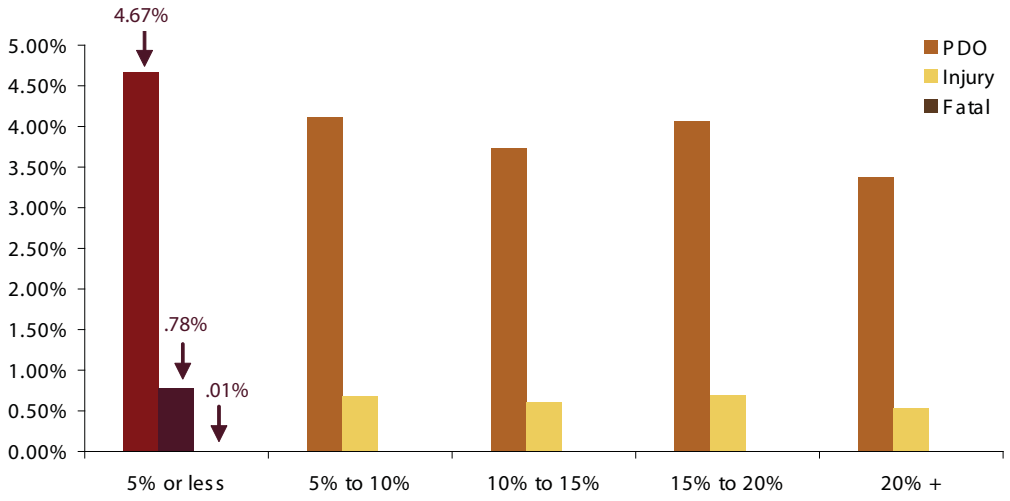
Although the relationship isn't strictly linear, crash rates are higher in more affluent zip codes than in less affluent zip codes, as measured by the zip code poverty rate in Exhibit 6.

Per Capita Income

As shown in Exhibit 7, the relationship between per capita income in a zip code and crash probability is muddied and no clear linear pattern emerges.

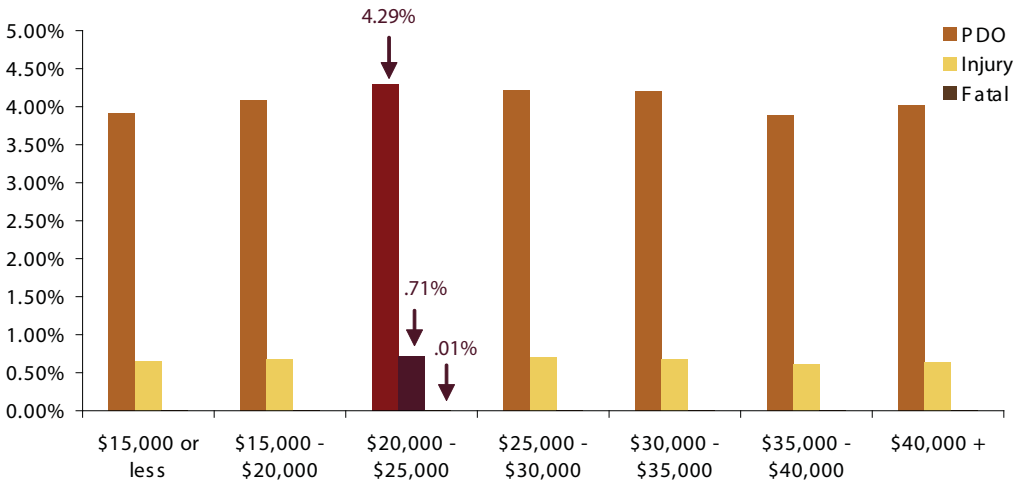
6. Probability of Crashing and Neighborhood Effects: Zip Code Poverty Rate

Source: 2007 - 2008 Crash Model

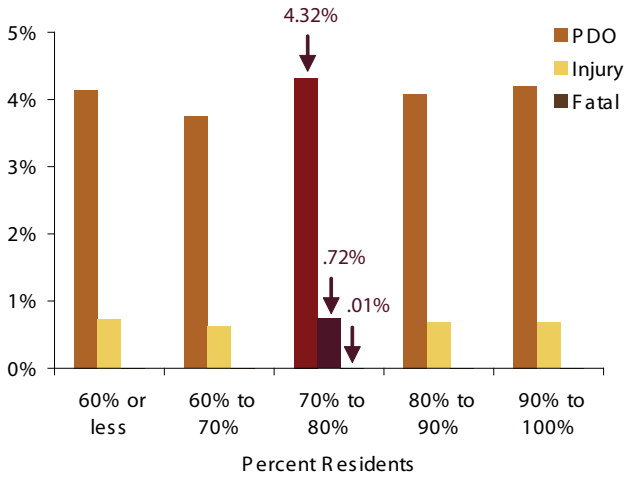


7. Probability of Crashing and Neighborhood Effects: Zip Code Per Capita Income

Source: 2007 - 2008 Crash Model



8. **Probability of Crashing and Neighborhood Effects: Percent of Residents Age 25+ with High School Degree**
Source: 2007 - 2008 Crash Model



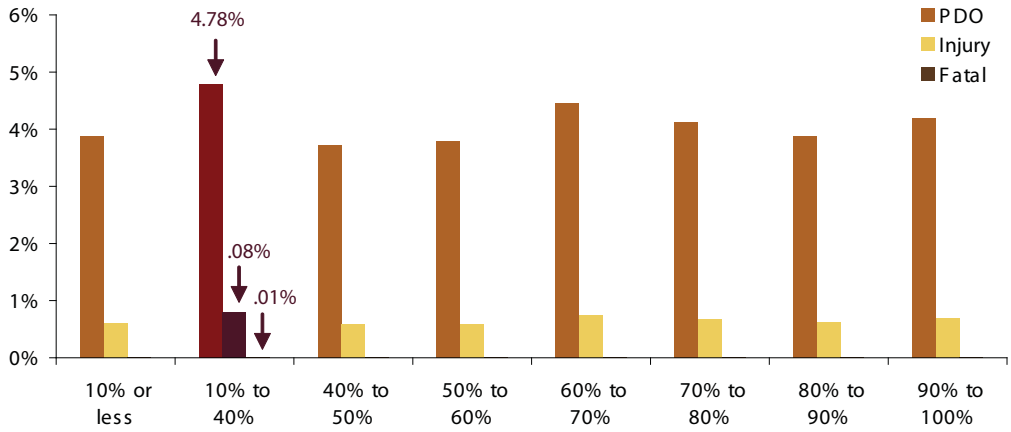
High School Completion

As shown in Exhibit 8, the relationship between the percentage of adults living in a zip code who completed a high school degree by the age of 25 and the probability of crash involvement is unclear.

Urban Zip Codes

In general, drivers in zip codes with a greater percentage of land considered Urban had lower probability of crash involvement, but this relationship is not linear. Drivers living in zip codes where 10% to 40% of the zip code is considered Urban had the highest probability of crashing, but drivers living in the most rural zip codes had the lowest crash probability (Exhibit 9).

9. **Probability of Crashing and Neighborhood Effects: Percent of Zip Codes Considered Urban**
Source: 2007 - 2008 Crash Model



This section examines high risk drivers by their county of residence.

All Drivers – County of Residence

Exhibit 1 below highlights the ten counties whose licensed drivers have the highest and lowest probability of crashing. Pueblo, Routt and Broomfield residents have the highest crash probability. Each year the data have been analyzed, Pueblo County drivers have had the highest crash probability. In prior analyses, Hinsdale County had the lowest crash probability, but in the 2007-2008 model, residents of Sedgwick County had the lowest probability of crash involvement.

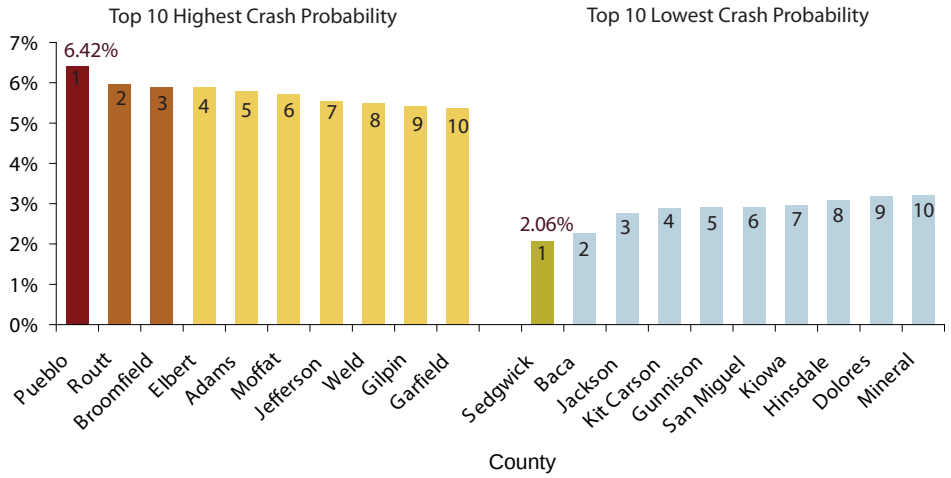
Young Drivers

Exhibit 2 presents the ten counties where resident drivers under age 21 have the highest and lowest crash probability. Like drivers overall, young residents of Pueblo county have the highest probability of crash involvement.

2. **Young Drivers' Probability of Crashing, by County of Residence**
Source: 2007 - 2008 Crash Model

	Rank	County	Odds of Crash
Top 10 *Worst Counties*	1	**Pueblo**	**9.90%**
	2	Moffat	9.00%
	3	Adams	8.60%
	4	Jefferson	8.60%
	5	Mesa	8.60%
	6	Broomfield	8.40%
	7	Elbert	8.20%
	8	Garfield	8.20%
	9	Gilpin	8.10%
	10	Rio Blanco	8.10%
Top 10 *Best Counties*	1	**Sedgwick**	**3.80%**
	2	Baca	4.10%
	3	San Miguel	4.30%
	4	Kiowa	4.40%
	5	Gunnison	4.70%
	6	Jackson	4.80%
	7	Kit Carson	5.00%
	8	Cheyenne	5.00%
	9	Lincoln	5.10%
	10	Phillips	5.40%

1. **Counties Whose Licensed Drivers Have the *Highest* and *Lowest* Probability of Crashing**
Source: 2007 - 2008 Crash Model



3. Young Drivers' Probability of Crashing, by Zip Code of Residence

Source: 2007 - 2008 Crash Model

Rank	City	Zip	Odds of Crash
Top 20 *Worst Zip Codes*			
1	**Pueblo**	**81006**	**11.00%**
2	**Pueblo**	**81005**	**10.40%**
3	**Pueblo**	**81008**	**10.40%**
4	Henderson	80640	9.90%
5	**Pueblo**	**81001**	**9.80%**
6	**Pueblo**	**81007**	**9.70%**
7	Arvada	80005	9.30%
8	**Pueblo**	**81004**	**9.30%**
9	Arvada	80003	9.10%
10	Arvada	80004	9.10%
11	Thornton/Denver	80229	9.10%
12	Lakewood/Denver	80232	9.10%
13	Northglenn/ Thornton/Denver	80233	9.00%
14	Grand Junction	81504	9.00%
15	Craig	81625	9.00%
16	Commerce City	80022	8.90%
17	Federal Heights/ Thornton/Westminster	80221	8.90%
18	Morrison	80465	8.90%
19	Kersey	80644	8.90%
20	Arvada	80007	8.80%
Top 20 *Best Zip Codes*			
1	**United States Air Force Academy**	**80840**	**4.60%**
2	Colorado Springs/Fort Carson	80913	4.90%
3	Gunnison	81230	4.90%
4	Limon	80828	5.00%
5	Burlington	80807	5.10%
6	Avon	81620	5.10%
7	Boulder	80302	5.20%
8	Wray	80758	5.30%
9	Holyoke	80734	5.40%
10	Fort Collins	80521	5.40%
11	Dillon	80435	5.50%
12	Silverthorne	80498	5.50%
13	Breckenridge	80424	5.50%
14	Edwards	81632	5.50%
15	Yuma	80759	5.70%
16	Dolores	81323	5.70%
17	Pagosa Springs	81147	5.70%
18	Granby	80446	5.80%
19	Akron	80720	5.90%
20	Glendale/Denver	80246	5.90%

Exhibit 3 examines the crash probability of young drivers by their zip code of residence. Six of the 20 most dangerous zip codes for young drivers are in Pueblo County. Four zip codes in the City of Arvada in Jefferson County are amongst the most dangerous. In addition to Pueblo and Jefferson counties, the 20 worst zip codes are located in Adams, Routt and Mesa counties.

In analyses of the 2004 and 2005 crash data, these same zip codes in Pueblo County had the highest crash probability for their resident young drivers. That these high probability persist in the 2007-2008 model suggests that efforts to reduce young driver crashes in Pueblo should be continued. The number of Arvada zip codes that are in the 20 most dangerous suggests that Arvada be selected for programs to reduce young residents' risky driving behavior.

While the zip codes where young drivers have the highest probability of crash involvement are located in just a few counties, the safest zip codes are spread across the state. The zip codes where residents under age 21 have the lowest crash probability include small cities on the Eastern Plains like Yuma and Burlington, college towns like Gunnison, Boulder and Fort Collins, mountain towns like Avon and Silverthorne and Dolores in Southwestern Colorado. Young drivers living in two zip codes in Colorado Springs have the lowest crash probability and those zip codes are associated with the United States Air Force Academy and Fort Carson. The town of Gunnison had the third lowest crash probability for young drivers.

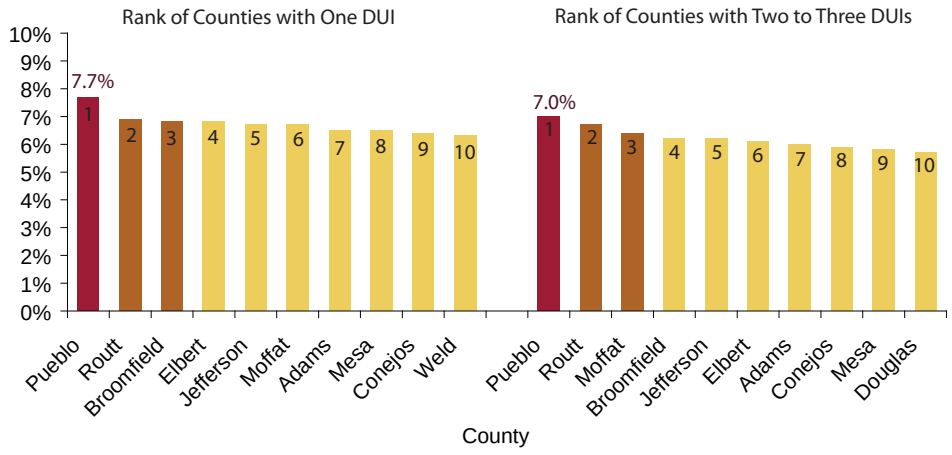
Impaired Drivers

Exhibits 4 and 5 present the counties where residents with prior DUI offenses have the highest probability of crash involvement. Exhibit 4 presents the ten counties with the highest crash probability of residents with one or two to three DUI offenses on their driving record. Pueblo, Routt and Broomfield county drivers with prior DUIs had the highest probability of crashing.

Exhibit 5 details the counties of residence of drivers with the highest crash probability based on the maximum BAC recorded on the driver's record. For each of three levels of maximum BAC, drivers from Pueblo County had the highest probability of crash involvement. As with the analysis of prior DUI offenses, residents from Broomfield and Moffat counties with BAC scores on their record had high probability of crash involvement.

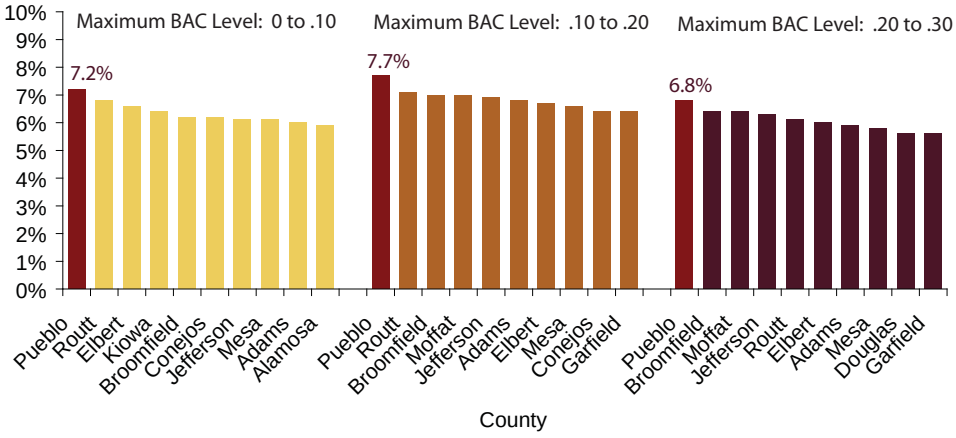
4. 10 Worst Counties: Probability of Crash by DUI Records

Source: 2007 - 2008 Crash Model



5. Probability of Crashing: Maximum BAC on Driver Record, By County

Source: 2007 - 2008 Crash Model



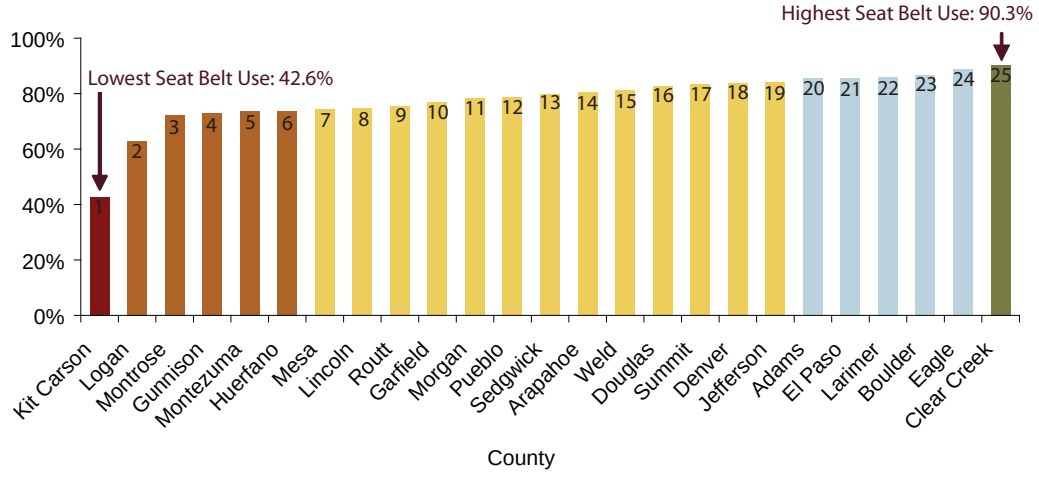
Occupant Protection

As part of the statewide seat belt survey sampling strategy, counties are selected as locations for seat belt observations. Because of this, county-level data are available for these counties. Exhibit 6 presents the observed seat belt use rates for each of the 25 counties included in the 2009 statewide seat belt survey. Exhibit 7 presents regional seat belt use rates from 1999 through 2009.

Kit Carson and Logan counties had the lowest overall seat belt use (Exhibit 6). Both of these counties are included in the Eastern Region of the state (Exhibit 7). Clear Creek County had the highest overall seat belt use, followed by the counties of Eagle, Boulder, Larimer, El Paso and Adams.

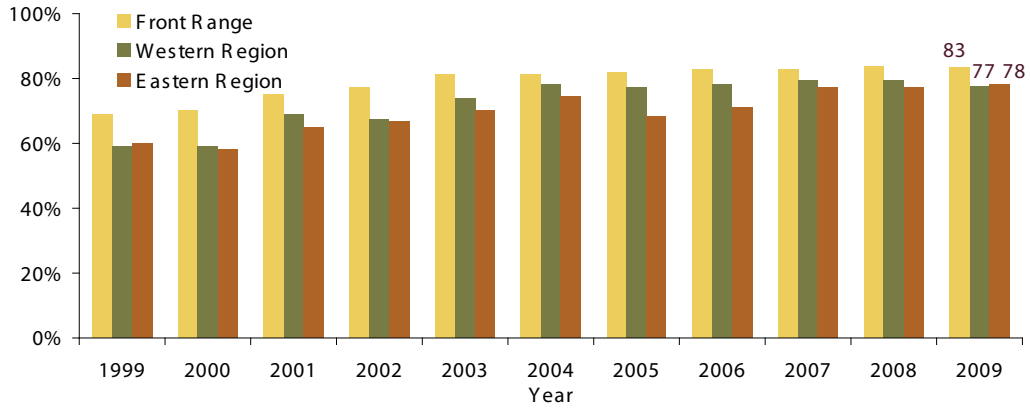
6. Observed Seat Belt Use - 25 County Ranking

Source: Colorado State University Annual Seat Belt Survey



7. Observed Seat Belt Use: Front Range, Western Region and Eastern Plains

Source: Colorado State University Annual Seat Belt Survey



Occupant Protection: Children, Juveniles and Teens

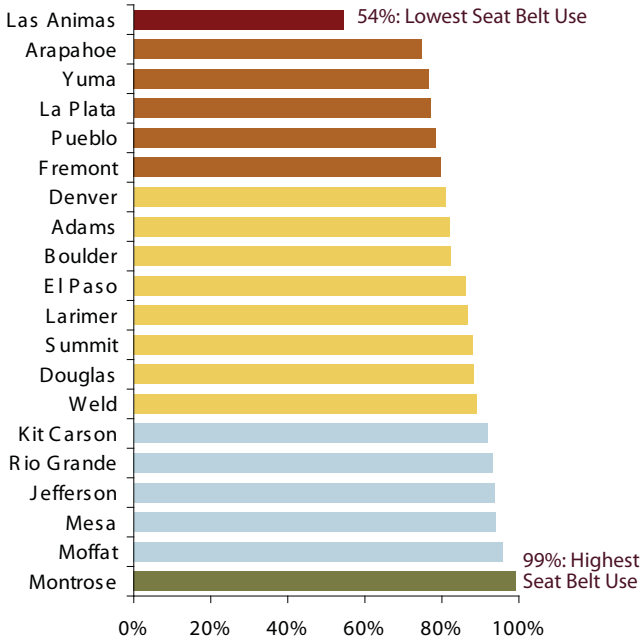
Exhibits 8 and 9 present the county-level results from observational surveys of children and juvenile occupant protection use.

Twenty counties were included in a survey of car seat/booster seat use by children ages 0-4 (Exhibit 8). Half of the young children observed in Las Animas County were not properly restrained. Arapahoe County had the second lowest rate of proper occupant protection for the youngest children. On the opposite end of the spectrum nearly all children in Montrose County were observed to be restrained in a car seat/booster seat. Moffat, Mesa, Jefferson, Rio Grande and Kit Carson counties also had comparatively high rates of observed car seat/booster seat use. It is interesting that adults in Kit Carson County have the lowest seat belt use but properly restrain young children at a relatively high rate.

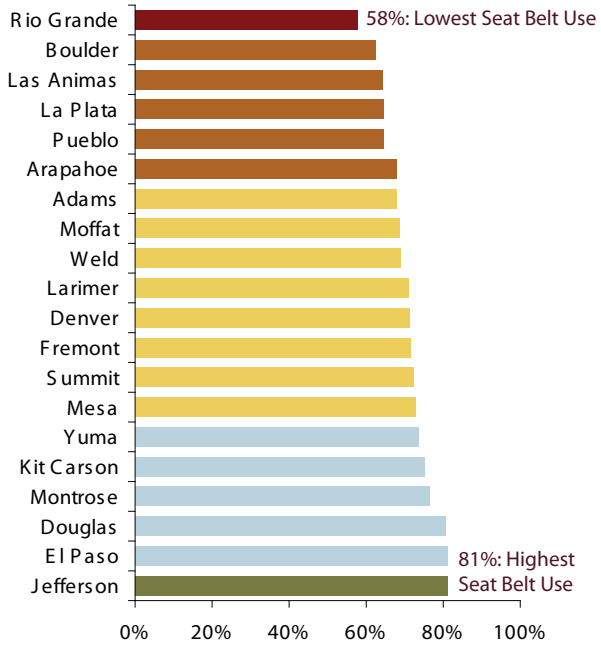
Among the counties included in the observational survey of juvenile (ages 5-15) seat belt use, Rio Grande County had the lowest overall rate, followed by Boulder, Las Animas, La Plata, Pueblo and Arapahoe counties. The low observed rate for Boulder County is surprising because adults in Boulder County had the third highest overall seat belt use rate.

Juveniles in Jefferson County had the highest observed seat belt use, followed by El Paso, Douglas, Montrose, Kit Carson and Yuma counties. Again, it's interesting to note that Kit Carson also has a high seat belt use rate by children ages 5 to 15, but few adults use seat belts.

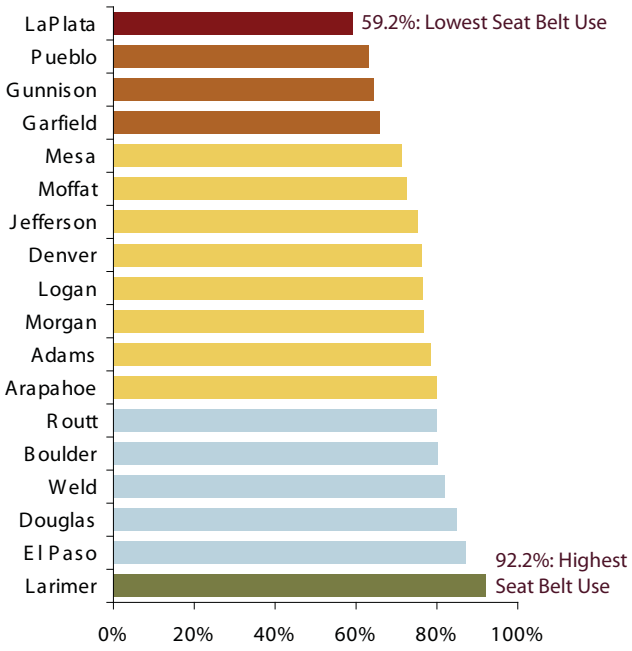
8. Observed Car Seat/Booster Seat Use, Children Ages 0-4
Source: Colorado State University Annual Seat Belt Survey



9. Observed Front and Rear Seat Belt Use, Juveniles Ages 5-15
Source: Colorado State University Annual Seat Belt Survey



10. | **Teen Seat Belt Use**
Source: 2009 CSU Teen Seat Belt Survey



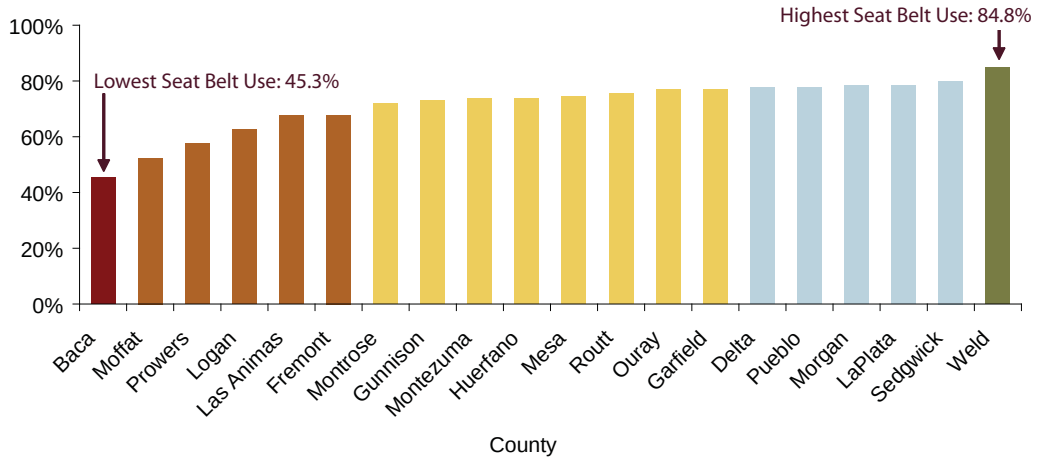
In 2009, an observational survey of teen seat belt use was completed for the first time. Exhibit 10 details the county-level results of this effort. As shown, teens in La Plata County had the lowest observed seat belt use, followed by teens in Pueblo, Gunnison and Garfield counties. Pueblo's low teen seat belt use rate combined with the most dangerous zip codes detailed previously indicate that risky driving behavior is a serious problem amongst Pueblo's most inexperienced drivers.

Teens in Larimer County had the highest observed seat belt use, followed by El Paso, Douglas, Weld, Boulder and Routt counties.

Rural Seat Belt Use

Exhibit 11 presents the results of a new seat belt survey conducted using the Regional Emergency and Trauma Advisory Council's geographic areas. In this survey, Weld County had the highest observed seat belt use and Baca County had the lowest.

11. | **Seat Belt Use - Rural Counties**
Source: 2009 CSU RETAC Seat Belt Survey



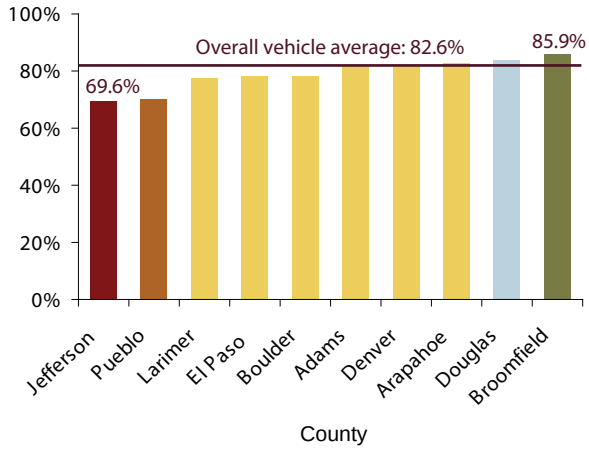
Nighttime Seat Belt Use

For the first time, a nighttime seat belt survey was conducted in selected Front Range counties. The results are presented in Exhibit 12. Drivers in Jefferson County had the lowest nighttime seat belt use followed by Pueblo County. At night, drivers in Broomfield County had the highest seat belt use rate among the counties surveyed, followed by Douglas and Arapahoe counties. Overall, the observed seat belt use rate was 82.6% which is consistent with the daytime seat belt use rate on the Front Range.

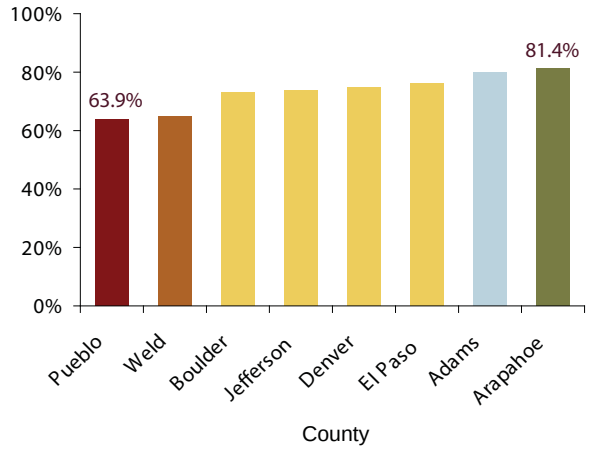
Diverse Neighborhoods

Zip codes with racially and ethnically diverse resident populations were sampled for an observational survey, by county, of seat belt use. Diverse neighborhoods in Pueblo had the lowest observed seat belt use, followed by Weld County. Diverse neighborhoods in Arapahoe County had the highest observed rate, followed by Adams County (Exhibit 13).

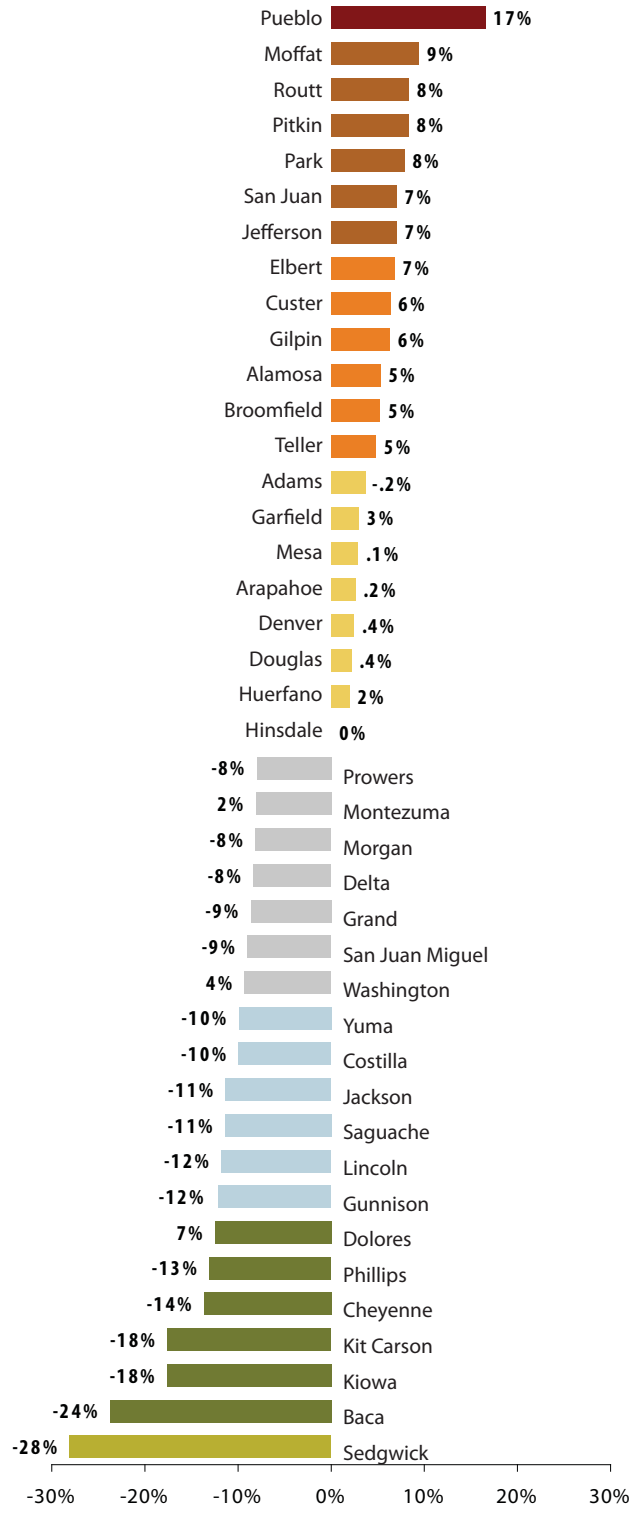
12. **Nighttime Seat Belt Use - Front Range Counties**
Source: 2009 CSU Nighttime Seat Belt Survey



13. **Seat Belt Use in Diverse Neighborhoods, By County**
Source: 2009 CSU Neighborhood Seat Belt Use



14. County Effect on Crash Probability
Source: 2007-2008 Crash Model



County-Only Effects

Exhibit 14 is based on an analysis of the characteristics of the county environment that contribute to the crash experience of all resident drivers. Counties may differ in their inherent dangerousness, due to differences in the types of roads and levels of traffic. They may also differ in their levels of enforcement.

All of these differences, *which do not depend on differences in the demographics of county residents*, are combined in the county effects upon which these results are based.

As shown in Exhibit 14, Pueblo's county-only effect had the greatest impact on increasing the probability that a resident will be involved in a crash. The county environment in Moffat, Routt, Pitkin and Park counties also significantly increases the probability of crash involvement of county residents.

On the opposite end of the spectrum, the county-only effect of Sedgwick County reduces the probability that its residents are involved in a crash. Similarly, the county effects significantly reduce the probability of crash involvement in Baca, Kiowa, Kit Carson, Cheyenne, Phillips and Dolores counties.

Each of the previous sections examined the probability that a driver may be involved in a crash based on characteristics aggregated across all individuals, across the state or in individual counties. For example, in Section II, analyses of gender focused on gender only, not the role of gender after controlling for other factors such as age or county of residence. Similarly, in Section IV, the analyses examined the probability of crashing a driver living in a particular county may be expected to acquire based on the driver's age or past DUI record. The analyses in this section examine the individual effect of particular characteristics while controlling for all other factors, therefore isolating the effect of a characteristic (e.g., getting one year older, having a maximum BAC of .20 on the record, moving to a different county, etc.) on the probability of crash involvement in the future.

Four profiles are examined: a 44 year old man, a 44 year old woman, a 22 year old man and a 22 year old woman. After establishing their "baseline" probability of crashing, the analysis explores how their probability of crash involvement would change if their profile were to change. For example, we take the same person and move that person from one county to another. The differences that we observe in the probability of crashing for that same individual in two different counties are entirely the consequence of the differences in the county specific environments, whether these are road conditions, traffic congestion or the intensity of traffic enforcement.

JACK MILLER

Height: **5' 7" tall** / Weight: **160 lbs.** / County of Residence: **Hinsdale**

Risk Profile:

Age: **22**

Address Changes: **3**

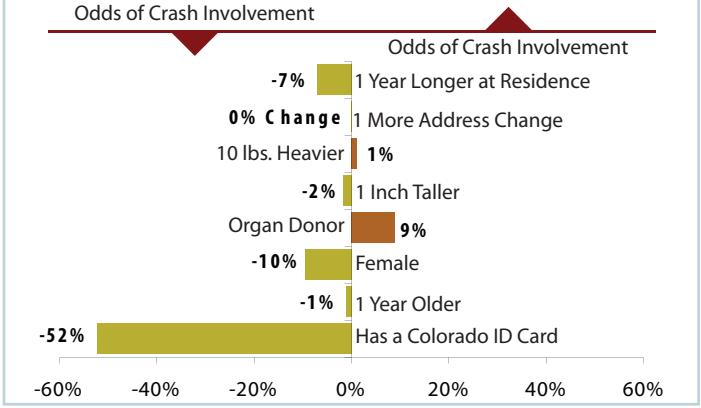
Last Address Change: **2 years**

Record: **1 citation** for **3 points**

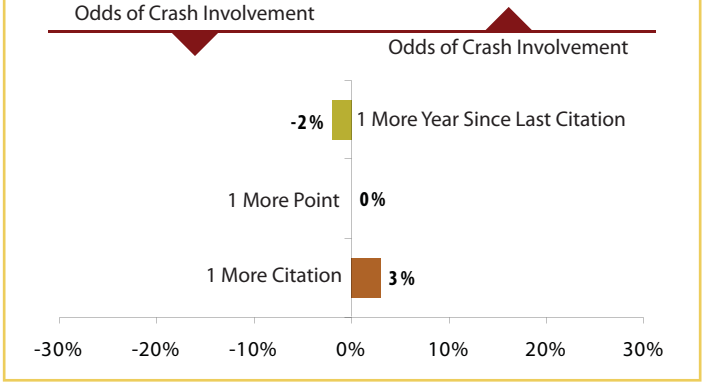
Filed on Record: **3 years ago**

If Jack was different, what would happen to his odds of crash involvement?

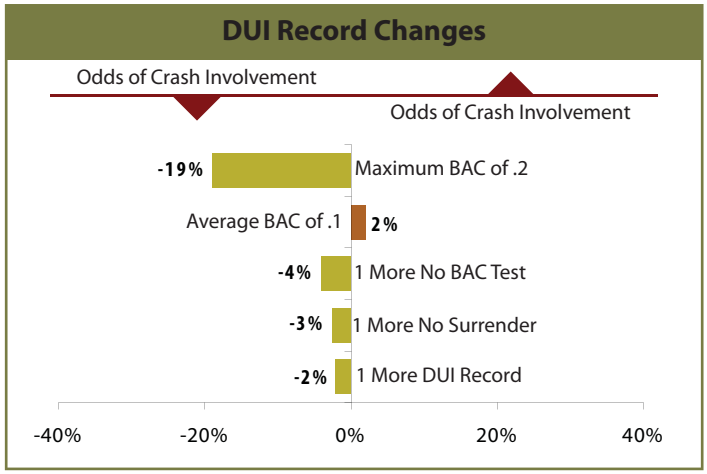
Demographic Changes*



Driving Record Changes



DUI Record Changes



***Relative change in the probability of crashing.**

JACK MILLER

Height: **5' 7" tall** / Weight: **160 lbs.** / County of Residence: **Hinsdale**

If Jack's ***neighborhood changed***, what would happen to his odds of crash involvement?

INCREASE

1% Minority Increases 5%

NO Change
- High School Graduation Rate Increases 5%
- Urban Rate Increases 5%
- Median Rent Increases $50
- Owner-Occupied Units Increase 5%

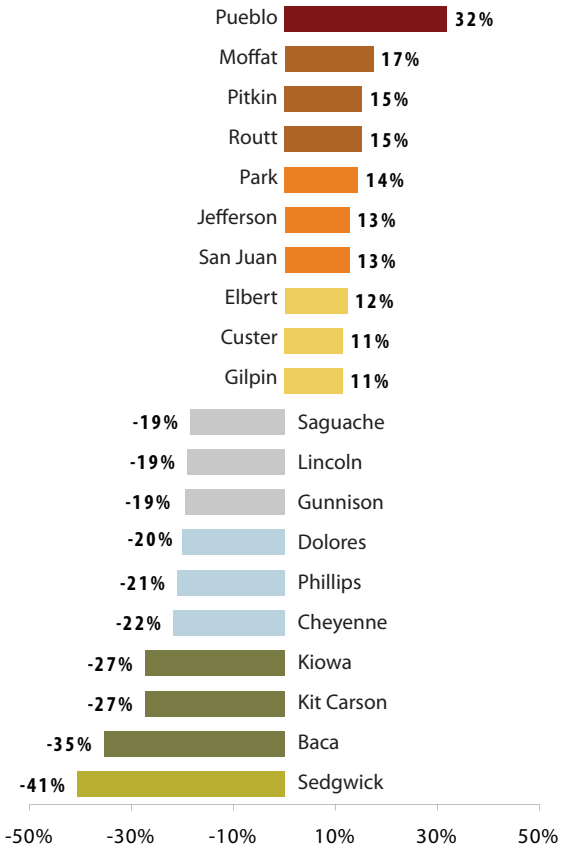
DECREASE

1% Vacancy Rates Increase 5%

2% Out of the Country in 1995
Per Capita Income Increases $5K

4% Poverty Rates Increase 5%

If Jack ***lived in another county***, what would happen to his odds of crash involvement?



Risk Profile:

Age: **22**

Address Changes: **3**

Last Address Change: **2 years**

Record: **1 citation** for **3 points**

Filed on Record: **3 years ago**

WILLIAM HUNTINGTON

Height: **5' 7" tall** / Weight: **160 lbs.** / County of Residence: **Hinsdale**

Risk Profile:

Age: **44**

Address Changes: **4**

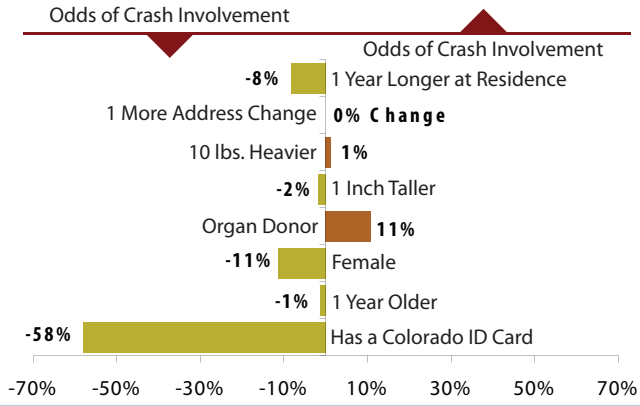
Last Address Change: **5 years**

Record: **1 citation** for **6 points**

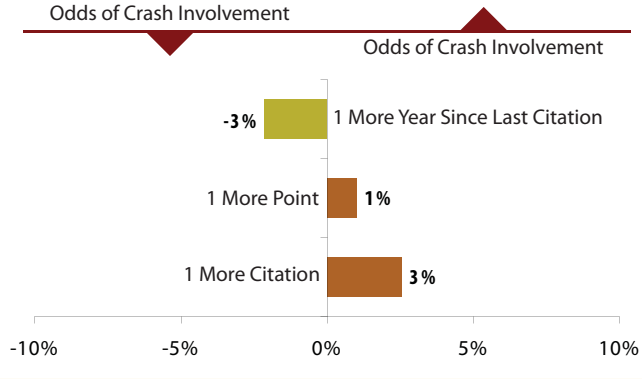
Filed on Record: **14 years ago**

If William was different, what would happen to his odds of crash involvement?

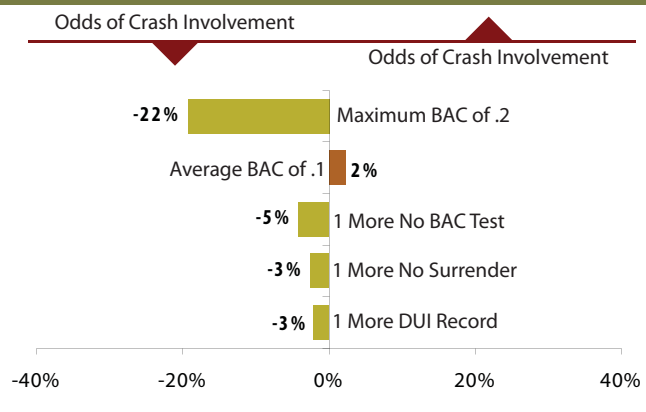
Demographic Changes*



Driving Record Changes



DUI Record Changes



***Relative change in the probability of crashing.**

WILLIAM HUNTINGTON

Height: **5' 7" tall** / Weight: **160 lbs.** / County of Residence: **Hinsdale**

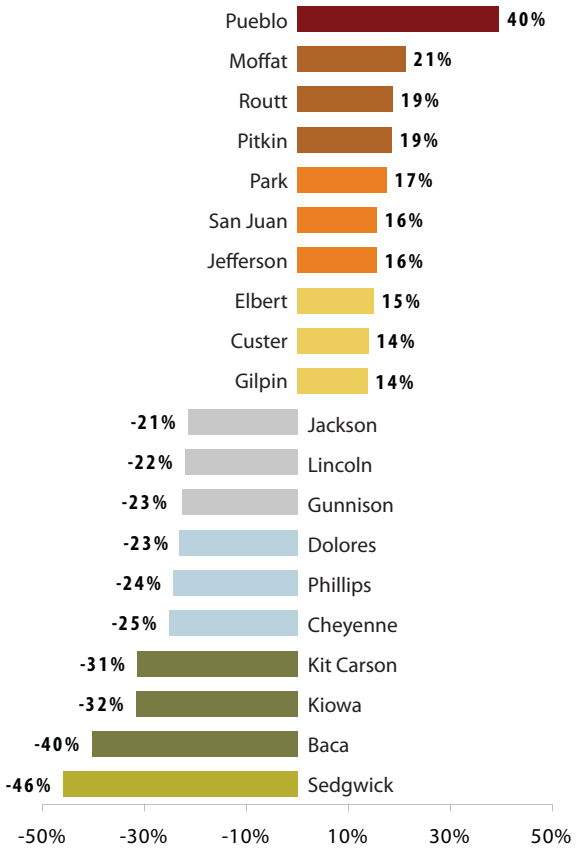
If William's ***neighborhood changed***, what would happen to his odds of crash involvement?

INCREASE

DECREASE

- 2% — Minority Increases 5%
- 1% — Owner-Occupied Units Increase 5%
- NO Change — • High School Graduation Rate Increases 5% • Urban Rate Increases 5%
- 1% — Median Rent Increases $50
- 2% — Out of the Country in 1995; Per Capita Income Increases $5K; Vacancy Rates Increase 5%
- 5% — Poverty Rates Increase 5%

If William ***lived in another county***, what would happen to his odds of crash involvement?



Risk Profile:

Age: **44**

Address Changes: **4**

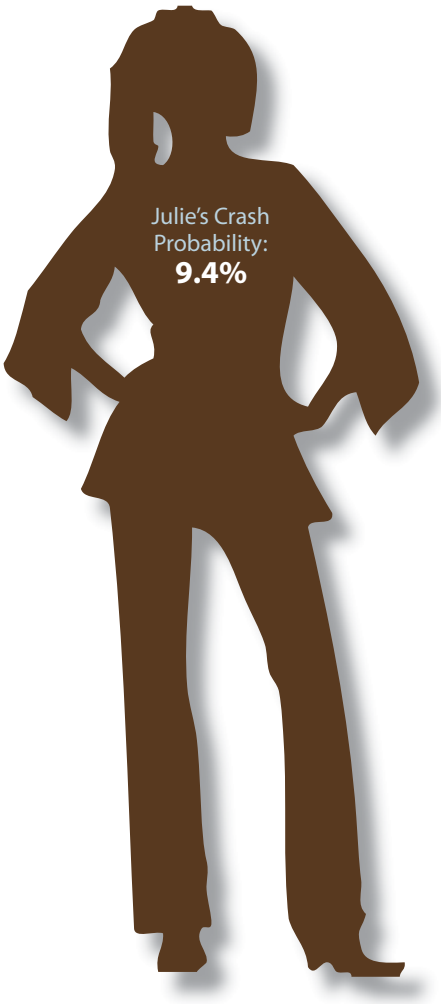
Last Address Change: **5 years**

Record: **1 citation** for **6 points**

Filed on Record: **14 years ago**

JULIE BARNES

Height: **5' 3" tall** / Weight: **130 lbs.** / County of Residence: **Hinsdale**



Risk Profile:

Age: **22**

Address Changes: **3**

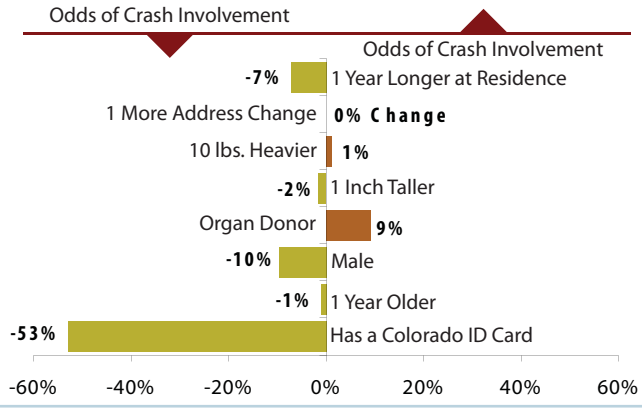
Last Address Change: **2 years**

Record: **1 citation** for **6 points**

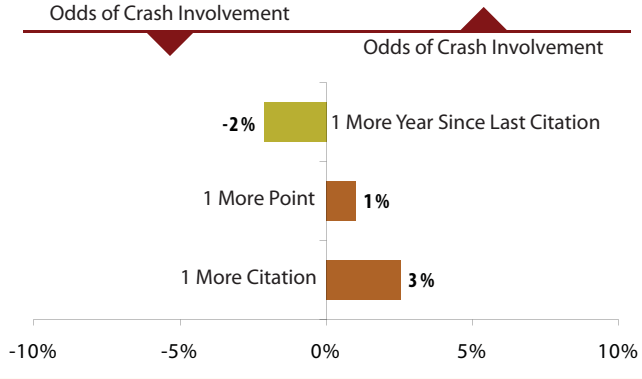
Filed on Record: **3 years ago**

If Julie was different, what would happen to her odds of crash involvement?

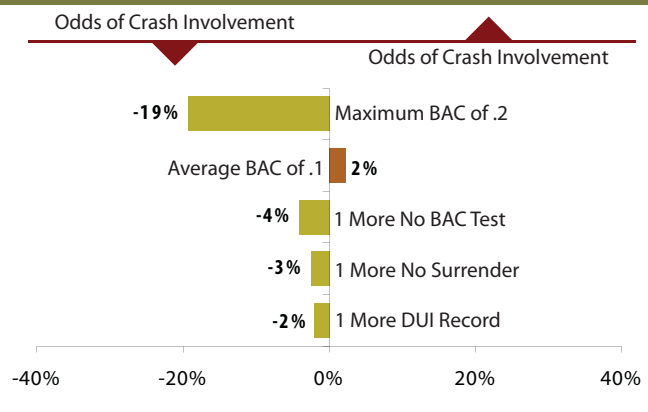
Demographic Changes*



Driving Record Changes



DUI Record Changes



***Relative change in the probability of crashing.**

JULIE BARNES

Height: **5' 3" tall** / Weight: **130 lbs.** / County of Residence: **Hinsdale**

If Julie's ***neighborhood changed***, what would happen to her odds of crash involvement?

INCREASE

1% Minority Increases 5%
Owner-Occupied Units Increase 5%

NO Change
- High School Graduation Rate Increases 5%
- Urban Rate Increases 5%
- Median Rent Increases $50

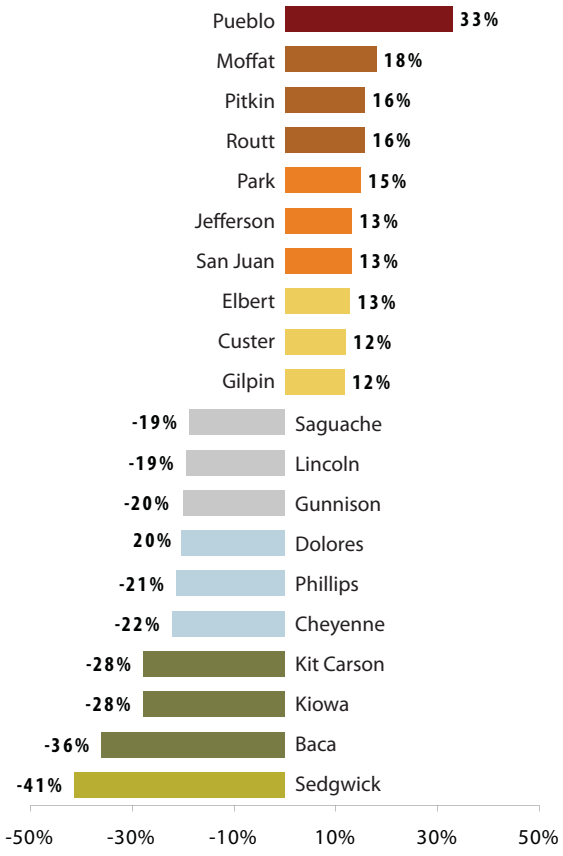
DECREASE

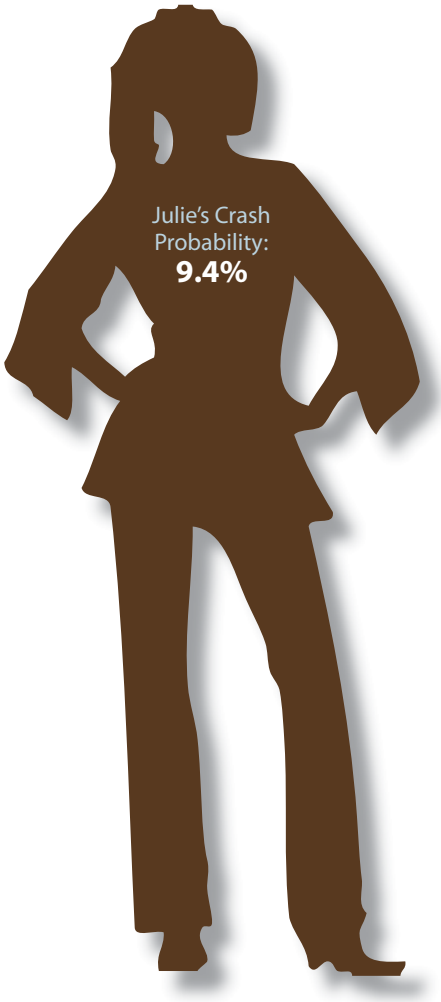
1% Vacancy Rates Increase 5%

2% Out of the Country in 1995
Per Capita Income Increases $5K

4% Poverty Rates Increase 5%

If Julie ***lived in another county***, what would happen to her odds of crash involvement?





Risk Profile:

Age: **22**

Address Changes: **3**

Last Address Change: **2 years**

Record: **1 citation** for **6 points**

Filed on Record: **3 years ago**

LINDA WEBER

Height: **5' 3" tall** / Weight: **130 lbs.** / County of Residence: **Hinsdale**

Risk Profile:

Age: **44**

Address Changes: **4**

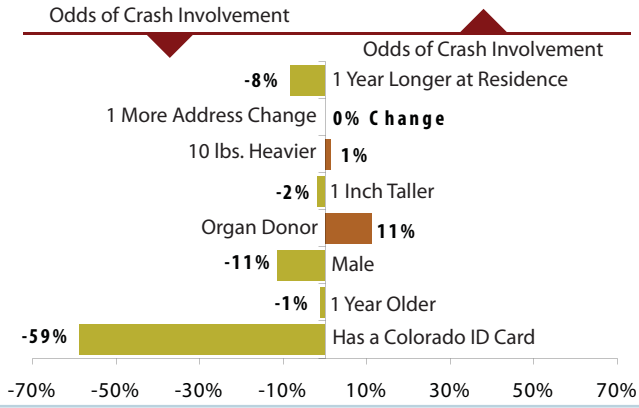
Last Address Change: **5 years**

Record: **1 citation** for **6 points**

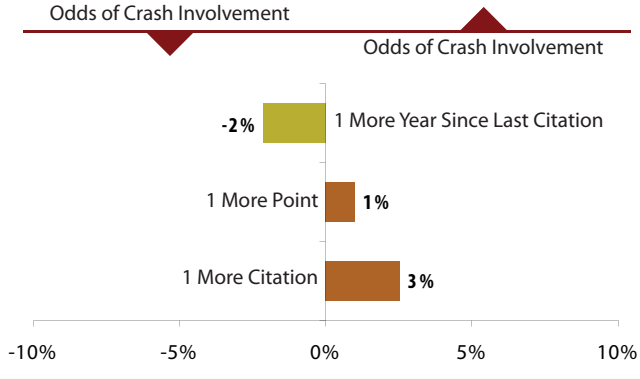
Filed on Record: **14 years ago**

If Linda was different, what would happen to her odds of crash involvement?

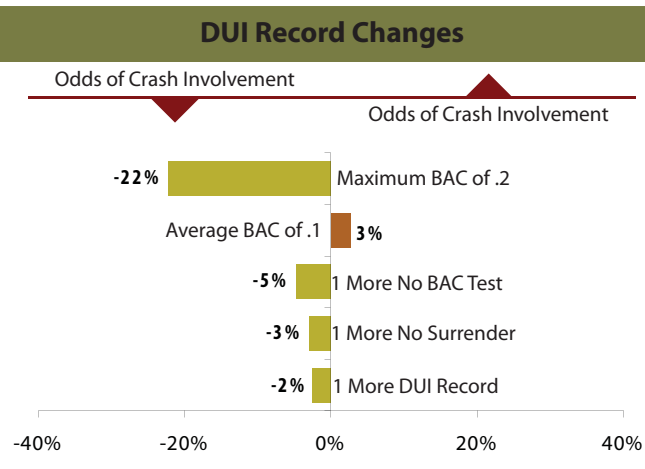
Demographic Changes*



Driving Record Changes



DUI Record Changes

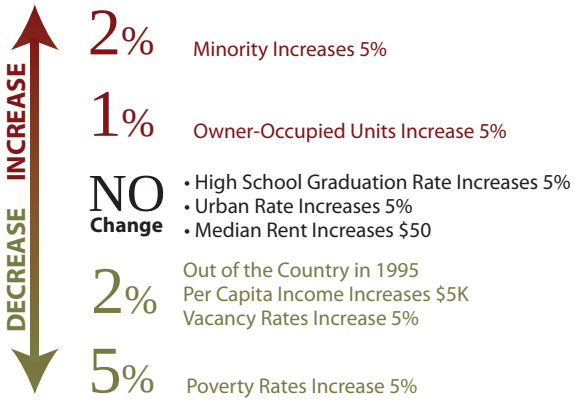


***Relative change in the probability of crashing.**

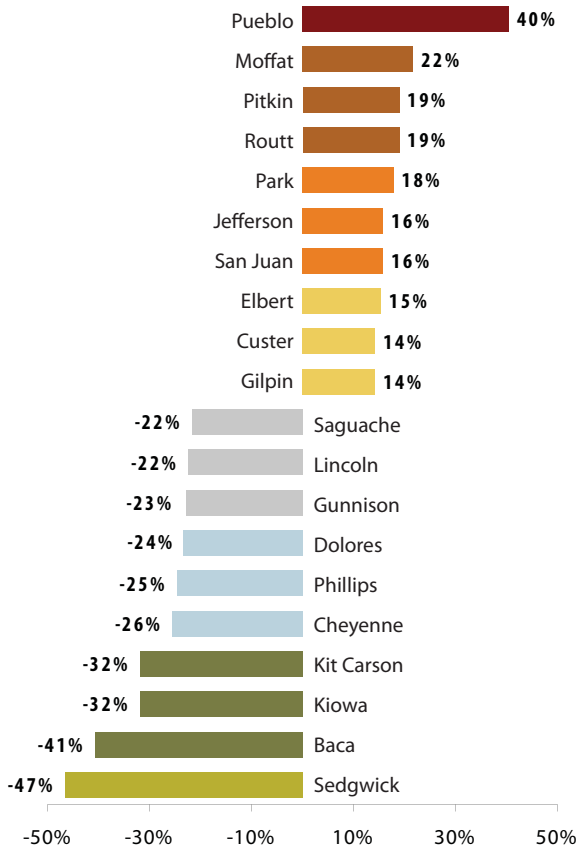
LINDA WEBER

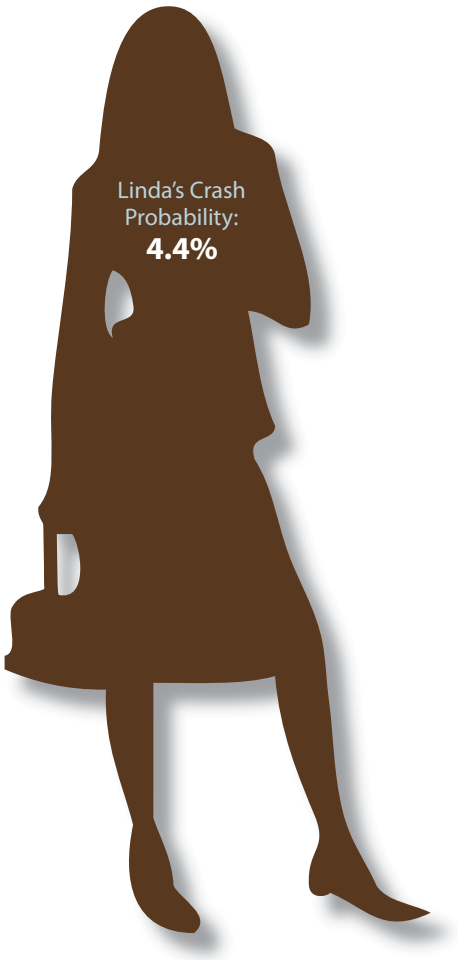
Height: **5' 3" tall** / Weight: **130 lbs.** / County of Residence: **Hinsdale**

If Linda's ***neighborhood changed***, what would happen to her odds of crash involvement?



If Linda ***lived in another county***, what would happen to her odds of crash involvement?





Risk Profile:

Age: **44**

Address Changes: **4**

Last Address Change: **5 years**

Record: **1 citation** for **6 points**

Filed on Record: **14 years ago**

Primary Counties to Focus On

Based on the results of the 2007-2008 Crash and Citation ordered probit model and the 2009 seat belt surveys, the study team recommends that the OTS Educational Programs team consider developing, supporting or expanding traffic safety programs in the following communities:

- Adams County
- Pueblo County
- Jefferson County

Adams County. Residents under age 21 in Adams County have the second highest probability of crashing statewide. Juvenile and teen seat belt use rates are relatively low. The probability of crashing for residents with prior DUI records are among the 10th highest. On-going occupant protection programs should be continued and strengthened. Support for DUI and general traffic enforcement is encouraged.

Jefferson County. Jefferson County residents had the 7th highest probability of crash involvement overall. Residents under the age of 21 had the 3rd highest probability of crashing. Four Arvada zip codes ranked among the 20 most dangerous statewide for resident young drivers. Consider developing young driver programs, particularly in the city of Arvada. Law enforcement efforts targeting DUI enforcement and general traffic enforcement should be expanded.

Pueblo County. Pueblo County has on-going, deep and persistent traffic safety problems that have been observed for years. Just as in past analyses, the 2007-2008 model demonstrated that Pueblo County and its resident drivers are among the most dangerous in the state. On nearly every measure, Pueblo ranks the worst. This includes measures of probability of crashing for young drivers, drivers with prior DUI records and drivers in general. The County's seat belt use rates are all low. In addition to supporting and reinforcing on-going community-based traffic safety programs, the study team strongly encourages that a concentrated law enforcement component be developed and funded. While DUI enforcement is important, it is apparent that rigorous enforcement of other risky driving behaviors such (e.g., speed) need to be enhanced to reinforce the on-going behavioral projects. Pueblo needs to get tough (or tougher) on traffic enforcement.

Secondary Counties to Focus On

Routt County. Out of Colorado's 64 counties, Routt County ranked 3rd worst in measures of the probability of crashing. The county's seat belt use rate (76%) is below the state average. On many other measures, Routt ranks among the 20 worst counties.

Moffat County. This county ranked 2nd worst out of all counties on measures of county-only effects. This indicates that something about the county itself, for example its roads, traffic volumes or other environmental factors raise the risk of crashes. The County also has low juvenile and teen seat belt use rates. For resident drivers under age 21, Moffat County is the second most dangerous county.

Occupant Protection Focus

The more extensive observational seat belt surveys identified several counties with very low seat belt and child occupant protection use rates, and if resources are available, should be considered for program development.

- Kit Carson, Logan and Montrose counties had the lowest overall adult seat belt use rates. As such, developing programs focused on increasing adult seat belt use rates, perhaps with a focus on drivers of light trucks are recommended, if resources are available. It is important to point out that Kit Carson and Logan counties both rank among the best counties with respect to probability of crashing, while Montrose County's ranking on most measures falls in the middle.

- Las Animas County had the lowest observed child occupant protection use rate and the third lowest juvenile seat belt use rate.

- Arapahoe County had the second lowest child occupant protection use rate and the 6th lowest juvenile seat belt use rate.

Data Efforts to Continue

Expanded Occupant Protection Data. The addition of statistically rigorous seat belt surveys of teens, rural counties and nighttime seat belt use greatly expanded the pool of information about occupant protection in Colorado. These additions added a richness of information that should be continued, if funds allow.

Current Crash Data. The timeliness of crash data availability has long been a challenge. That this effort included the entire 2007 dataset and the nearly complete 2008 file demonstrates the OTS's significant progress toward accomplishing its goal of providing crash records in a timely fashion.

Request for Additional Data

Original Citation File. The ordered probit model estimated the probability of crashing using a wide array of data from the Motor Vehicle Division. Chief among these databases is the adjudicated citation file. If possible to obtain, the original citation file in addition to adjudicated citations would provide a rich dataset and would allow the study team to vastly expand its analyses.

Recommended Analytical Focus for FY2011

The study team recommends that future Problem Identification reports continue to emphasize place-based analyses and expand those analyses whenever possible. We suggest that efforts be made to incorporate prior crash experiences, to the extent that they are available, among predictors of current crash propensities.

Analytical Approach

The 2010 Problem ID project continues and expands on the analysis of the annual crash experiences of Colorado drivers first introduced in the 2008 Problem ID report. It characterizes each Colorado resident with an active Colorado drivers license based on all available information about that individual as of December 31, 2006. It then imputes the probability that each individual will be involved as a driver in a property-damage-only, possible injury, non-incapacitating injury, incapacitating injury or fatal crash during the two subsequent years, 2007 and 2008. These imputed probabilities can then be aggregated to identify demographic groups or geographic areas which contain high concentrations of at-risk drivers.

Driver License Records

The foundation for these imputations is the data held by the Colorado Department of Revenue (DOR) in its various files regarding drivers licenses, traffic violations and sanctions. These files yield measures of age, sex, height, weight, county of residence, residential mobility, numbers of and points from past citations, duration since last citation, numbers of DUI records, BAC scores, and refusals to surrender licences or to take BAC tests at DUI stops. These measures, matched with actual crash experiences in 2007 and 2008 in an ordered probit analysis, yield estimates of how each measured characteristic affects the probability of experiencing a crash of any given severity.

The analysis in this report expands on that in the 2009 Problem ID report by augmenting the individual driver characteristics there with additional information from the DOR. For the first time, individuals who have surrendered their Colorado drivers license to some other state are excluded from the analysis, on the presumption that they are not regular drivers in Colorado. In addition, among those individuals included, the analysis distinguishes between those who have Colorado drivers licenses and those who have some other form of Colorado ID.

2007-2008 Crash Data

The original file of individuals involved in crashes contains 491,312 records. Of these, 124,718 were not drivers. Of the 366,594 records representing drivers, 55,877 had invalid driver license numbers. Of those that remain, 21,500 represent multiple crashes for the same driver. Consequently, the crash files identify 289,217 individual drivers who were involved in at least one crash during 2007 and 2008, and who have drivers license numbers which are potentially valid.

The quality of the 2007-2008 crash data is noticeably higher than that of the crash data for previous years. In earlier crash files, substantial numbers of records omitted severity codes or represented duplicate records with the same drivers license and crash identifiers. Neither problem occurs in the present data.

However, some crashes in November and December of 2008 are omitted from the available data. More importantly, there remains some uncertainty as to the identity of some of the remaining crash drivers. Of the 289,217 with potentially valid license numbers, 49,923 do not appear in the other DOR files necessary for the analysis. Therefore, the analysis is based on 239,294 fully-identifiable individuals involved as drivers in crashes in 2007 and 2008, and 4,636,412 fully-identifiable individuals not involved as drivers in crashes in these years.

1. | **Ordered Probit Estimates of Determinants of Crash Severity**
Source: 2007 - 2008 Crash Model

Severity	Coeficient	z
Driver holds Colorado ID, not license	-0.3882581	-100.69
Driver age	-0.0062677	-92.74
Driver is female	-0.0565587	-19.62
Driver is organ donor	0.0495688	23.60
Driver height	-0.009084	-23.54
Driver weight	0.000625	18.01
Number of DOR address records	-0.0001804	-0.54
Elapsed time since last address change	-0.0415296	-141.13
Number of past citations	0.0148616	23.37
Number of past citation points	0.0026784	10.92
Elapsed time since last citation	-0.0121968	-99.20
Number of DUI records	-0.0124445	-1.68
Number of DUI stops, no license surrender	-0.0147097	-2.67
Number of DUI stops, refused test	-0.0239112	-2.98
Average BAC, all DUI citations	0.1200937	1.40
Maximum BAC, all DUI citations	-0.5843986	-5.51
% zip code adults high school graduates	-0.0429928	-1.39
% zip code population Hispanic or black	0.1577497	9.18
% zip code population in urban areas	0.0074966	1.32
% zip code pop. in different county 1995	-0.2097581	-11.79
Median rent in zip code	-0.0000565	-5.16
% zip code dwelling units owner-occupied	0.0593164	4.05
% zip code dwelling units vacant	-0.1585561	-6.60
Zip code poverty rate	-0.4556758	-11.82
Zip code per capita income	-0.0021374	-8.31
Adams County	0.0374878	0.43
Alamosa County	0.0529543	0.60
Arapahoe County	0.0261132	0.30
Archuleta County	-0.068697	-0.78
Baca County	-0.2372252	-2.49
Bent County	-0.0255437	-0.27
Boulder County	-0.0021838	-0.03
Broomfield County	0.0527464	0.61
Chaffee County	-0.0268482	-0.31
Cheyenne County	-0.1363079	-1.36
Clear Creek County	-0.0450564	-0.5
Conejos County	-0.0671783	-0.74
Costilla County	-0.0994421	-1.08
Crowley County	-0.0331575	-0.35
Property damage only threshold	0.3617612	
Possible injury threshold	1.211391	
Non-incapacitating injury threshold	1.526547	
Incapacitating injury threshold	1.955991	
Fatality threshold	2.642171	

Ordered Probit Analysis

The following table presents the ordered probit estimates of the severity of the crash experience. The coefficients estimate the effect of each characteristic on the propensity of a driver to become involved in a crash. Almost all of these effects are statistically significant by conventional standards. However, the sample size is huge, 4,875,706 drivers. Consequently, it is appropriate to set more rigorous standards for the purpose of interpretation.

This ordered probit analysis of the severity of the most severe crash experienced by each driver is the foundation for the 2010 Problem ID report. However, the relationships between crash propensity, personal characteristics, county of residence and zip code characteristics are identical in supplemental analyses of the probability of crash participation, the number of crashes experienced, and an index which combines the number of crashes experienced with the severity of each crash.

These effects are also very similar to those from the analysis of 2005 crashes. As an example, the number of residential records had no effect on the probability of crash involvement in 2005 or in 2007-2008.

Demographics

More importantly, in both analyses older drivers and women were significantly less likely to become involved in crashes than were younger drivers and men. Drivers whose residences had been more stable, as measured by the length of time since the last change to these records, were significantly less likely to become involved in crashes than were drivers who had changed residences more often and more recently. Taller drivers and drivers who weigh less were also significantly less likely to become involved in a crash.

Driving History

Similarly, characteristics of driving history have similar effects in the two different periods. In both, drivers with more citations were significantly more likely to become involved in crashes. Drivers whose citations were more recent were also significantly more likely to become involved in crashes. The propensity for crash involvement increased with the numbers of accumulated points and the average BAC recorded at all DUI stops.

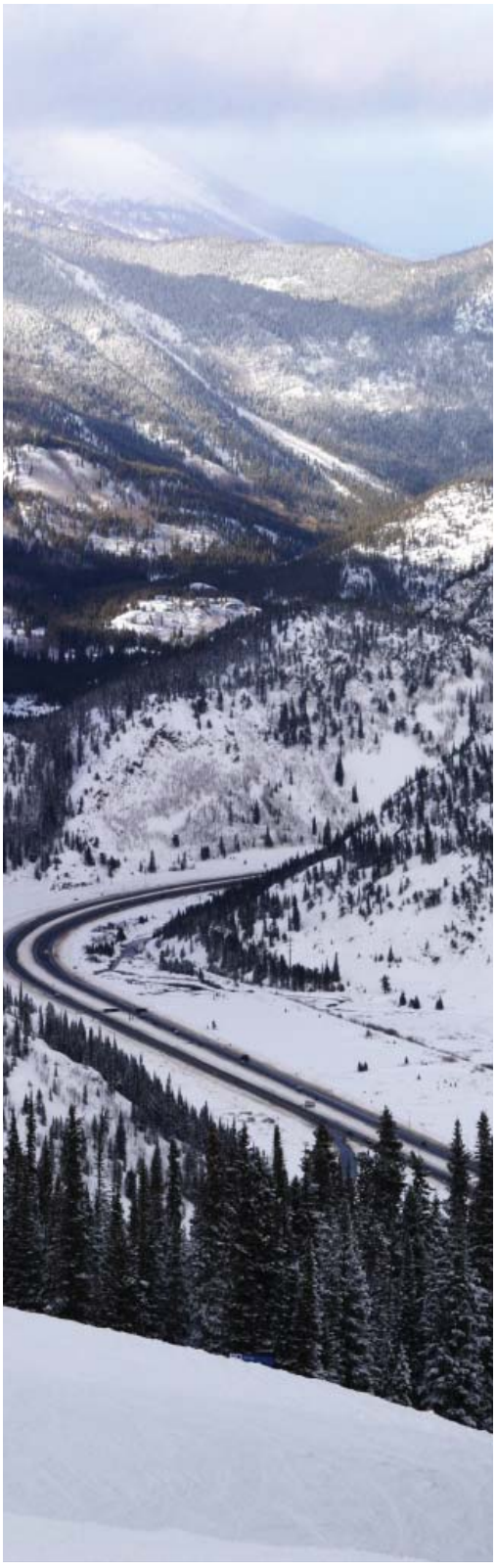
Those with more DUI records were significantly less likely to subsequently become involved in a crash in 2005 and 2007-2008. In both periods, drivers who did not surrender their licenses at a DUI stop were significantly less likely to subsequently become involved in a crash than were drivers whose DUI profile was otherwise similar, but who surrender their licenses. Crash involvement in both periods declined with the number of times a driver refused a sobriety test and with the maximum BAC recorded at any sobriety test.

Neighborhood Effects

Among the zip code characteristics, two, the proportion of adults with high school diplomas and the proportion living in urban areas, are not significantly associated with crash probabilities. The estimated effects of the remaining seven characteristics indicate that crash probabilities increase with two, the proportion of zip code residents who are minorities and the proportion of zip code dwelling units that are owner-occupied.

Crash probabilities decline with increases in the remaining five characteristics. Zip codes in which a greater proportion of the population is beneath the poverty line or lived in a different county in 1995 are associated with lower crash risks. Zip codes with higher median rents and per capita incomes are similarly associated with lower crash frequencies. Lastly, the same is true of zip codes in which greater proportions of dwelling units are vacant.

The behavioral interpretations of these effects are complex. For example, two variables measure income. Their effects indicate that, comparing two zip codes with the same per capita income, crashes will be less common in the zip code with greater poverty. In other words, the zip code in which more people have incomes which fall well below the average income will experience fewer crashes. In other words, crash probabilities are higher in zip codes with less income inequality.



The same conclusion arises from the negative effect of per capita income. Comparing two zip codes with the same poverty rates, crashes will be less frequent in the zip code with the higher per capita income. Similarly, higher median rents and higher vacancy rates are both associated with reduced crash risks. These results again suggest that crashes are less common in zip codes with more inequality. Comparing two zip codes with the same median rents, crash probabilities are lower in the zip code with more vacancies. In this comparison, the zip code with more dwelling units that are not rented at the prevailing rents experiences fewer crashes. Alternatively, comparing two zip codes with the same vacancy rates, crash probabilities are lower in the zip code with higher median rents.

The probabilities of becoming involved in crashes of varying severity, as presented in the 2010 Problem ID document, combine the effects represented by the coefficients in this table with the characteristics of each driver and of the zip code in which each driver resides. The simulations in this document take a reference individual with a specified set of characteristics, and vary those characteristics systematically to examine the consequent changes in the probabilities of crash involvement.

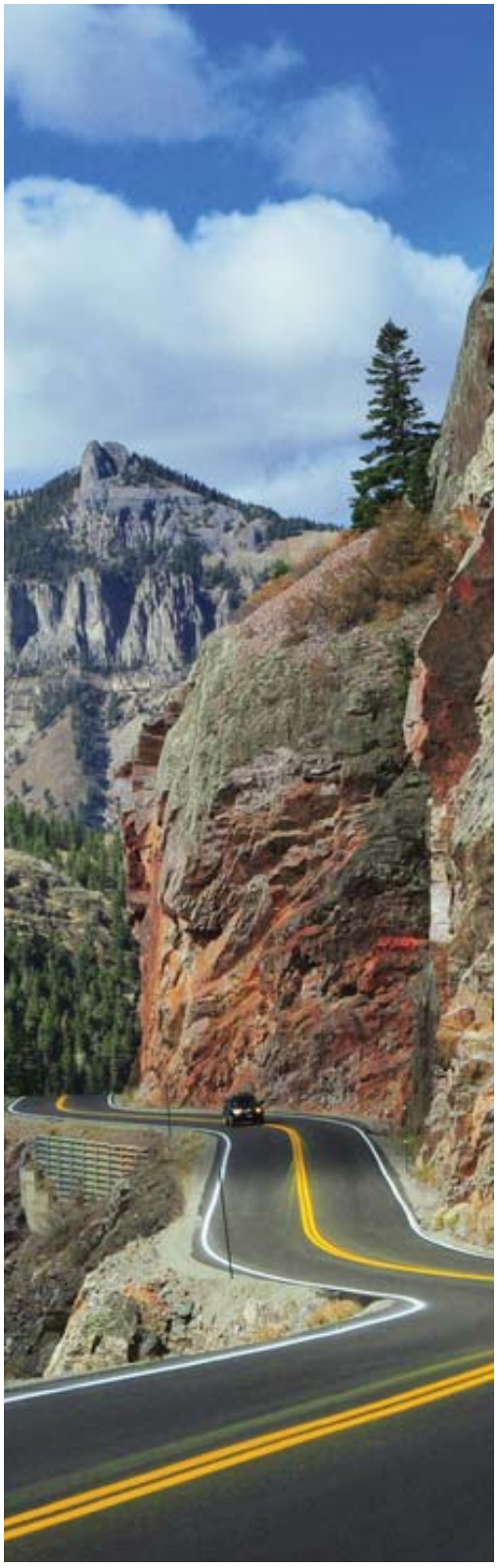
Recommendations for Future Analyses

The results here could be improved with additional data. In the future, the analysis may be expanded to incorporate past crash experience and measures of automobile insurance coverage.

APPENDIX B.
High-Risk County Profiles

This section includes in-depth summaries of the state's most problematic counties with respect to traffic safety.

Each summary includes a snapshot of the county's socio-demographic characteristics from the Census Bureau's County QuickFacts reports. In addition to the data characterizing each county, the county profiles also summarize each county's traffic safety challenges, including young drivers, impaired drivers and occupant protection.



ADAMS COUNTY

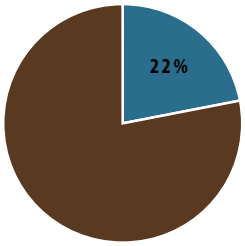
A Focus on High-Risk County Population Demographics

14th highest

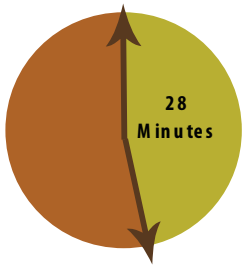
Rank in County-Only Effects on Crash Odds
Out of 64 Counties

$52,544
Median Household Income

Language Other than English Spoken at Home



Mean Travel Time to Work

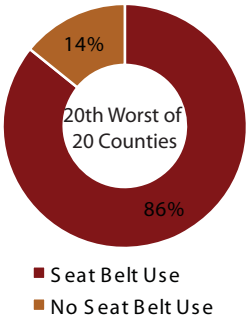


34
Fatal Crashes
Out of 473 Statewide

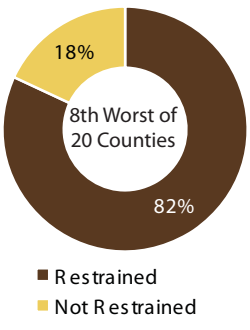
39
Fatalities
Out of 548 Statewide

OCCUPANT PROTECTION IN ADAMS COUNTY

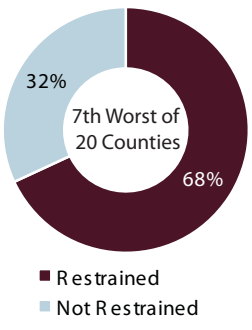
Overall Seat Belt Use



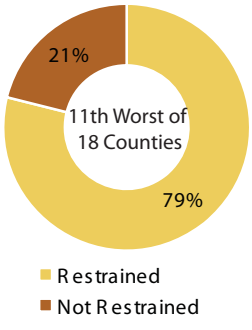
Car Seat/Booster Seat Use



Juvenile Seat Belt Use



Teen Seat Belt Use



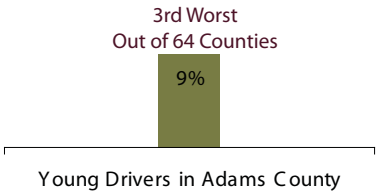
ADAMS COUNTY

A Focus on High-Risk County Crash Trend Behavior

With **34 fatal crashes** out of 473 statewide; and **39 fatalities** out of 548 statewide, Adams County has a **5.80% probability of crash involvement** and is **ranked 5th** out of 64 counties. Adams County also ranks 14th out of 64 counties in county-only effects.

YOUNG DRIVERS IN ADAMS COUNTY

Odds of Crash Involvement: Drivers Under Age 21 Residing in Adams County

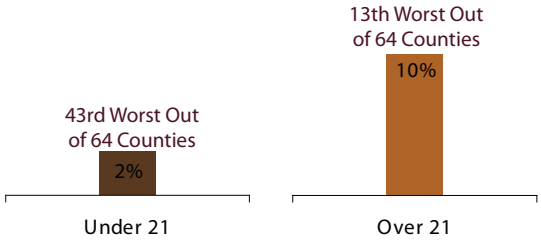


5 of the 20 Worst Zip Codes Where Young Drivers Had the Highest Odds of Crash Involvement

Zip	City
80640	Henderson
80229	Denver/Thornton
80233	Denver/Northglenn/Thornton
80022	Denver/Commerce City
80221	Denver/Federal Heights/Thornton/Westminster

IMPAIRED DRIVERS IN ADAMS COUNTY

Percentage of Drivers with 1+ DUIs on Record



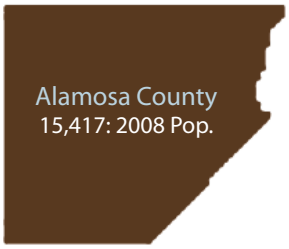
Odds of Crash: Drivers with One DUI on Record

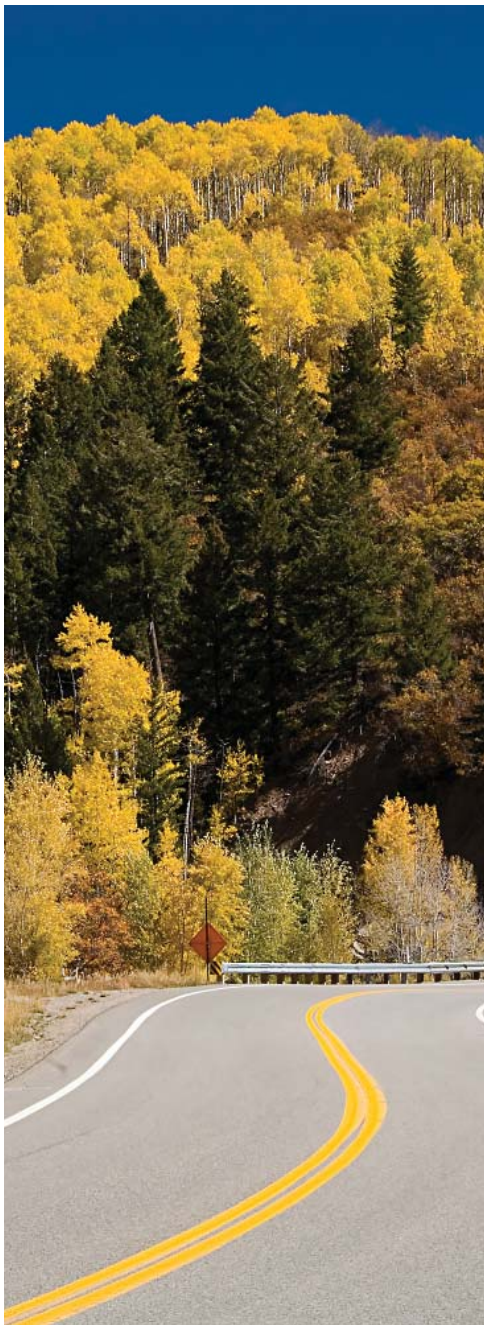
Odds of Crash: Drivers with a Max. BAC of .10 to .20

* 2007-2008 Crash Model, 2009 Seat Belt Surveys, 2008 FARS Data, 2008 County QuickFacts

ALAMOSA COUNTY

A Focus on High-Risk County Population Demographics



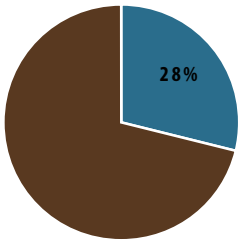


11th highest

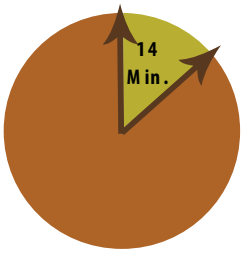
Rank in County-Only Effects on Crash Odds
Out of 64 Counties

$35,988
Median Household Income

Language Other than English Spoken at Home



Mean Travel Time to Work



3
Fatal Crashes
Out of 473 Statewide

3
Fatalities
Out of 548 Statewide

OCCUPANT PROTECTION IN ALAMOSA COUNTY

**Data is Currently Unavailable*

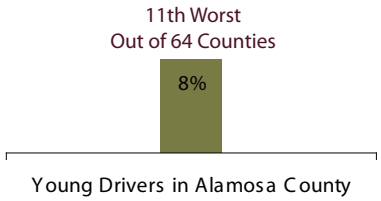
ALAMOSA COUNTY

A Focus on High-Risk County Crash Trend Behavior

With **3 fatal crashes** out of 554 statewide; and **3 fatalities** out of 548 statewide, Alamosa County has a **5.08% probability of crash involvement** and is **ranked 15th** out of 64 counties. Alamosa County also ranks 11th highest out of 64 counties in county-only effects.

YOUNG DRIVERS IN ALAMOSA COUNTY

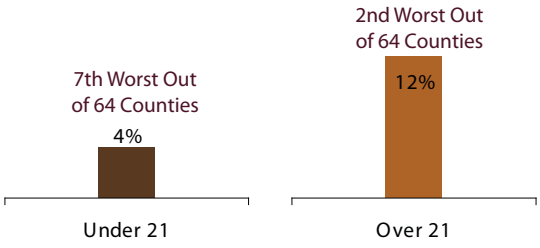
Odds of Crash Involvement: Drivers Under Age 21 Residing in Alamosa County



***Zip Code 81101 Ranks 81st Most Dangerous for Drivers Under 21 Out of 225 Most Populous Counties**

IMPAIRED DRIVERS IN ALAMOSA COUNTY

Percentage of Drivers with 1+ DUIs on Record



Odds of Crash: Drivers with One DUI on Record

Odds of Crash: Drivers with a Max. BAC of .10 to .20

*2007-2008 Crash Model, 2009 Seat Belt Surveys, 2008 FARS Data, 2008 County QuickFacts

ARAPAHOE COUNTY

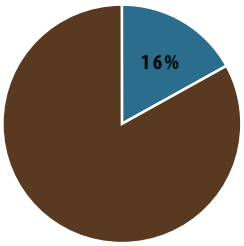
A Focus on High-Risk County Population Demographics

17th highest

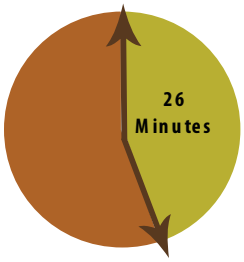
Rank in County-Only Effects on Crash Odds
Out of 64 Counties

$59,299
Median Household Income

Language Other than English Spoken at Home



Mean Travel Time to Work

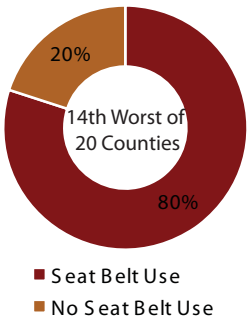


34
Fatal Crashes
Out of 473 Statewide

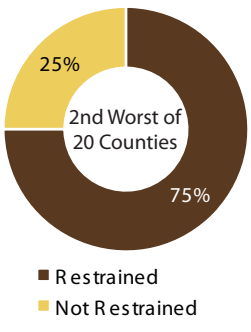
44
Fatalities
Out of 548 Statewide

OCCUPANT PROTECTION IN ARAPAHOE COUNTY

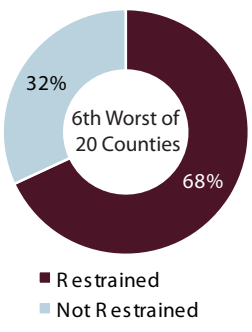
Overall Seat Belt Use



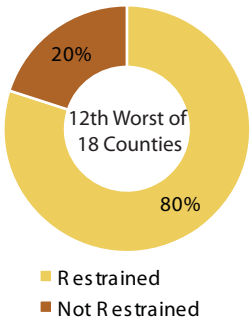
Car Seat/Booster Seat Use



Juvenile Seat Belt Use



Teen Seat Belt Use



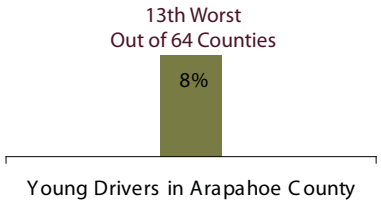
ARAPAHOE COUNTY

A Focus on High-Risk County Crash Trend Behavior

With **34 fatal crashes** out of 473 statewide; and **44 fatalities** out of 548 statewide, Arapahoe County has a **5.12% probability of crash involvement** and is **ranked 14th** out of 64 counties. Arapahoe County also ranks 17th out of 64 counties in county-only effects.

YOUNG DRIVERS IN ARAPAHOE COUNTY

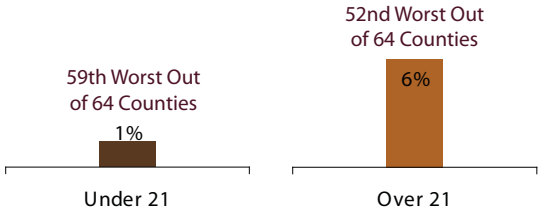
Odds of Crash Involvement: Drivers Under Age 21 Residing in Arapahoe County



***Zip Code 80013 Ranks 49th Most Dangerous for Drivers Under 21 Out of 225 Most Populous Counties**

IMPAIRED DRIVERS IN ARAPAHOE COUNTY

Percentage of Drivers with 1+ DUIs on Record



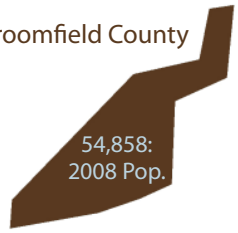
Odds of Crash: Drivers with One DUI on Record

Odds of Crash: Drivers with a Max. BAC of .10 to .20

*2007-2008 Crash Model, 2009 Seat Belt Surveys, 2008 FARS Data, 2008 County QuickFacts

BROOMFIELD COUNTY

A Focus on High-Risk County Population Demographics



12th highest

Rank in County-Only Effects on Crash Odds
Out of 64 Counties

$70,168
Median Household Income

Language Other than English Spoken at Home

**Data is Currently Unavailable*

Mean Travel Time to Work

**Data is Currently Unavailable*

2
Fatal Crashes
Out of 473 Statewide

2
Fatalities
Out of 548 Statewide

OCCUPANT PROTECTION IN BROOMFIELD COUNTY

**Data is Currently Unavailable*

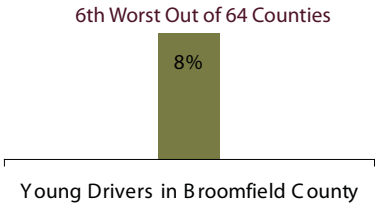
BROOMFIELD COUNTY

A Focus on High-Risk County Crash Trend Behavior

With **2 fatal crashes** out of 473 statewide; and **2 fatalities** out of 548 statewide, Broomfield County has a **5.90% probability of crash involvement** and is **ranked 3rd** out of 64 counties. Broomfield County also ranks 12th highest out of 64 counties in county-only effects.

YOUNG DRIVERS IN BROOMFIELD COUNTY

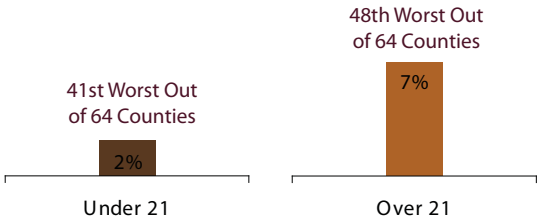
Odds of Crash Involvement: Drivers Under Age 21 Residing in Broomfield County



***Zip Code 80021 Ranks 41st Most Dangerous for Drivers Under 21 Out of 225 Most Populous Counties**

IMPAIRED DRIVERS IN BROOMFIELD COUNTY

Percentage of Drivers with 1+ DUIs on Record



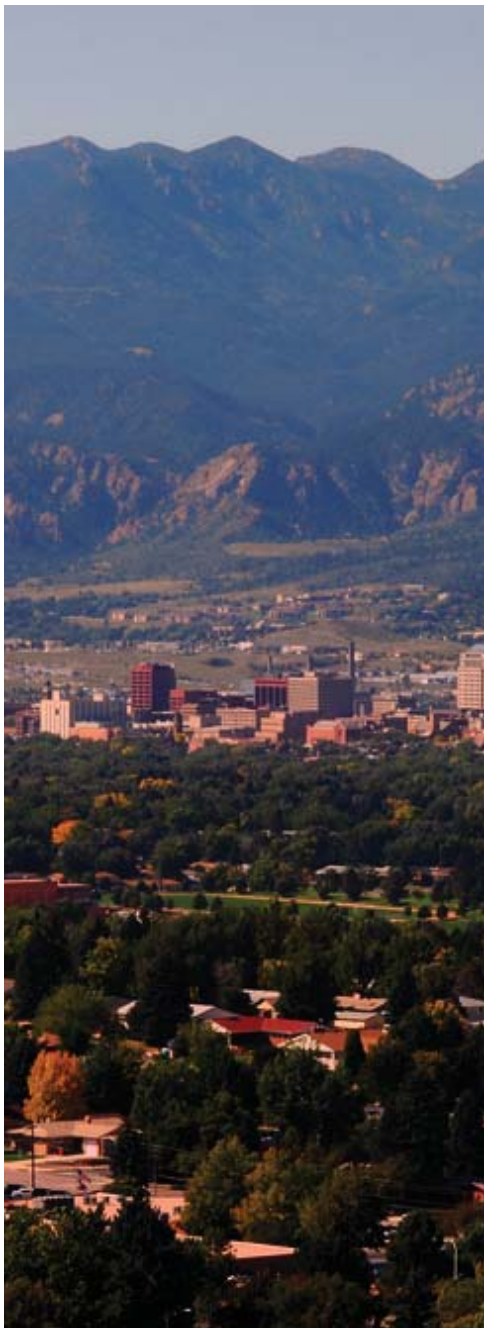
Odds of Crash: Drivers with One DUI on Record

Odds of Crash: Drivers with a Max. BAC of .10 to .20

*2007-2008 Crash Model, 2009 Seat Belt Surveys, 2008 FARS Data, 2008 County QuickFacts

ELBERT COUNTY

A Focus on High-Risk County Population Demographics

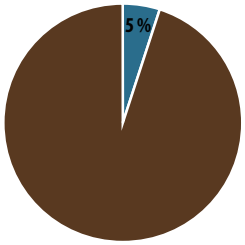


8th highest

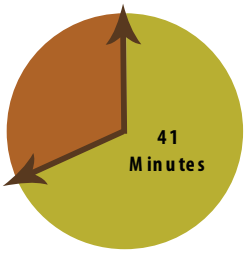
Rank in County-Only Effects on Crash Odds
Out of 64 Counties

$77,037
Median Household Income

Language Other than English Spoken at Home



Mean Travel Time to Work



4
Fatal Crashes
Out of 473 Statewide

4
Fatalities
Out of 548 Statewide

OCCUPANT PROTECTION IN ELBERT COUNTY

**Data is Currently Unavailable*

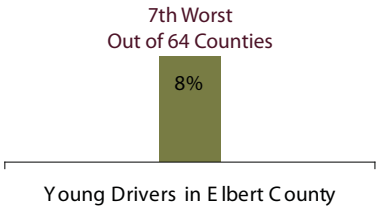
ELBERT COUNTY

A Focus on High-Risk County Crash Trend Behavior

With **4 fatal crashes** out of 473 statewide; and **4 fatalities** out of 548 statewide, Elbert County has a **5.90% probability of crash involvement** and is **ranked 3rd** out of 64 counties. Elbert County also ranks 8th highest out of 64 counties in county-only effects.

YOUNG DRIVERS IN ELBERT COUNTY

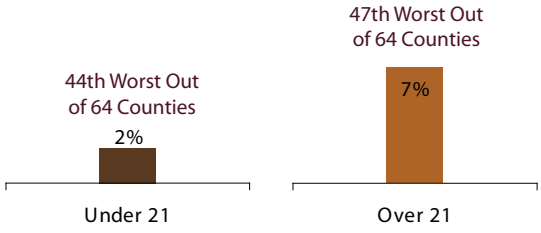
Odds of Crash Involvement: Drivers Under Age 21 Residing in Elbert County



***80106 Ranks 38th Most Dangerous Out of 225 Most Populous Counties**

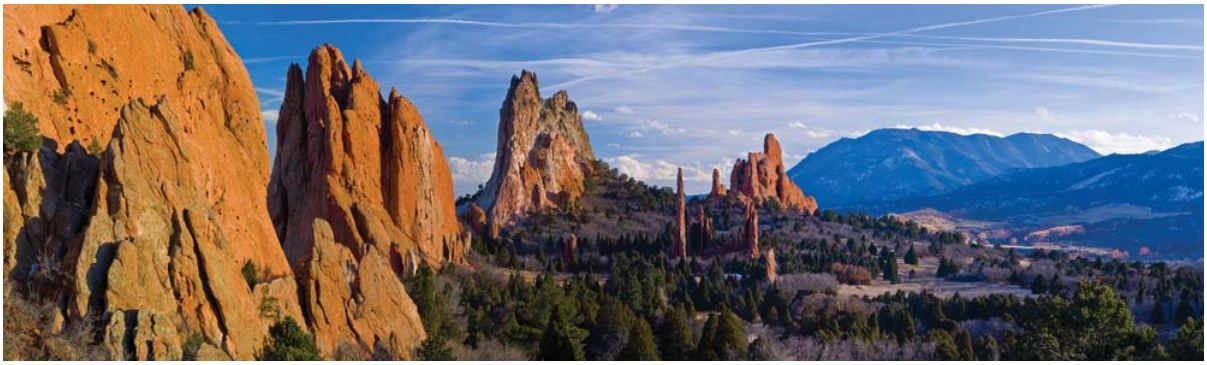
IMPAIRED DRIVERS IN ELBERT COUNTY

Percentage of Drivers with 1+ DUIs on Record



Odds of Crash: Drivers with One DUI on Record

Odds of Crash: Drivers with a Max. BAC of .10 to .20



*2007-2008 Crash Model, 2009 Seat Belt Surveys, 2008 FARS Data, 2008 County QuickFacts

JEFFERSON COUNTY

A Focus on High-Risk County Population Demographics

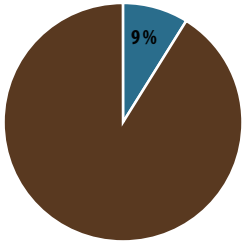
533,339:
2008 Population

7th highest

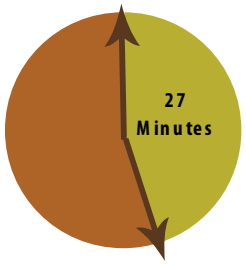
Rank in County-Only Effects on Crash Odds
Out of 64 Counties

$64,548
Median Household Income

Language Other than English Spoken at Home



Mean Travel Time to Work

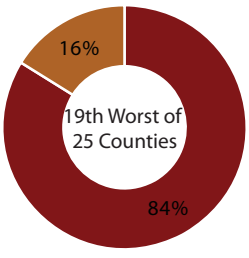


37
Fatal Crashes
Out of 473 Statewide

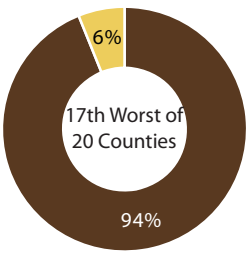
39
Fatalities
Out of 548 Statewide

OCCUPANT PROTECTION IN JEFFERSON COUNTY

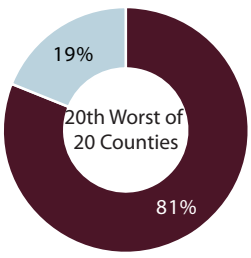
Overall Seat Belt Use



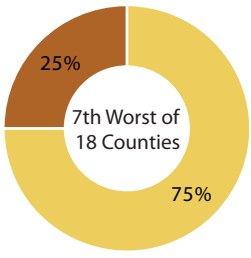
Car Seat/Booster Seat Use



Juvenile Seat Belt Use



Teen Seat Belt Use



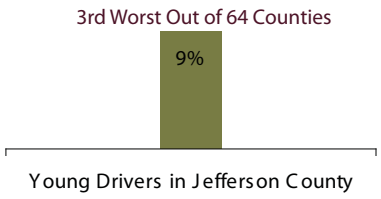
JEFFERSON COUNTY

A Focus on High-Risk County Crash Trend Behavior

With **37 fatal crashes** out of 473 statewide; and **39 fatalities** out of 548 statewide, Jefferson County has a **5.55% probability of crash involvement** and is **ranked 7th** out of 64 counties. Jefferson County also ranks 7th out of 64 counties in county-only effects.

YOUNG DRIVERS IN JEFFERSON COUNTY

Odds of Crash Involvement: Drivers Under Age 21 Residing in Jefferson County

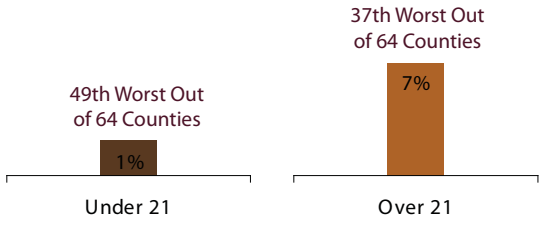


6 of the 20 Worst Zip Codes Where Young Drivers Had the Highest Odds of Crash Involvement

Zip Code	City
80003	Arvada
80004	Arvada
80005	Arvada/Westminster
80007	Arvada
80232	Denver/Lakewood
80465	Morrison

IMPAIRED DRIVERS IN JEFFERSON COUNTY

Percentage of Drivers with 1+ DUIs on Record



Odds of Crash: Drivers with One DUI on Record

Odds of Crash: Drivers with a Max. BAC of .10 to .20

*2007-2008 Crash Model, 2009 Seat Belt Surveys, 2008 FARS Data, 2008 County QuickFacts

KIT CARSON COUNTY

A Focus on High-Risk County Population Demographics

61st highest

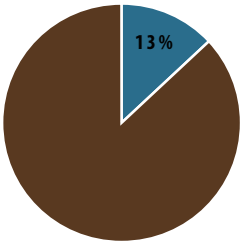
Rank in County-Only Effects on Crash Odds

Out of 64 Counties

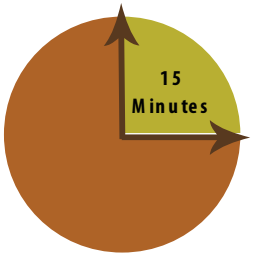
$37,288

Median Household Income

Language Other than English Spoken at Home



Mean Travel Time to Work



3

Fatal Crashes

Out of 473 Statewide

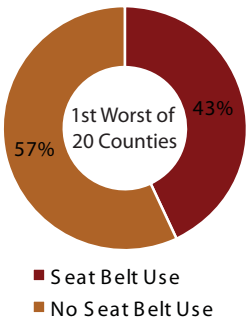
3

Fatalities

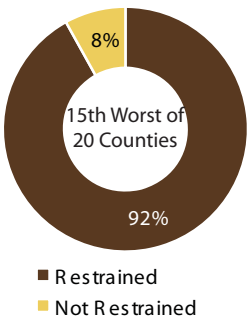
Out of 548 Statewide

OCCUPANT PROTECTION IN KIT CARSON COUNTY

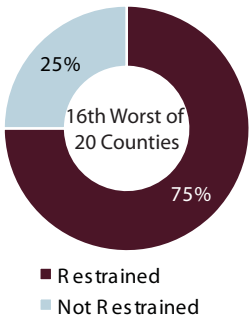
Overall Seat Belt Use



Car Seat/Booster Seat Use



Juvenile Seat Belt Use



Teen Seat Belt Use

**Data is Currently Unavailable*

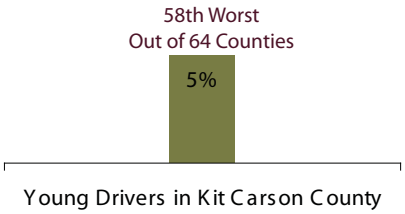
KIT CARSON COUNTY

A Focus on High-Risk County Crash Trend Behavior

With **3 fatal crashes** out of 473 statewide; and **3 fatalities** out of 548 statewide, Kit Carson County has a **2.90% probability of crash involvement** and is **ranked 61st** out of 64 counties. Kit Carson County also ranks 61st out of 64 counties in county-only effects.

YOUNG DRIVERS IN KIT CARSON COUNTY

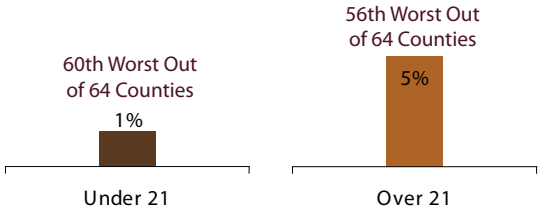
Odds of Crash Involvement: Drivers Under Age 21 Residing in Kit Carson County



***80807 Ranks 221 as Most Dangerous for Under 21 Drivers Out of the 225 Most Populous Zip Codes**

IMPAIRED DRIVERS IN KIT CARSON COUNTY

Percentage of Drivers with 1+ DUIs on Record



Odds of Crash: Drivers with One DUI on Record

Odds of Crash: Drivers with a Max. BAC of .10 to .20

*2007-2008 Crash Model, 2009 Seat Belt Surveys, 2008 FARS Data, 2008 County QuickFacts

LAS ANIMAS COUNTY

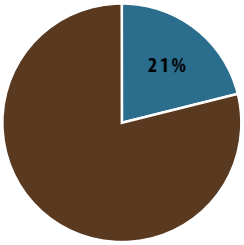
A Focus on High-Risk County Population Demographics

36th highest

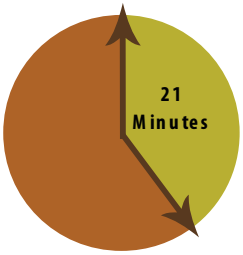
Rank in County-Only Effects on Crash Odds
Out of 64 Counties

$36,607
Median Household Income

Language Other than English Spoken at Home



Mean Travel Time to Work



6
Fatal Crashes
Out of 473 Statewide

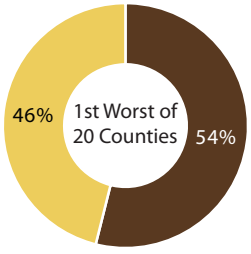
6
Fatalities
Out of 548 Statewide

OCCUPANT PROTECTION IN LAS ANIMAS COUNTY

Overall Seat Belt Use

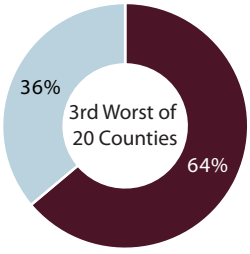
**Data is Currently Unavailable*

Car Seat/Booster Seat Use



Restrained
Not Restrained

Juvenile Seat Belt Use



Restrained
Not Restrained

Teen Seat Belt Use

**Data is Currently Unavailable*

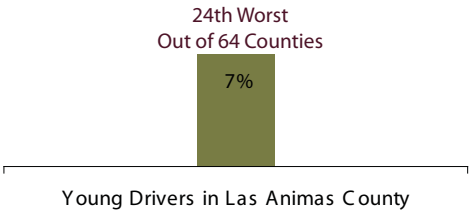
LAS ANIMAS COUNTY

A Focus on High-Risk County Crash Trend Behavior

With **6 fatal crashes** out of 473 statewide; and **6 fatalities** out of 548 statewide, Las Animas County has a **4.06% probability of crash involvement** and is **ranked 32nd** out of 64 counties. Las Animas County also ranks 36th out of 64 counties in county-only effects.

YOUNG DRIVERS IN LAS ANIMAS COUNTY

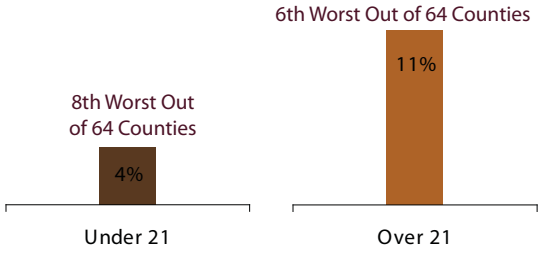
Odds of Crash Involvement: Drivers Under Age 21 Residing in Las Animas County



***Zip Code Data for Drivers Under the Age of 21 is Currently Unavailable**

IMPAIRED DRIVERS IN LAS ANIMAS COUNTY

Percentage of Drivers with 1+ DUIs on Record



Odds of Crash: Drivers with One DUI on Record

Odds of Crash: Drivers with a Max. BAC of .10 to .20

*2007-2008 Crash Model, 2009 Seat Belt Surveys, 2008 FARS Data, 2008 County QuickFacts

LOGAN COUNTY

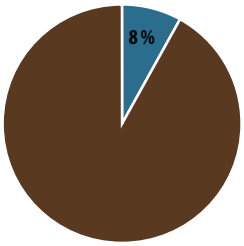
A Focus on High-Risk County Population Demographics

40th highest

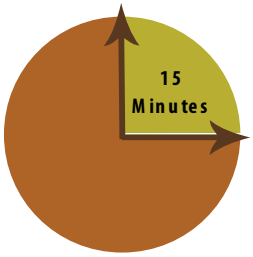
Rank in County-Only Effects on Crash Odds
Out of 64 Counties

$40,874
Median Household Income

Language Other than English Spoken at Home



Mean Travel Time to Work

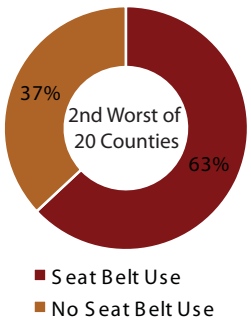


5
Fatal Crashes
Out of 473 Statewide

5
Fatalities
Out of 548 Statewide

OCCUPANT PROTECTION IN LOGAN COUNTY

Overall Seat Belt Use



Car Seat/Booster Seat Use

**Data is Currently Unavailable*

Juvenile Seat Belt Use

**Data is Currently Unavailable*

Teen Seat Belt Use

**Data is Currently Unavailable*

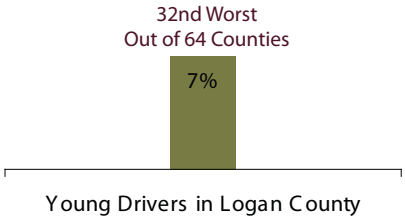
LOGAN COUNTY

A Focus on High-Risk County Crash Trend Behavior

With **5 fatal crashes** out of 473 statewide; and **5 fatalities** out of 548 statewide, Logan County has a **4.24% probability of crash involvement** and is **ranked 28th** out of 64 counties. Logan County also ranks 40th out of 64 counties in county-only effects.

YOUNG DRIVERS IN LOGAN COUNTY

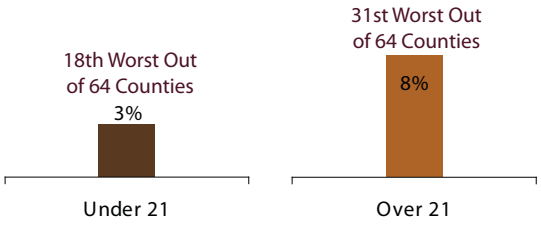
Odds of Crash Involvement: Drivers Under Age 21 Residing in Logan County



***80751 Ranks 152nd Most Dangerous Zip Code for Under 21 Drivers Out of the 225 Most Populous Zip Codes**

IMPAIRED DRIVERS IN LOGAN COUNTY

Percentage of Drivers with 1+ DUIs on Record



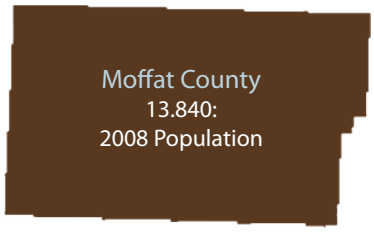
Odds of Crash: Drivers with One DUI on Record

Odds of Crash: Drivers with a Max. BAC of .10 to .20

*2007-2008 Crash Model, 2009 Seat Belt Surveys, 2008 FARS Data, 2008 County QuickFacts

MOFFAT COUNTY

A Focus on High-Risk County Population Demographics



2nd highest

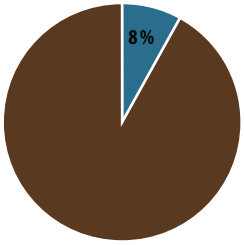
Rank in County-Only Effects on Crash Odds

Out of 64 Counties

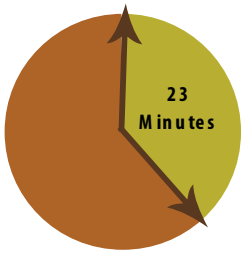
$54,323

Median Household Income

Language Other than English Spoken at Home



Mean Travel Time to Work



2

Fatal Crash

Out of 473 Statewide

3

Fatality

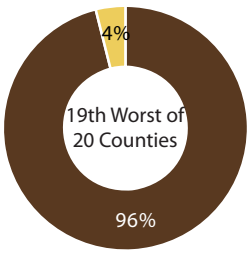
Out of 548 Statewide

OCCUPANT PROTECTION IN MOFFAT COUNTY

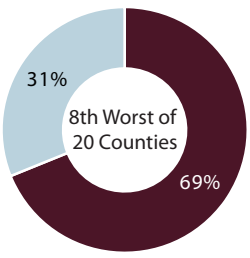
Overall Seat Belt Use

**Data is Currently Unavailable*

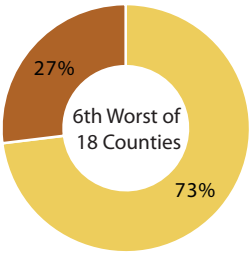
Car Seat/Booster Seat Use



Juvenile Seat Belt Use



Teen Seat Belt Use



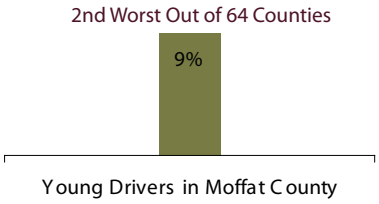
MOFFAT COUNTY

A Focus on High-Risk County Crash Trend Behavior

With **2 fatal crashes** out of 473 statewide; and **3 fatalities** out of 548 statewide, Moffat County has a **5.71% probability of crash involvement** and is ranked 6th out of 64 counties. Moffat County also ranks 2nd out of 64 counties in county-only effects.

YOUNG DRIVERS IN MOFFAT COUNTY

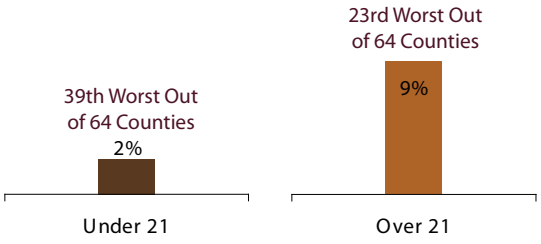
Odds of Crash Involvement: Drivers Under Age 21 Residing in Moffat County



***Zip Code 81625, Located in Craig, is the 15th Most Dangerous Zip Code for Under 21 Drivers Out of Colorado's 225 Most Populous Zip Codes**

IMPAIRED DRIVERS IN MOFFAT COUNTY

Percentage of Drivers with 1+ DUIs on Record



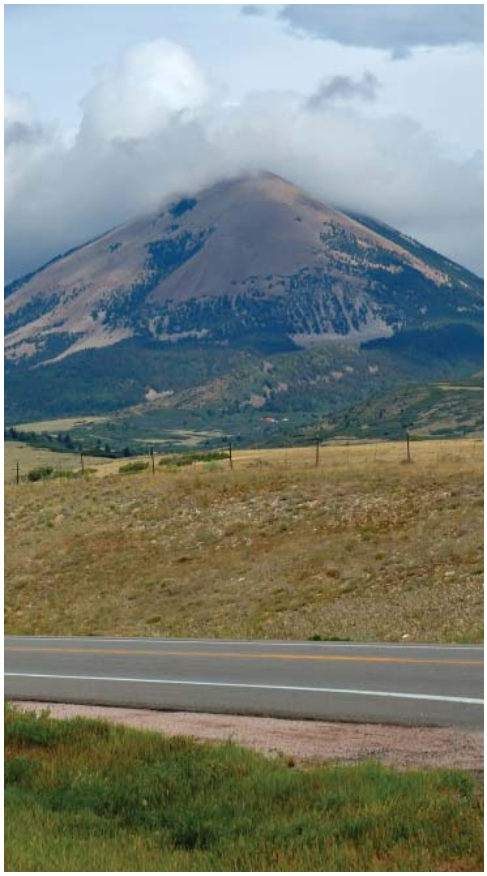
Odds of Crash: Drivers with One DUI on Record

Odds of Crash: Drivers with a Max. BAC of .10 to .20

*2007-2008 Crash Model, 2009 Seat Belt Surveys, 2008 FARS Data, 2008 County QuickFacts

MONTROSE COUNTY

A Focus on High-Risk County Population Demographics

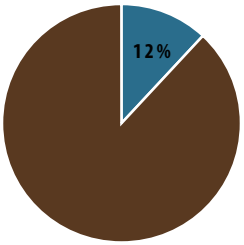


35th highest

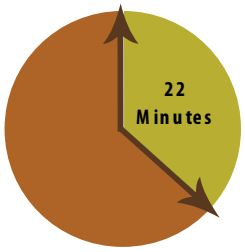
Rank in County-Only Effects on Crash Odds
Out of 64 Counties

$45,254
Median Household Income

Language Other than English Spoken at Home



Mean Travel Time to Work

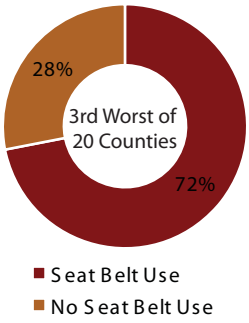


9
Fatal Crashes
Out of 473 Statewide

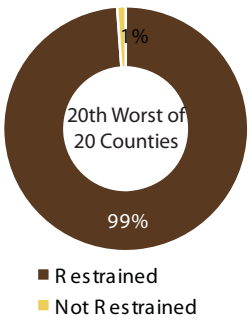
10
Fatalities
Out of 548 Statewide

OCCUPANT PROTECTION IN MONTROSE COUNTY

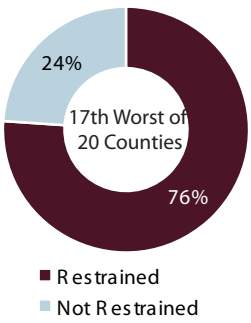
Overall Seat Belt Use



Car Seat/Booster Seat Use



Juvenile Seat Belt Use



Teen Seat Belt Use

**Data is Currently Unavailable*

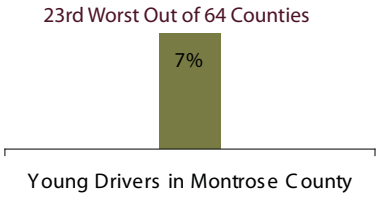
MONTROSE COUNTY

A Focus on High-Risk County Crash Trend Behavior

With **9 fatal crashes** out of 473 statewide; and **10 fatalities** out of 548 statewide, Montrose County has a **4.22% probability of crash involvement** and is **ranked 29th** out of 64 counties. Montrose County also ranks 35th out of 64 counties in county-only effects.

YOUNG DRIVERS IN MONTROSE COUNTY

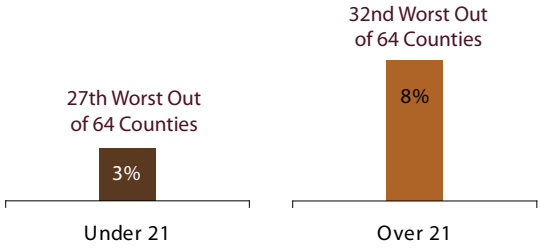
Odds of Crash Involvement: Drivers Under Age 21 Residing in Montrose County



***81401 Ranks 129th Most Dangerous for Under 21 Drivers Out of the 225 Most Populous Zip Codes**

IMPAIRED DRIVERS IN MONTROSE COUNTY

Percentage of Drivers with 1+ DUIs on Record



Odds of Crash: Drivers with One DUI on Record

Odds of Crash: Drivers with a Max. BAC of .10 to .20

*2007-2008 Crash Model, 2009 Seat Belt Surveys, 2008 FARS Data, 2008 County QuickFacts

PUEBLO COUNTY

A Focus on High-Risk County Population Demographics

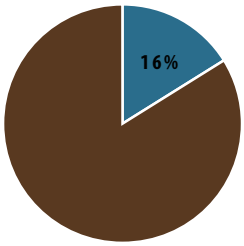
Pueblo County
156,737:
2008 Population

1st highest

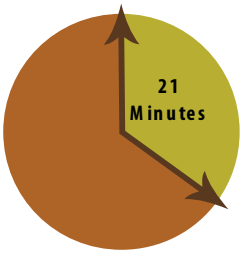
Rank in County-Only Effects on Crash Odds
Out of 64 Counties

$40,570
Median Household Income

Language Other than English Spoken at Home



Mean Travel Time to Work

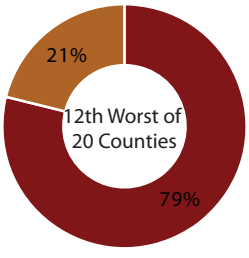


21
Fatal Crashes
Out of 473 Statewide

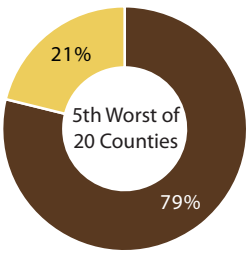
26
Fatalities
Out of 548 Statewide

OCCUPANT PROTECTION IN PUEBLO COUNTY

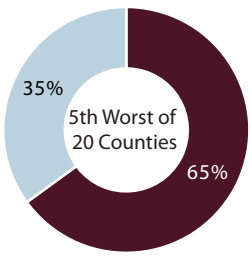
Overall Seat Belt Use



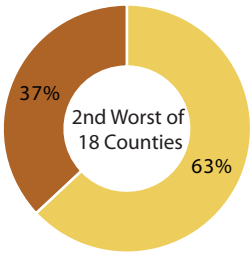
Car Seat/Booster Seat Use



Juvenile Seat Belt Use



Teen Seat Belt Use



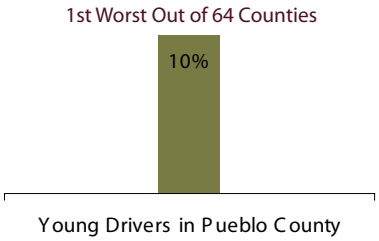
PUEBLO COUNTY

A Focus on High-Risk County Crash Trend Behavior

With **21 fatal crashes** out of 473 statewide; and **26 fatalities** out of 548 statewide, Pueblo County has a **6.42% probability of crash involvement** and is **ranked 1st** out of 64 counties. Pueblo County also ranks 1st highest out of 64 counties in county-only effects.

YOUNG DRIVERS IN PUEBLO COUNTY

Odds of Crash Involvement: Drivers Under Age 21 Residing in Pueblo County

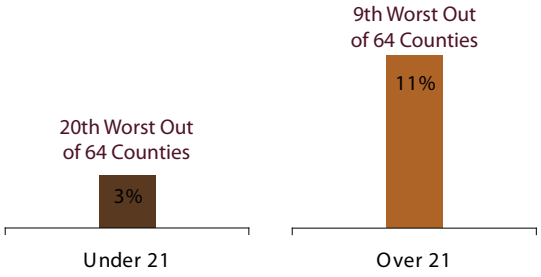


6 of the 20 Worst Zip Codes Where Young Drivers Had the Highest Odds of Crash Involvement

Zip Code	City
81001	Pueblo
81004	Pueblo
81005	Pueblo
81006	Pueblo
81007	Pueblo
81008	Pueblo

IMPAIRED DRIVERS IN PUEBLO COUNTY

Percentage of Drivers with 1+ DUIs on Record



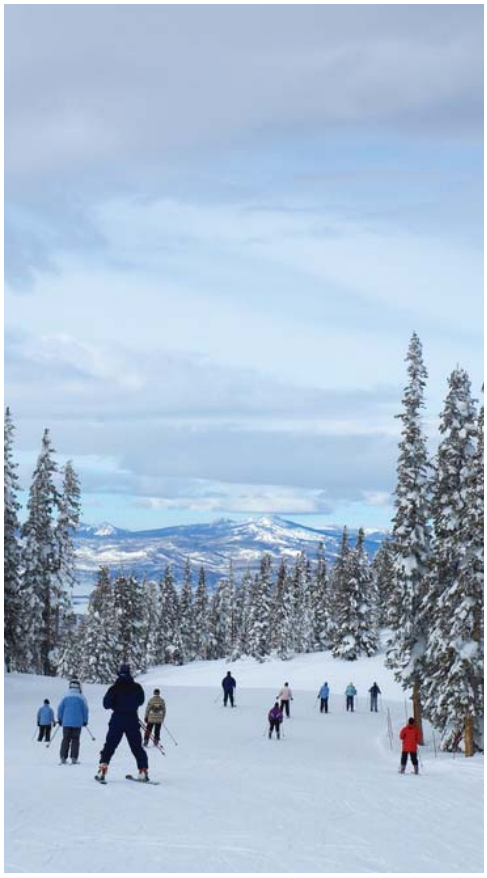
Odds of Crash: Drivers with One DUI on Record

Odds of Crash: Drivers with a Max. BAC of .10 to .20

* 2007-2008 Crash Model, 2009 Seat Belt Surveys, 2008 FARS Data, 2008 County QuickFacts

ROUTT COUNTY

A Focus on High-Risk County Population Demographics

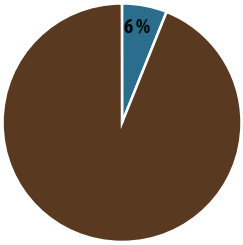


3rd highest

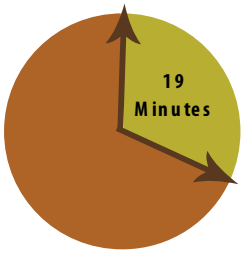
Rank in County-Only Effects on Crash Odds
Out of 64 Counties

$63,797
Median Household Income

Language Other than English Spoken at Home



Mean Travel Time to Work

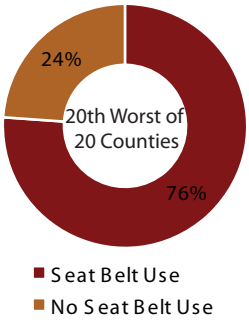


1
Fatal Crash
Out of 473 Statewide

1
Fatality
Out of 548 Statewide

OCCUPANT PROTECTION IN ROUTT COUNTY

Overall Seat Belt Use



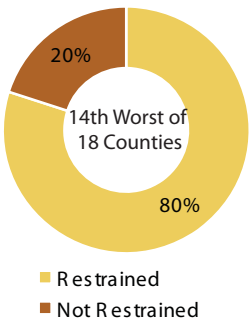
Car Seat/Booster Seat Use

**Data is Currently Unavailable*

Juvenile Seat Belt Use

**Data is Currently Unavailable*

Teen Seat Belt Use



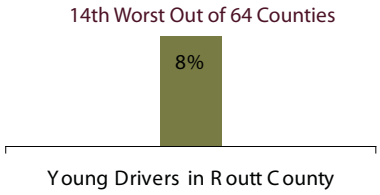
ROUTT COUNTY

A Focus on High-Risk County Crash Trend Behavior

With **1 fatal crash** out of 473 statewide; and **1 fatality** out of 548 statewide, Routt County has a **5.96% probability of crash involvement** and is **ranked 2nd** out of 64 counties. Routt County also ranks 3rd out of 64 counties in county-only effects.

YOUNG DRIVERS IN ROUTT COUNTY

Odds of Crash Involvement: Drivers Under Age 21 Residing in Routt County

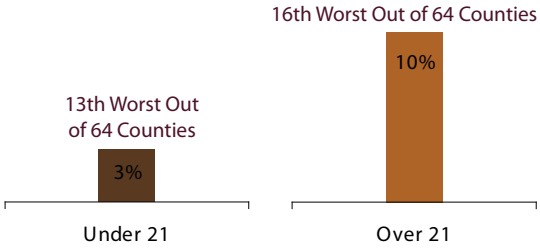


Zip Codes Where Young Drivers Had the Highest Odds of Crash Involvement

***Zip Code 80487 Ranks 132 Most Dangerous for Drivers Under 21 Out of 225 Most Populous Counties**

IMPAIRED DRIVERS IN ROUTT COUNTY

Percentage of Drivers with 1+ DUIs on Record



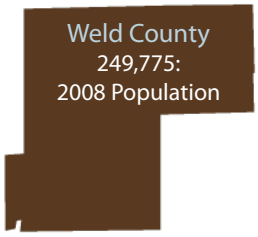
Odds of Crash: Drivers with One DUI on Record

Odds of Crash: Drivers with a Max. BAC of .10 to .20

*2007-2008 Crash Model, 2009 Seat Belt Surveys, 2008 FARS Data, 2008 County QuickFacts

WELD COUNTY

A Focus on High-Risk County Population Demographics

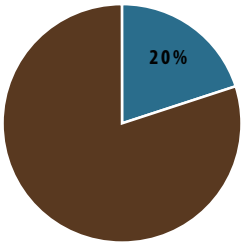


24th highest

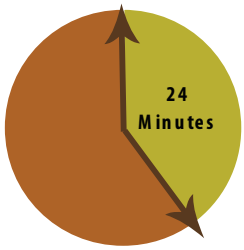
Rank in County-Only Effects on Crash Odds
Out of 64 Counties

$52,228
Median Household Income

Language Other than English Spoken at Home



Mean Travel Time to Work

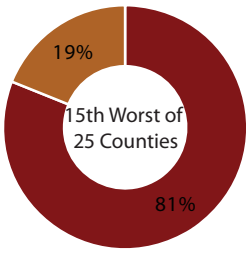


35
Fatal Crashes
Out of 473 Statewide

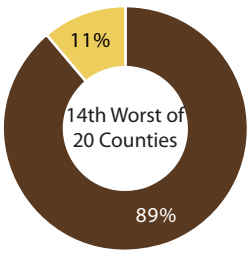
45
Fatalities
Out of 548 Statewide

OCCUPANT PROTECTION IN WELD COUNTY

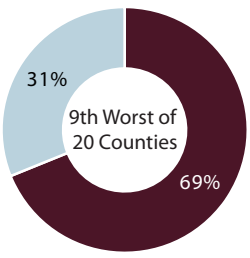
Overall Seat Belt Use



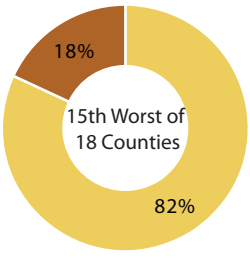
Car Seat/Booster Seat Use



Juvenile Seat Belt Use



Teen Seat Belt Use



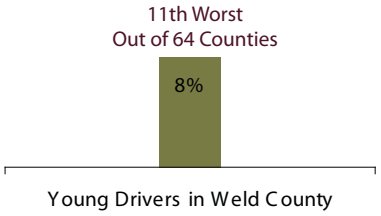
WELD COUNTY

A Focus on High-Risk County Crash Trend Behavior

With **35 fatal crashes** out of 473 statewide; and **45 fatalities** out of 548 statewide, Weld County has a **5.00% probability of crash involvement** and is **ranked 8th** out of 64 counties. Weld County also ranks 24th out of 64 counties in county-only effects.

YOUNG DRIVERS IN WELD COUNTY

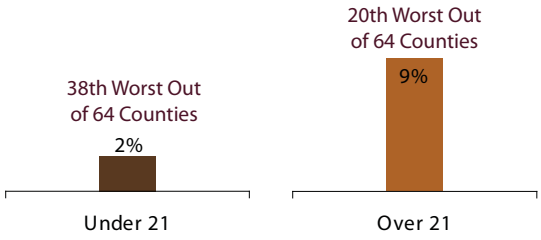
Odds of Crash Involvement: Drivers Under Age 21 Residing in Weld County



***Zip Code 80644 Ranks 19th Most Dangerous for Drivers Under 21 Out of 225 Most Populous Counties. Zip Code 80621 Ranks 24th.**

IMPAIRED DRIVERS IN WELD COUNTY

Percentage of Drivers with 1+ DUIs on Record



Odds of Crash: Drivers with One DUI on Record

Odds of Crash: Drivers with a Max. BAC of .10 to .20

*2007-2008 Crash Model, 2009 Seat Belt Surveys, 2008 FARS Data, 2008 County QuickFacts

SAFETY DOESN'T HAPPEN BY ACCIDENT

Colorado Department of Transportation
Office of Transportation Safety