

Colorado Department of Transportation
Office of Transportation Safety

FY 2003 Problem Identification

An Analysis of Highway Traffic Problems
in the State of Colorado

April 2002



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Office of Transportation Safety**

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FY 2003 Problem Identification Report

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Prepared for

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Executive Summary

Colorado Fatal Crashes

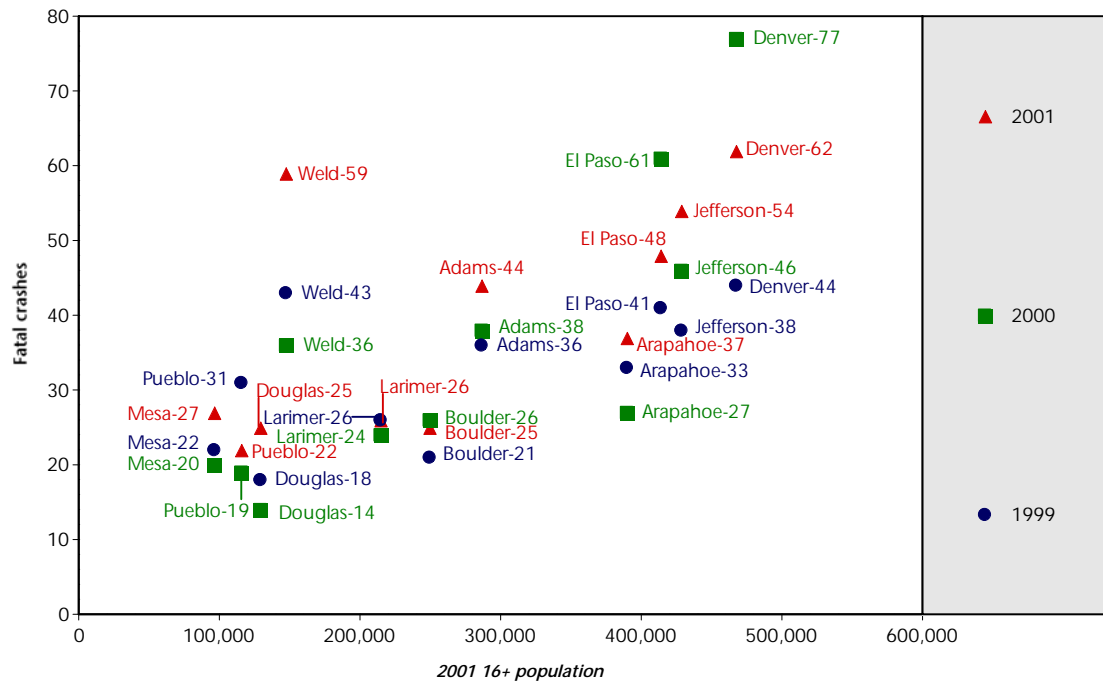
After six years of little growth in traffic deaths, fatalities in Colorado increased by 9 percent in 2000 and 10 percent in 2001. The number of fatal crashes grew by 10 percent in 2000 and 5 percent in 2001. Colorado's growth in fatal crashes is much higher than the national fatal crash increase of less than 1 percent per year. The increases in fatal crashes is also higher than what would be expected from estimated statewide growth in VMT, population or registered drivers (about 2 to 3 percent per year).

Crash locations. Most fatal crashes in Colorado occurred in one of the 11 most populous counties. Even so, fewer fatal crashes took place in these large counties than expected based on their population.

The statewide growth in fatal crashes in 2000 was primarily due to increases in Denver and El Paso County. While fatal crashes in these two counties declined in 2001, growth in fatal crashes in Weld County and rural parts of the state more than compensated for these favorable trends.

Exhibit ES-1 provides an indication of whether the number of fatal crashes occurring in a county is in line with its driving age population. Over the past three years, Weld County has had fatal crashes well above communities with similar populations. Similarly, Arapahoe and Boulder counties have fewer fatal crashes than one would expect given just their population size.

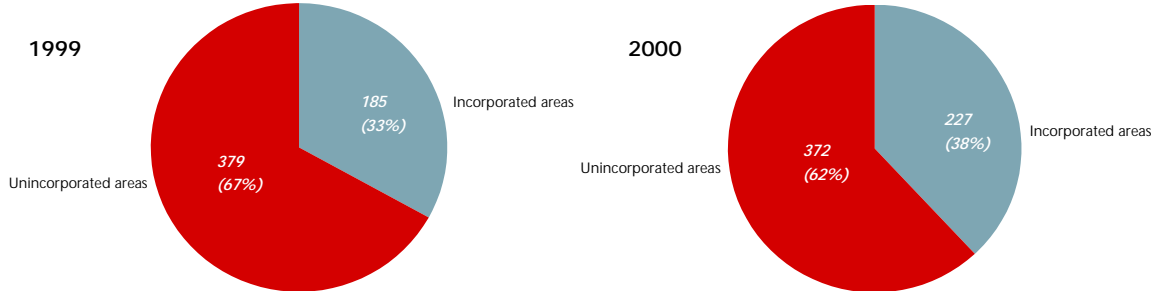
Exhibit ES-1.
Fatal Crashes in the 11 Largest Colorado Counties, 1999 - 2001



Source: BBC Research & Consulting from 1999 and 2000 CDOT crash data and 2001 FARS data from CDOT and Colorado Division of Local Government population data.

Sixty-two percent of the fatal crashes in Colorado in 2000 took place outside of incorporated cities and towns, down from 67 percent in 1999, as shown in Exhibit ES-2.

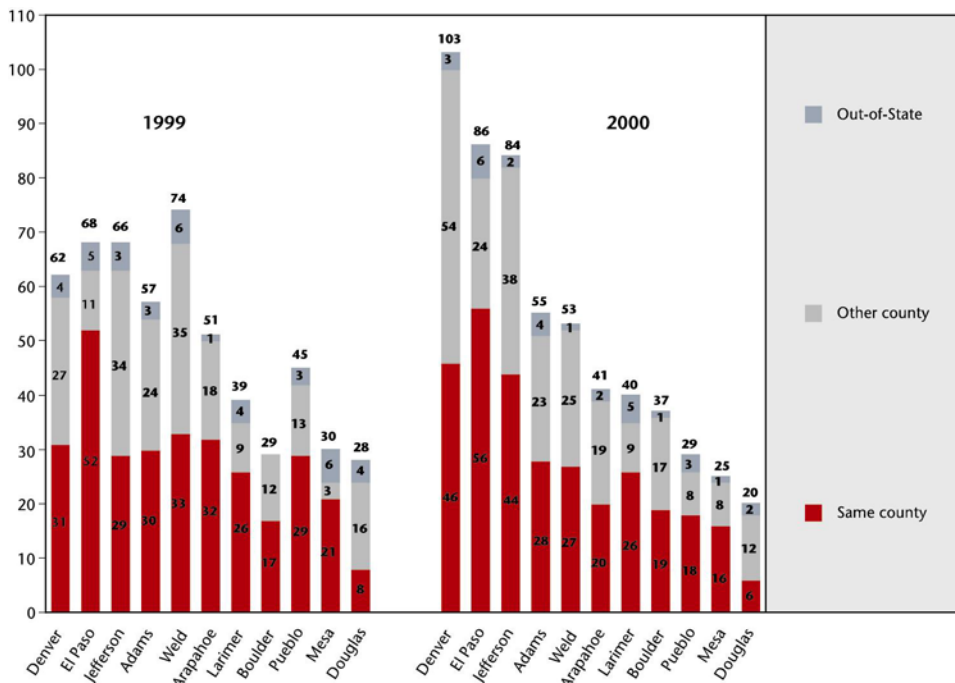
Exhibit ES-2.
Location of Fatal Crashes by Jurisdiction



Source: BBC Research & Consulting from 1999 and 2000 CDOT crash data and Colorado Division of Local Government population data.

Role of non-local drivers in fatal crashes. As shown in Exhibit ES-3, about half of the drivers involved in fatal crashes in large counties lived in the county of the crash. One half were drivers from outside the local county. One exception is El Paso County. El Paso County residents accounted for two-thirds or more of all drivers involved in El Paso County fatal crashes.

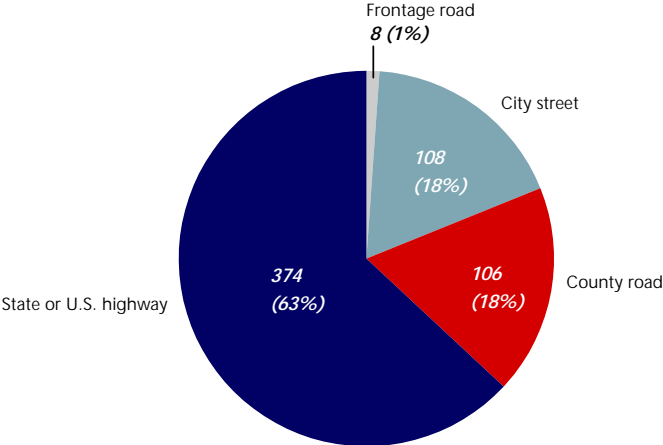
Exhibit ES-3.
Place of Residence of Drivers in Fatal Crashes Occurring in Large Counties



Source: BBC Research & Consulting from 1999 and 2000 CDOT crash data and Colorado Division of Local Government population data.

Type of road. Almost two-thirds of fatal crashes in Colorado in 2000 occurred on state or U.S. highways (see Exhibit ES-4). Crashes on county roads outside municipalities accounted for 18 percent of fatal crashes in 2000. The maps at the end of Section III plot the location of 2000 fatal crashes occurring on state and U.S. highways.

Exhibit ES-4.
Type of Road for Fatal Crashes in Colorado, 2000

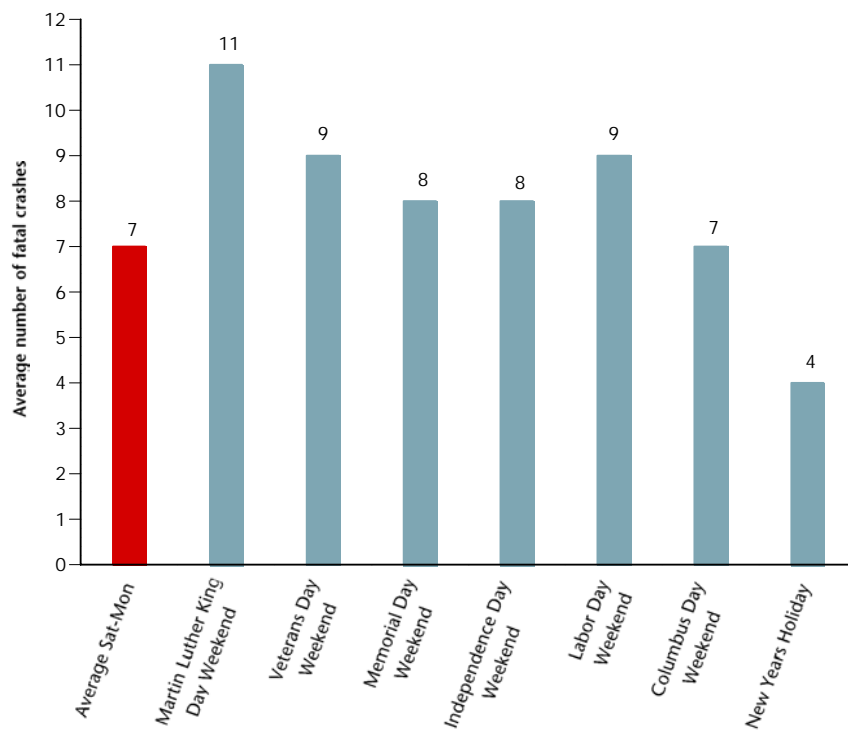


Note: Data for 1999 were not available.
Source: BBC Research & Consulting from 2000 CDOT crash data.

Time of year. There is relatively little seasonal or monthly variation in fatal crashes in Colorado, similar to the national pattern. However, day of week has a pronounced influence on the number of crashes. The fewest number of crashes during 1999 and 2000 took place on Wednesdays. In 1999 and 2000, more fatal crashes took place on Saturday (including the first three hours of Sunday morning) than any other day of the week. Fridays had the most fatal crashes that did not involve a driver suspected of impairment.

Holidays. Perhaps because of greater enforcement and media attention concerning traffic crashes, Memorial Day, Labor Day and Fourth of July weekends in 1999 and 2000 did not see much of an increase in fatal crashes over a typical Saturday through Monday period. As shown in Exhibit ES-5, Colorado averaged seven fatal crashes from Saturday through Monday for 1999 and 2000. The peak three-day weekend for fatal crashes for 1999-2000 was the Martin Luther King Day weekend (averaging 11 fatal crashes). For 1999 and 2000, about 27 percent of drivers involved in fatal crashes on holidays or holiday weekends were suspected to be alcohol-impaired, no different from the average Saturday through Monday time period.

Exhibit ES-5.
Average Fatal Crashes for 3-Day Holiday Weekends, 1999 – 2000

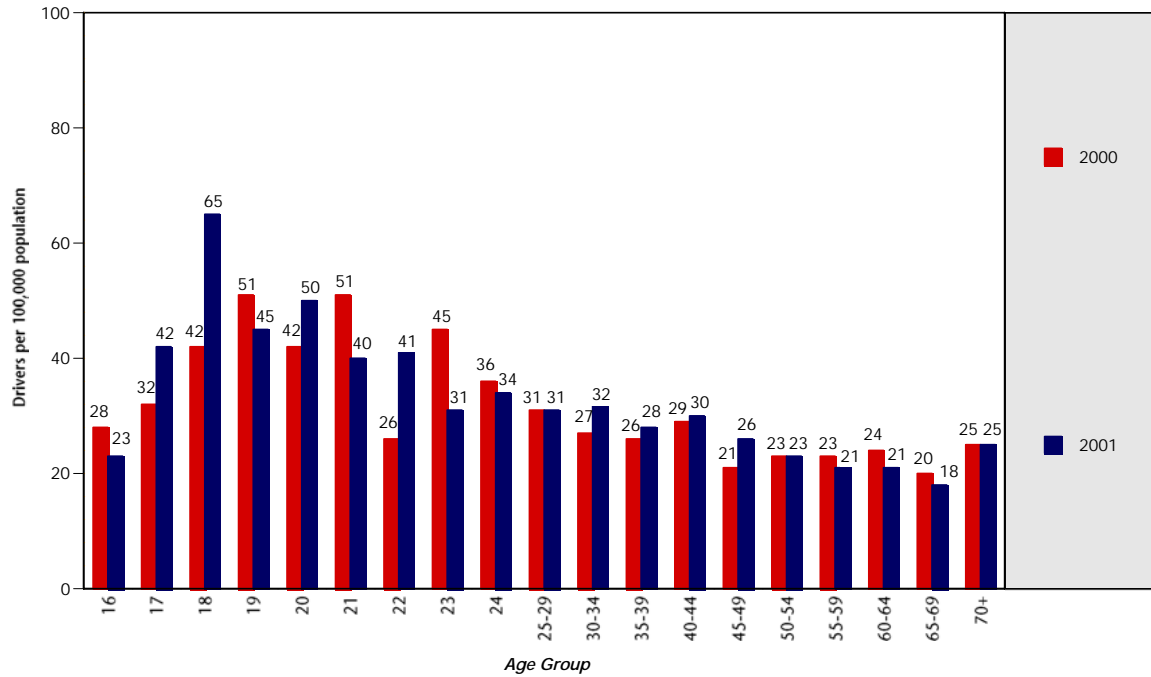


Note: The New Years Holiday includes only New Years Eve and New Years Day.
 Source: BBC Research & Consulting from 1999 and 2000 CDOT crash data.

Fatal crash involvement by age. From 2000 to 2001, the largest increase in the number of drivers involved in fatal crashes per 100,000 population occurred among 18-year-old drivers (Exhibit ES-6).

Exhibit ES-6.

Drivers Involved in Fatal Crashes per 100,000 Population, 2000 and 2001



Source: BBC Research & Consulting using 2000 and 2001 FARS data from CDOT and 2000 population data from the Colorado Division of Local Government.

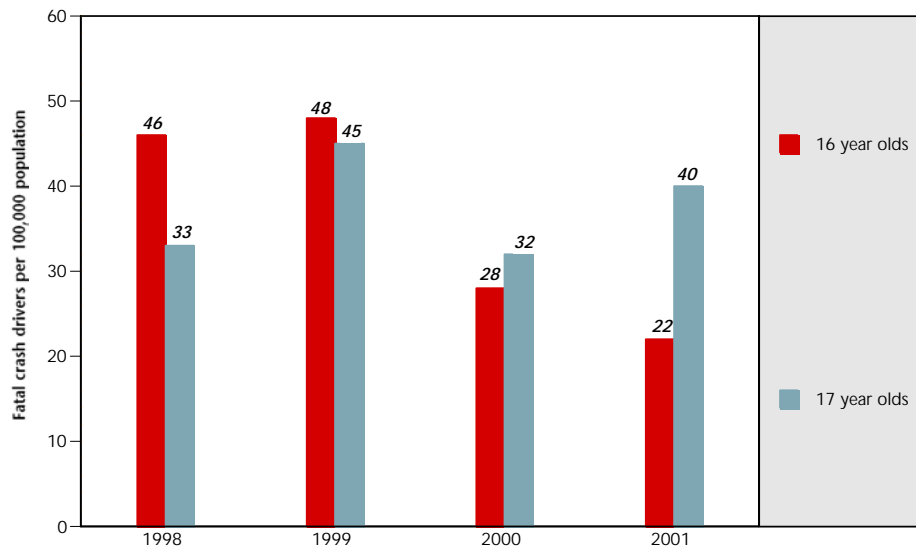
Young Drivers

Historically, young drivers are over-represented in traffic crashes.

Fatal crash involvement. The fatal crash rate of the youngest drivers is shown in Exhibit ES-7. Data from 2000 and 2001 begin to demonstrate results of the impact of the new Graduated Driver Licensing (GDL) law, as the law was in effect for only a portion of 1999. As shown in the exhibit, 48 out of every 100,000 16-year-olds were involved in a fatal crash in 1999. This rate fell to 28 per 100,000 16-year-olds in 2000 and 22 per 100,000 in 2001, a preliminary indication of GDL's impact. In order to evaluate GDL's long-term impact, this rate should be monitored annually.

Exhibit ES-7.

Young Driver Fatal Crash Rate, 1998 - 2001

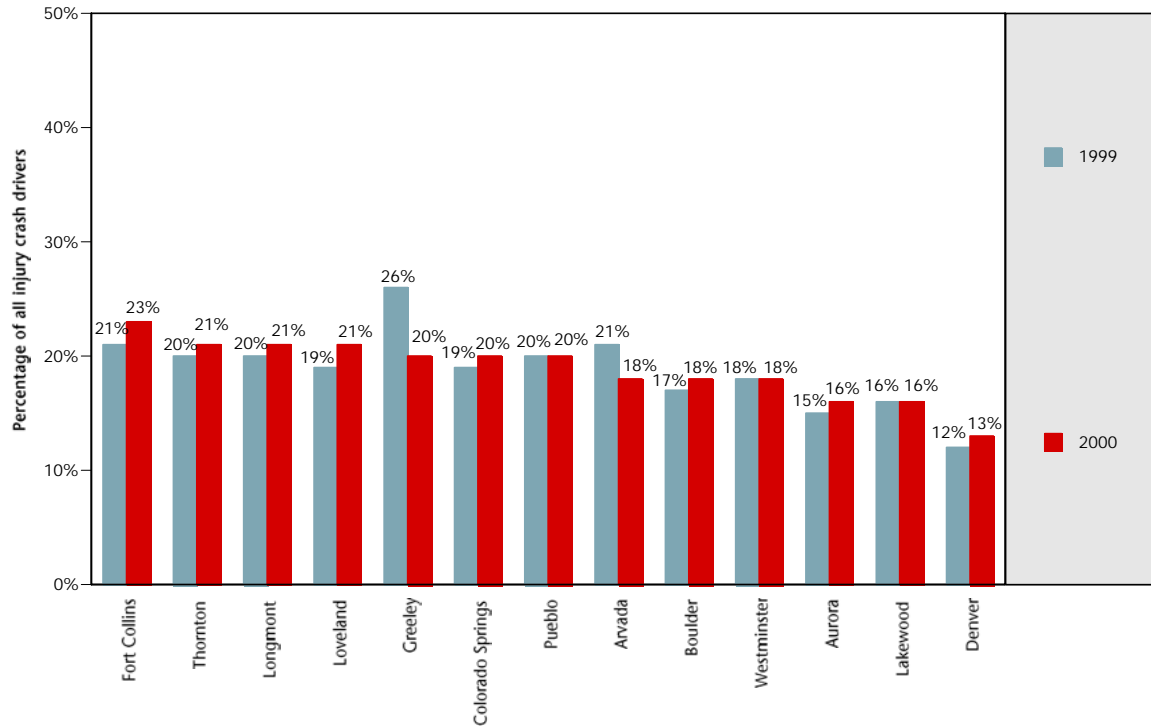


Note: The Graduated Driver Licensing Law (GDL) was enacted in July 1999 in Colorado.

Source: BBC Research & Consulting from 1998-2001 FARS data and population data from the Colorado Division of Local Government.

Young drivers' role in injury crashes—cities. On average, about 20 percent of the injury crash drivers from large cities are between the ages of 16 and 20. Few large cities saw a decrease in the percentage of young driver involvement in injury crashes from 1999 to 2000. One notable exception was Greeley.

Exhibit ES-8.
Young Drivers as a Percentage of All Injury Crash Drivers from Large Cities, 1999 and 2000



Note: Young drivers are between the ages of 16 and 20.

Source: BBC Research & Consulting from 1999 and 2000 CDOT crash data and population data from the Colorado Division of Local Government.

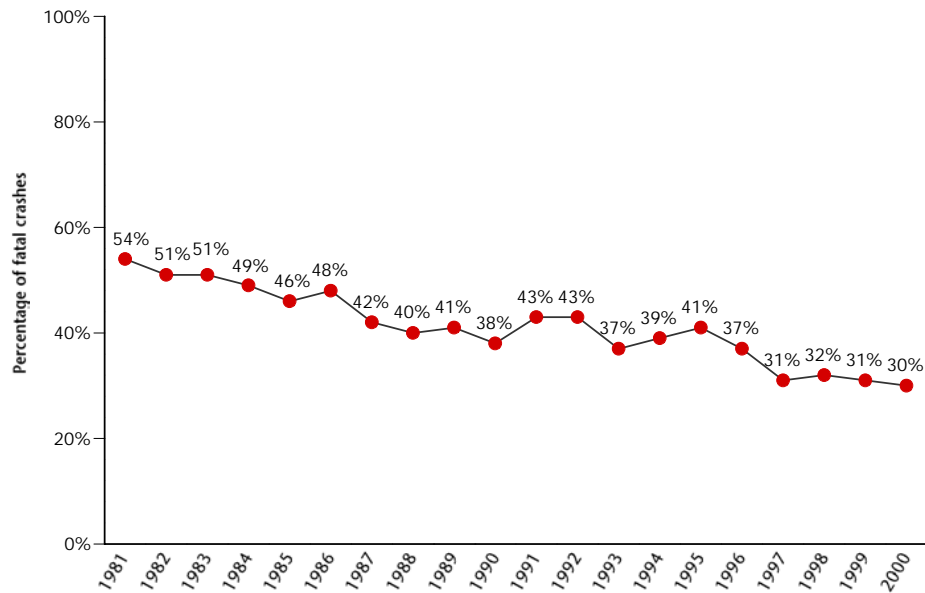
Impaired Drivers

In 2000 there were 3,277 injury crash drivers suspected of alcohol or drug use in Colorado, up slightly from 3,204 impaired drivers in 1999. Statewide, approximately 6 percent of all drivers involved in injury crashes were impaired drivers.

Role of alcohol in fatal crashes. In 1981, more than half of all fatal crashes in Colorado were alcohol-related (Exhibit ES-9). Since then, the role of alcohol in fatal crashes has dropped substantially. In 2000, 30 percent of Colorado fatal crashes involved alcohol, compared to 40 percent nationally.

Exhibit ES-9.

Alcohol-Related Fatal Crashes as a Percentage of All Fatal Crashes in Colorado, 1981–2000



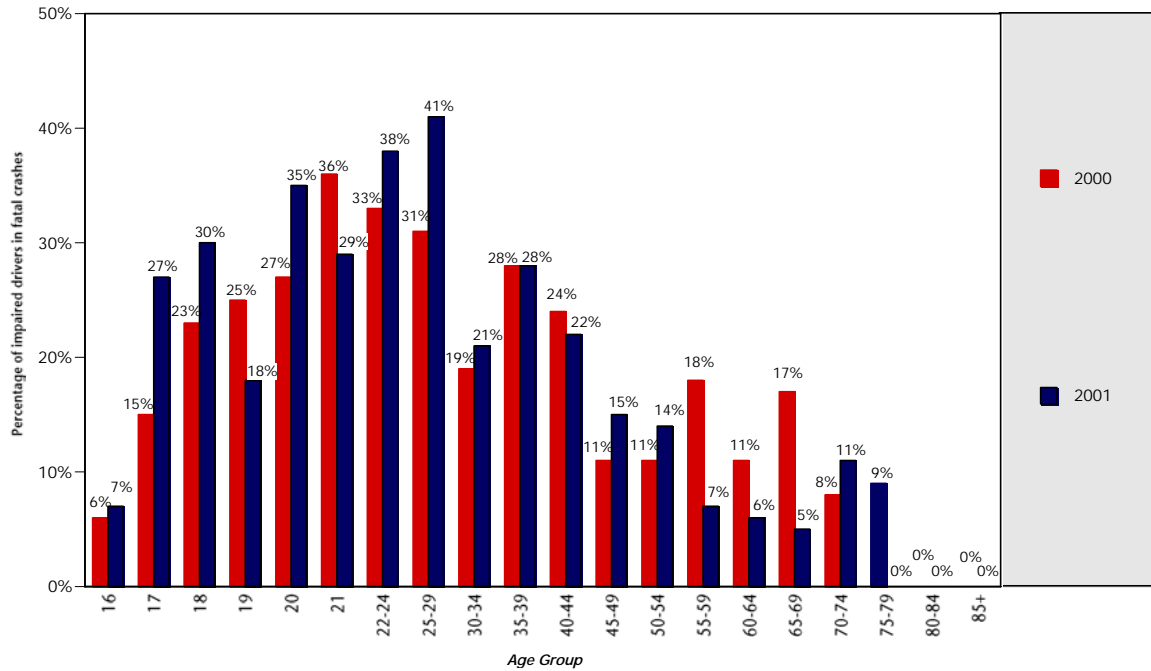
Note: Alcohol-related fatal crashes are those where at least one driver was found to have a BAC of 0.05 or greater.

Source: BBC Research & Consulting using FARS data from CDOT.

Driver age and alcohol-related fatal crashes. In 2001, 41 percent of all drivers between the ages of 25 and 29 who were involved in a fatal crash were impaired (Exhibit ES-10). Impaired drivers were also a high share of 20- to-24 year-old drivers involved in fatal crashes. About 30 percent of 17- to 25-year-old drivers and 35- to 44-year-old drivers in fatal crashes were impaired.

Exhibit ES-10.

Colorado Drinking Drivers Involved in Fatal Crashes by Age, 2000 and 2001



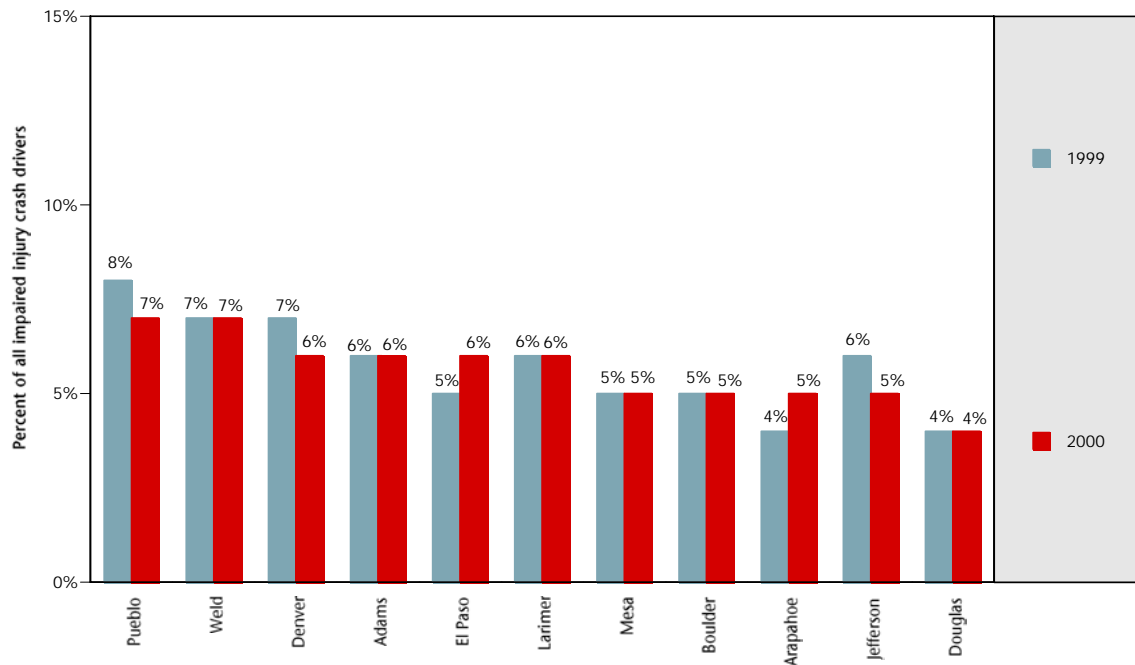
Note: Drinking drivers are those with BACs of 0.01 or greater as reported in the 2000 FARS database.

Source: BBC Research & Consulting using FARS data from CDOT.

Impaired drivers—counties. Impaired drivers who live in rural parts of the state make up just 15 percent of all impaired crash drivers. Exhibit ES-11 shows the percentage of all injury crash drivers in 1999 and 2000 from large counties who were impaired. Relatively more Pueblo and Weld County drivers involved in injury crashes were impaired than in other large counties.

Exhibit ES-11.

Resident Drivers Suspected of Impaired Driving as a Percentage of All Injury Crash Drivers, Large Counties, 1999 and 2000

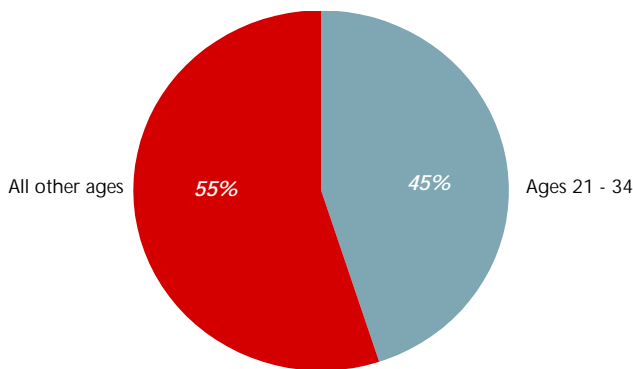


Source: BBC Research & Consulting from 1999 and 2000 CDOT crash data.

The role of 21-34 year-olds in impaired crashes. For the period 1998 through 1999 and again in 2000, nearly half of all impaired drivers involved in an injury crash were between 21 and 34 years old (Exhibit ES-12). Male drivers were over 80 percent of impaired drivers ages 21 to 34 in 2000.

Exhibit ES-12.

Drinking Drivers Involved in Injury Crashes by Age, 2000

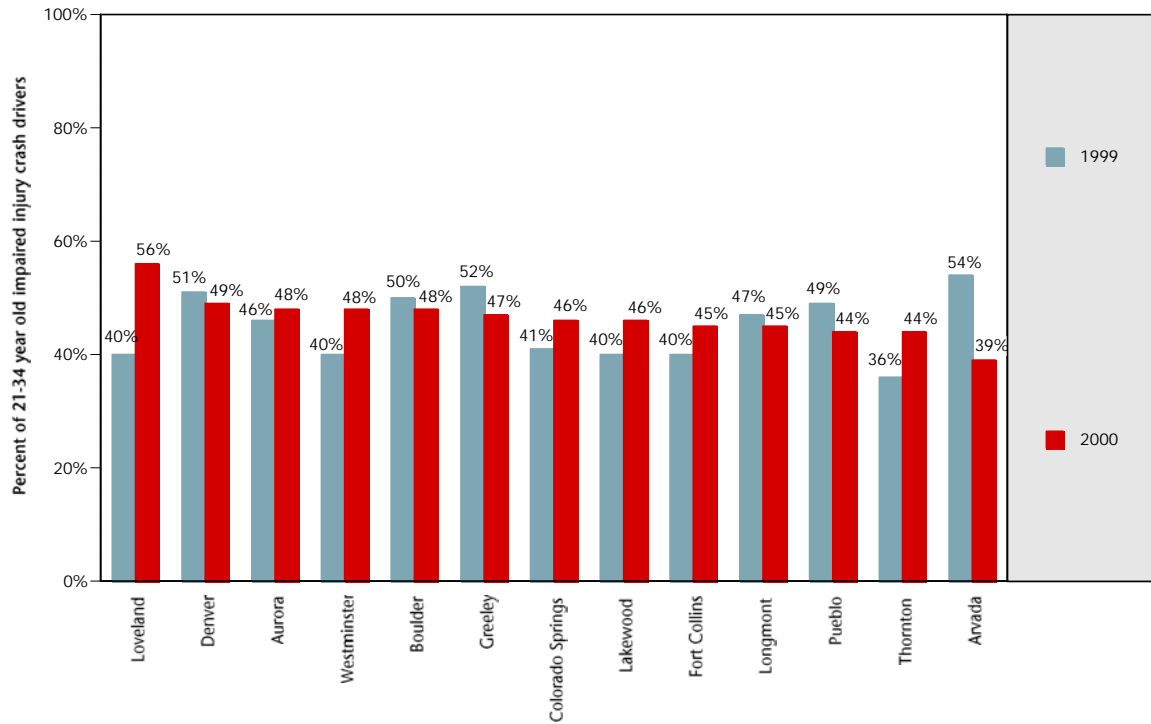


Note: Among all drivers involved in serious crashes who were suspected of impaired driving, 45 percent were between the ages of 21 and 34.
 Source: BBC Research & Consulting using 2000 crash data from CDOT.

Percentage of 21 to 34-year old impaired drivers in injury crashes—cities. Across large cities in Colorado, about 40 to 50 percent of drivers age 21 to 34 who were involved in injury crashes were suspected of impairment (Exhibit ES-13).

Exhibit ES-13.

Resident 21-34 Year Olds Suspected of Impaired Driving, Large Cities, 1999 and 2000

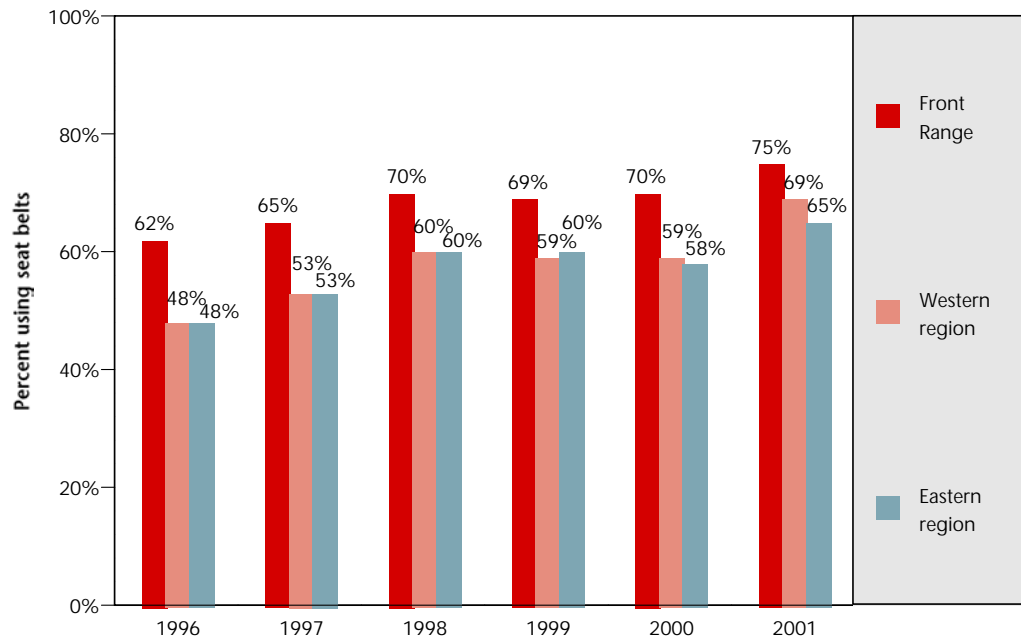


Source: BBC Research & Consulting from 1999 and 2000 CDOT crash data.

Occupant Protection

Seat belt use among drivers and front seat passengers steadily increased in Colorado for much of the 1990s and reached a new high of 72 percent in 2001. This overall increase in seat belt use has been achieved by steady increases in urban Front Range communities and the more rural western and eastern parts of the state. Roughly three-fourths of all drivers and front seat passengers along the Front Range who were observed were wearing seat belts in 2001. Rural seat belt use lags this rate by 6 to 10 percentage points.

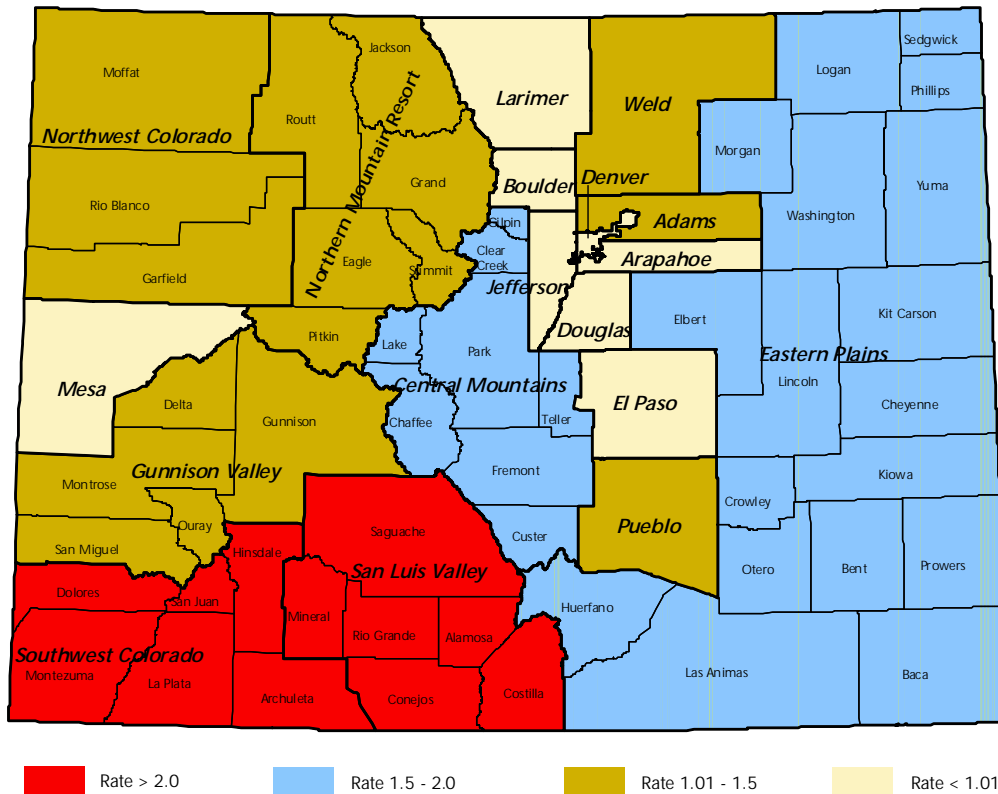
Exhibit ES-14.
Colorado Regional Seat Belt Use, 1997 – 2001



Source: Annual Seat Belt Surveys conducted by the CSU Institute of Transportation Management on behalf of CDOT.

Drivers in incapacitating injury crashes not wearing seat belts—counties and regions. Crash data also suggest that non-seat belt use is a relatively greater problem in rural Colorado. In 2000, drivers from rural regions were over 50 percent more likely than drivers statewide to be in an incapacitating injury crash and not be wearing a seat belt. In contrast to rural areas, seat belt use among drivers from large counties was better than the state average in 2000. Among urban counties, Pueblo, Weld and Adams counties exceeded the statewide average of non-seat belt use in these crashes (Exhibit ES-15).

Exhibit ES-15.
Unbelted Driver Incapacitating Injury Crash Rates, Counties and Regions, 2000



Note: Incapacitating injury crashes are those with evident, incapacitating or fatal injuries. The state average is 1.0. These rates are adjusted for the driving-age population in each county and region.

Source: BBC Research & Consulting using 2000 crash data from CDOT and 2000 population data from the Colorado Division of Local Government.

Motorcycles, Bicycles and Pedestrians

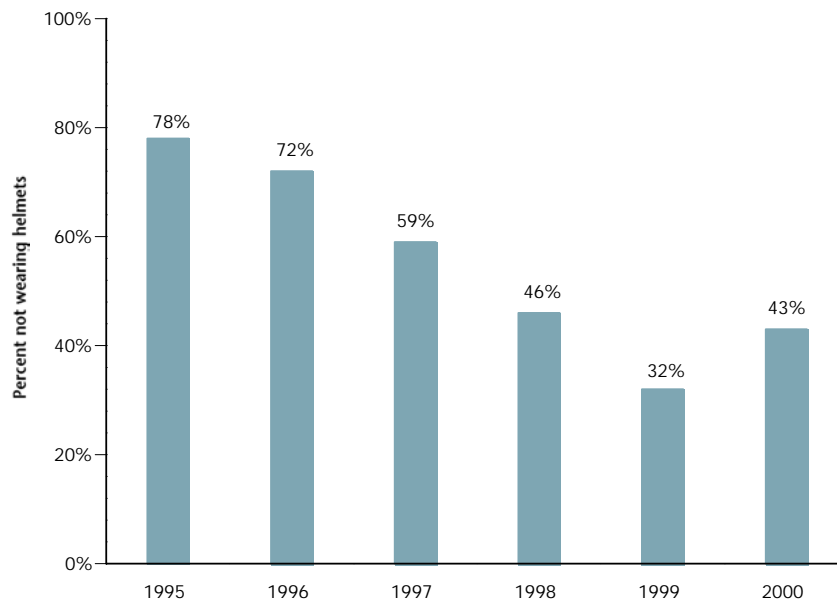
Although motorcyclists, bicyclists and pedestrians are involved in a small proportion of traffic crashes, it is important to monitor their crash involvement.

Motorcycles. Close to 1.5 percent of all registered motorcycles in Colorado were involved in an injury crash in 2000 (little change between 1999 and 2000). Among large counties, Pueblo and Denver motorcyclists had the highest incidence of injury crashes. Motorcyclists living in rural portions of the state were less likely to be in an injury crash than the state average.

Data on helmet use are available from the Colorado State Patrol for motorcyclists killed in traffic crashes. In 2000, 43 percent of all motorcyclists killed in Colorado were not wearing helmets (see Exhibit ES-16). While a larger share of motorcyclists killed in 2000 were not wearing helmets, compared with 1999, it is still a large improvement from the mid-1990s.

Exhibit ES-16.

Percent of Motorcycle Fatalities Not Wearing Helmets, 1995 – 2000



Source: Data obtained from Colorado State Patrol website, February 2002.

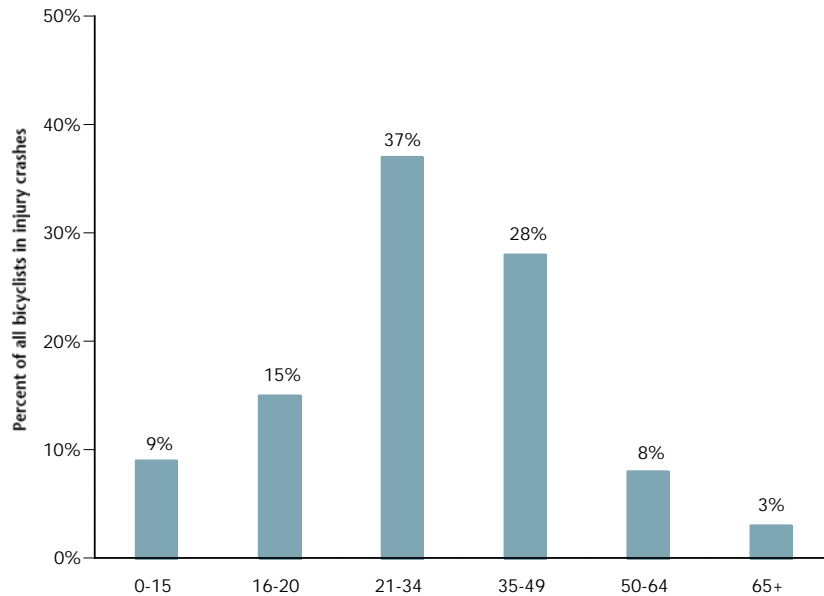
Bicyclists. In 2000, six counties had at least 100 reported crashes involving bicyclists—Denver, Boulder, Arapahoe, Larimer, El Paso and Jefferson. Together, these counties accounted 75 percent of all bicycle crashes. Between 1999 and 2000, reported crashes decreased by close to 15 percent for Boulder, Larimer and Jefferson counties.

Among large cities, the percentage of total crashes in Boulder, Loveland, Fort Collins and Greeley involving bicycles exceeded the statewide average. Nearly 5 percent of all crashes in Boulder involved a bicycle.

Approximately 240 Coloradoans were injured in bicycle crashes in 2000, based upon crash reports. As shown in Exhibit ES-17, nearly two-in-five of these bicyclists were between 21 and 34 years old.

The incidence of injury crashes among 21- to 34-year old and 35- to 49-year old bicyclists may be a reflection of Colorado residents' outdoor lifestyle. In a 1999 bicycling and walking survey of Coloradoans conducted by the Center for Research on Economic and Social Policy (CRESP) of the University of Colorado at Denver, nearly three-fourths of all respondents reported that they sometimes bicycle for exercise or recreation. Additionally, findings from the survey show that Coloradoans are five times more likely than the national average to ride a bicycle to work.

Exhibit ES-17.
Colorado Resident Bicyclists as a Percent of All Bicyclists in Injury Crashes, by Age, 2000



Source: BBC Research & Consulting from 2000 CDOT crash data.

Pedestrian crashes. There were 1,348 crashes in 2000 that involved pedestrians, or 1 percent of all crashes statewide. Nearly one-in-four of these crashes took place in Denver. Arapahoe and El Paso counties each had close to 140 traffic crashes that involved a pedestrian.

Key Findings

The key findings presented in this section relate to fatal crashes and the areas of key concern to CDOT.

Fatal crashes. The number of fatal crashes in Colorado increased in both 2000 and 2001. Most occurred in the state's most populous counties.

Denver and El Paso counties. The number of fatal crashes in Denver and El Paso counties should be closely monitored. From 1999 to 2000, both counties experienced very large increases in the number of fatal crashes followed by reductions in 2001.

Weld County. Fatal crashes are disproportionately high in Weld County. In 2001, 59 fatal crashes occurred in Weld County—an increase of 23 fatal crashes from 2000. In both 1999 and 2000, more than half of the drivers involved in Weld County fatal crashes lived elsewhere. This suggests that in addition to educational programs in the county, efforts to improve safety through visible enforcement of traffic laws should be increased.

Holidays. The number of fatal crashes in 2000 occurring during holiday weekends was similar to the number of fatal crashes that occur on the average non-holiday weekend. The Martin Luther King Day weekend was a notable exception. Highly visible enforcement on holiday weekends, particularly for DUI, may be successful in moderating driver behavior on these targeted dates. This may also suggest that other weekends be randomly selected for highly visible enforcement so that residents do not know “when the heat may be on” during non-holiday periods. Perhaps a statewide non-holiday impaired driving enforcement and public information program should be implemented.

Driver age. The youngest drivers continue to be at the highest risk of crash involvement. Despite this, since full implementation of Colorado's Graduated Licensing Law (year 2000), the fatal crash rate of 16-year-old drivers per 100,000 16-year-old population fell significantly. As 2000 was the first year of full implementation of the law, the long-term impact can only be gauged with time. Continued monitoring of the implementation of the Graduated Licensing Law across the state may provide additional insight into the success and challenges of this law.

Drivers over age 65 continue to be less likely than other drivers to be involved in an injury crash. The injury crash rates of older drivers should continue to be monitored.

Impaired drivers. Although the role of alcohol in fatal crashes in Colorado continues to decrease, it is still a factor in three out of every ten fatal crashes statewide. Men between the ages of 21 and 34 continue to be over-represented as impaired drivers in injury crashes. Comprehensive efforts to reduce the incidence of impaired driving among this age group should be expanded into new communities. Highly preliminary results from a Pueblo program focusing on this population segment indicate that awareness programs can be effective. El Paso County and Denver may be good candidates for similar projects.

Occupant protection. Occupant protection use in Colorado rose from 2000 to 2001, with the highest rates of use in the Front Range. Other areas of the state continue to be less likely to consistently use seat belts. There is a need for more culturally-relevant and culturally competent programs and messages to increase seat belt use. The programs should focus on urban African American and Latino communities as well as the Eastern Plains.

Report Organization

Following the Introduction in Section I, statewide trends in Colorado crashes are presented in Section II. Colorado's fatal crashes are explored in great detail in Section III, followed by the impact of age (Section IV) and the role of driver impairment (Section V) in injury crashes. Occupant protection use is detailed in Section VI. Analyses of crashes involving motorcycles, bicycles and pedestrians comprise Section VII. A summary of key findings and recommendations is presented in Section VIII.

SECTION I.

Introduction

The Colorado Department of Transportation (CDOT) retained BBC Research & Consulting (BBC) to prepare the 2003 Problem Identification report.

Purpose

Each year CDOT examines crash records to identify areas with traffic safety problems. CDOT uses the resulting document—the Problem Identification—to design projects enhancing traffic safety in Colorado. CDOT provides the report to others interested in traffic safety upon request.

Analyses

Since the late 1970s, Colorado has been successful in holding down annual growth in the number of traffic fatalities in the face of dramatic increases in population and vehicle miles traveled. Despite this long-term trend, fatalities markedly increased in 2000 and 2001. Because of these increases, much of the 2003 Problem Identification report focuses on recent increases in traffic fatalities.

To explore why Colorado has seen this jump in fatalities, this report examines where, when and why fatal crashes occur, and who is crashing. Results highlight long-term CDOT concerns including drinking and driving, seat belt use and crashes by young drivers. In addition to the analysis of fatalities and fatal crashes, the nature of injury crashes and the drivers involved in them is considered in chapters organized around key CDOT concerns: age, impaired driving, occupant protection, and motorcyclists, bicyclists and pedestrians. Analyses include statewide trends and detailed inspections of crashes in the largest cities and counties as well as regions of the state. Because some counties have only a few injury and fatal crashes in a given year, BBC created regions to minimize reliance on small data sets. The appendices include data for all cities and counties.

The Crash Data

Most of the analyses included in this report are based upon crash records compiled by law enforcement officials at crash locations. Accident records contain fields for information such as location of the crash, time of day, vehicle and road type, driver impairment and use of occupant protection devices. Linked driver's license records report age, gender and place of residence of the driver.

There are important limitations to these data. For example, the address shown on a driver's license may be somewhat dated. Information on use of occupant protection for all but the most serious crashes may be unrecorded. There is some indication that certain jurisdictions under-report minor crashes (e.g., property damage-only crashes).

The analyses of crash records contained in this report are designed to minimize these limitations. In particular, nearly all of the statistical analyses are based upon crashes where injuries are suspected or are evident, which yield more consistently reported information than property damage-only crashes.

Information in the CDOT crash database is supplemented by national data from NHTSA and other studies of observed seat belt use, bicycle safety surveys and other topics. Where population counts are needed, data come from the Colorado Division of Local Government and the U.S. Census Bureau. Since the release of the 2000 Census, population estimates for 1999 have been revised. These revisions are reflected in the 1999 figures throughout this report.¹

Report Organization

Section II presents statewide trends in Colorado crashes. The nature of Colorado's fatal crashes is explored in great detail in Section III, followed by an examination of the impact of age in injury crashes (Section IV) and the role of driver impairment (Section V). Occupant protection use is detailed in Section VI. Analyses of crashes involving motorcycles, bicycles and pedestrians comprise Section VII. A summary of key findings and recommendations is presented in Section VIII.

Acknowledgements

Compiling the data included in this report involves the work of many people from several organizations. We would like to acknowledge the contributions of David Ellison of CDOT, Bonny Hathaway of CDOT, Joan Vecchi of the Department of Revenue, Rebecca Picasso of the Colorado Department of Local Affairs, Tim Foote of the Department of Revenue, and Linda Allen of the Colorado State Patrol.

¹ The 1999 crash analyses that incorporate population counts were adjusted in this year's report to include growth estimates based on 2000 census data. As a result, the several community rankings are different from the 2002 Problem Identification report.

SECTION II.

Colorado Crash Trends

Reducing the number of fatalities in traffic crashes, and the associated social and economic losses from these crashes, is at the core of the Colorado Department of Transportation's traffic safety program. Over the past 20 years, Colorado has undertaken a number of initiatives to reduce fatalities and injuries. These include:

- Child safety seat and seat belt laws (1985 and 1987);
- Efforts focusing on drinking and driving (e.g., creation of the Law Enforcement Assistance Fund in 1982); and
- The Graduated Licensing Law for new drivers (1999).

Coupled with safer vehicles and road improvements, these initiatives have contributed to reducing Colorado annual fatalities since 1977, when increasing vehicle miles traveled would predict a doubling of annual traffic deaths. Year-to-year progress is not always steady, as found with the increase in fatalities during the early 1980s and 1990s. Statistics for 2000 and 2001 again show this pattern of increasing fatalities.

Trends

Fatalities increased in Colorado in 2000 and 2001 because the number of fatal crashes increased for each of these years. Between 1999 and 2000, fatalities increased 8.8 percent and fatal crashes increased 9.9 percent. Fatalities increased by 8.2 percent and fatal crashes increased by 4.9 percent between 2000 and 2001. The growth in fatal crashes is significantly higher than the national fatal crash increase of under 1 percent. The 1999 to 2000 increase in fatal crashes is higher than what would be expected from estimated growth in VMT, population or registered drivers (about 2 to 3 percent).

The number of total crashes grew by 5.9 percent between 1999 and 2000 but injury crashes (not counting fatalities) grew by only 1.7 percent (injuries grew by 1.2 percent). It appears that many more of 2000's injury-causing crashes resulted in fatalities than in past years. Exhibit II-1 on the following page shows these data.

Exhibit II-1.
Colorado Crash and Population Trends, 1999–2000

	1993	1994	1995	1996	1997	1998	1999	2000	2001*	% Change 1999-2000
Total Crashes	90,430	94,610	95,778	101,886	107,844	110,866	115,145	121,995		5.9%
Fatal Crashes	511	523	572	552	534	551	558	613	643	9.9%
Injury Crashes	28,153	30,134	30,455	30,263	28,252	31,080	31,406	31,940		1.7%
Property Damage Crashes	61,757	63,821	67,366	71,069	79,078	79,263	83,175	89,456		7.6%
Fatalities	559	586	645	617	613	628	626	681	737	8.9%
Injuries	43,007	45,862	46,099	45,448	42,878	45,488	46,804	47,387		1.2%
Fatalities per 100 Million VMT	1.72	1.73	1.83	1.71	1.62	1.63	1.55	1.64		5.8%
Injuries per 100 Million VMT	132.2	135.6	130.7	126.1	113.6	118.1	115.4	114.0		-1.2%
Alcohol-related Fatal Crashes	188	202	232	202	163	175	177	185		4.5%
Alcohol-related Fatalities	204	232	262	215	186	184	193	209		8.3%
Population (thousands)	3,605	3,712	3,811	3,903	3,996	4,103	4,216	4,301		3.4%
VMT (billions)	32.52	33.83	35.27	36.04	37.74	38.52	40.55	41.56		2.5%
Licensed Drivers (thousands)	2,592	2,733	2,815	2,849	2,996	3,014	3,040	3,113		2.4%
Registered Vehicles (thousands)	3,450	3,619	3,556	3,841	3,961	4,053	4,130			

* Preliminary, partial data.

Source: Colorado Department of Revenue – Motor Vehicle Division, CDOT, Colorado Division of Local Governments — Colorado Economic and Demographic Information System, U.S. Department of Transportation, National Highway Traffic Safety Administration, Fatal Accident Reporting System (FARS).

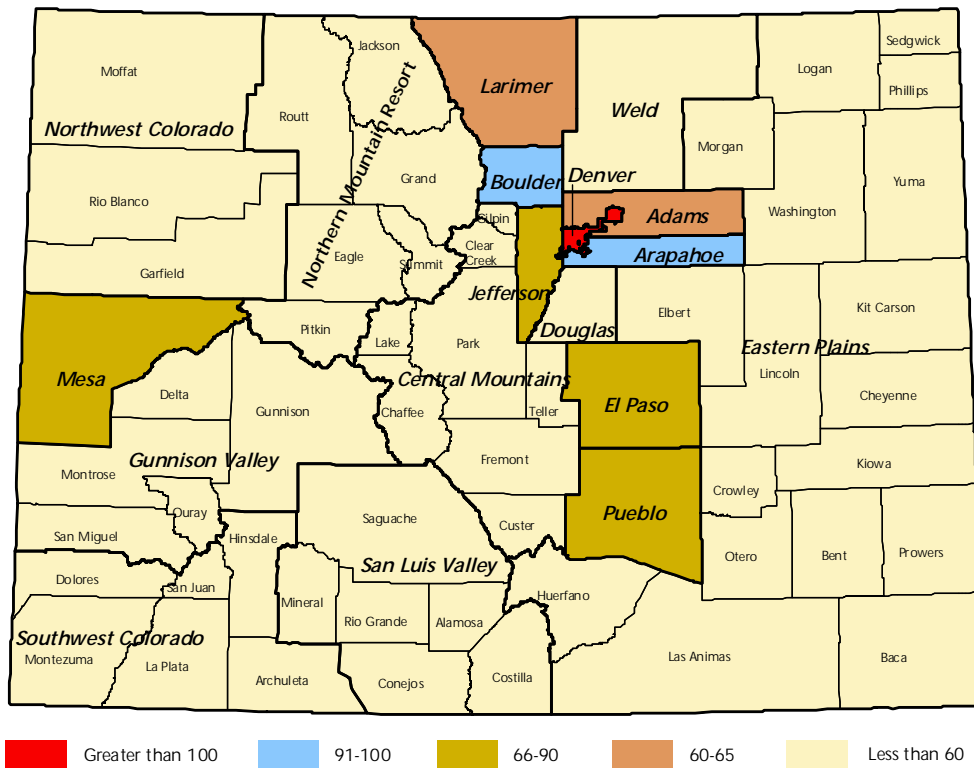
Overview of Injury Crashes

As shown in Exhibit II-1, the number of injury crashes increased modestly from 1999 to 2000 and injuries per 100 million VMT decreased in 2000 by less than 2 percent statewide. Despite this small increase in injury crashes and overall decrease in injuries, drivers from some communities have higher injury crash rates than would be expected given their community's driving-age population. The following sections look at the geographic distribution of where injury crashes occurred in Colorado as well as where injury crash drivers live. As mentioned in Section I, several regions were created to minimize problems associated with analyzing small numbers of injury crashes.

Crash location. Understanding the extent to which injury crashes are a problem in different areas of the state can be useful in directing law enforcement and other resources to areas of greatest need. The crash location analyses in this section highlight injury crash rates in 2000 for large counties and regions.

County and regional injury crash rates. In comparing injury crash rates among counties and regions throughout the state, annual Vehicle Miles Traveled (VMT) data were incorporated to control for areas' varying traffic volumes. VMT data were only available for on-system roadways (e.g., Interstates, state highways) and therefore only injury crashes that took place on these roadways were analyzed. Exhibit II-2 shows on-system county and region injury crashes that took place in 2000 per 100 million VMT. Denver had the highest injury crash rate followed by Boulder and Arapahoe counties.

Exhibit II-2.
2000 County and Region On-System Injury Crashes Per 100 Million County and Region VMT



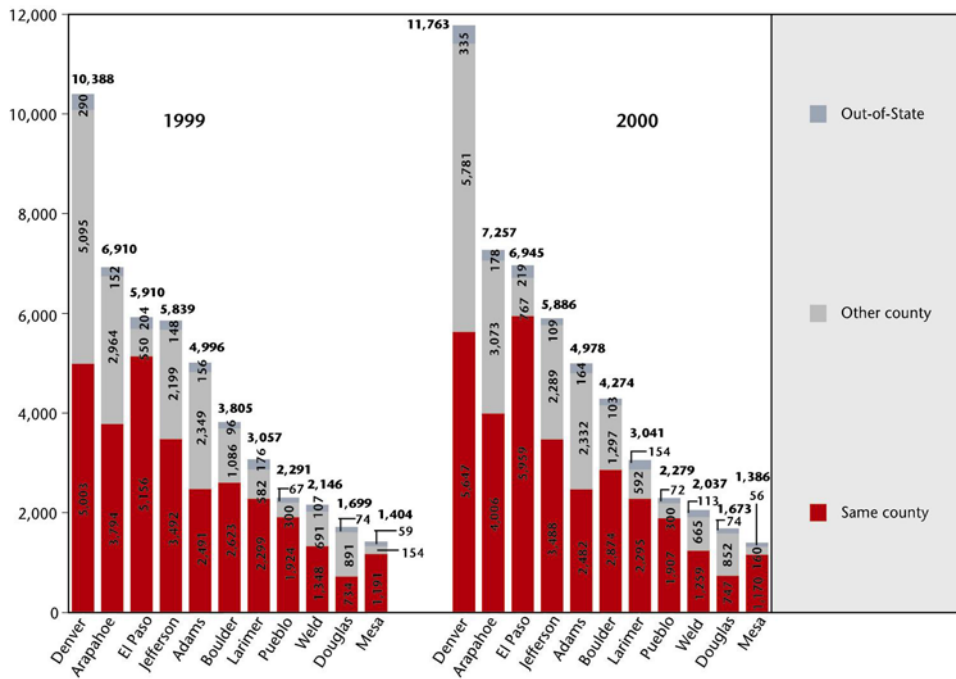
Source: BBC using 2000 crash data from CDOT and 2000 County VMT for State System from CDOT's Department of Transportation Development.

Composition of drivers in injury crashes—large counties. Drivers involved in injury crashes in large counties were classified in one of three ways based on their residency:

- Drivers who are residents of the county in which they crashed;
- Drivers living in Colorado who are not residents of the county in which they crashed; and
- Drivers who are from out of state.

Exhibit II-3 shows the composition of drivers by county of crash for the largest counties in Colorado. With the exception of Denver and Douglas counties, over half of all drivers were from the county in which they crashed in both 1999 and 2000. Over three-quarters of drivers who crashed in El Paso, Larimer, Pueblo and Mesa counties were residents of these counties.

Exhibit II-3.
Place of Residence of Drivers in Injury Crashes Occurring in Large Counties



Source: BBC Research & Consulting from 1999 and 2000 CDOT crash data.

Driver residence. Analyses of where injury crash drivers live are useful in identifying communities that would benefit from traffic safety education programs.

Residence of drivers involved in injury crashes—cities. In both 1999 and 2000, at least 2 percent of Aurora and Pueblo’s driving-age population was involved in an injury crash. The percentage of driving-age residents involved in injury crashes was fairly stable from 1999 to 2000 for large cities, reflecting the modest growth in injury crashes statewide. (Appendix B presents an analysis of residents involved in serious crashes in 2000 for other cities over 10,000 population.)

Exhibit II-4.
Percentage of 16+ Population Involved in Injury Crashes, Large Cities, 1999 and 2000

Rank	1999	2000
1	Aurora (2.3%)	Aurora (2.4%)
2	Pueblo (2.1%)	Pueblo (2.0%)
3	Thornton (1.9%)	Denver (1.9%)
4	Longmont (1.9%)	Longmont (1.9%)
5	Denver (1.8%)	Thornton (1.9%)
6	Loveland (1.8%)	Colorado Springs (1.7%)
7	Colorado Springs (1.6%)	Arvada (1.7%)
8	Arvada (1.6%)	Westminster (1.6%)
9	Westminster (1.6%)	Lakewood (1.6%)
10	Lakewood (1.5%)	Loveland (1.5%)
11	Greeley (1.4%)	Fort Collins (1.4%)
12	Fort Collins (1.4%)	Greeley (1.4%)
13	Boulder (1.4%)	Boulder (1.4%)

Note: An “injury crash” is one where a possible, evident, or incapacitating injury was observed or where there was a fatality. Percentages are calculated by dividing the number of drivers residing in a city who were involved in an injury crash in Colorado in 2000 by the 16+ population of that city. The statewide average in 2000 was 1.6 percent. The average for cities with over 50,000 driving age population was 1.9 percent.

Source: BBC Research & Consulting from 1999 and 2000 CDOT crash data and the Colorado Division of Local Government 2000 population data.

Residence of drivers involved in injury crashes—counties and regions. Among large counties in 2000, Pueblo and Denver county drivers were the most likely to be involved in an injury crash (1.9 percent of drivers involved in an injury crash). Compared with driving-age population, Pueblo drivers had the most injury crashes in 1999 and Denver had the fourth-highest rate of injury crashes. Drivers in Arapahoe and Adams counties also had above-average crash rates in 1999 and 2000. Weld County drivers were slightly less likely to be involved in an injury crash in 1999 and 2000 than the average driver in the state.

As shown in Exhibit II-5, drivers living in rural regions of the state were less likely than urban drivers to be involved in an injury crash were. Crash rates were particularly low in the Gunnison Valley, San Luis Valley and Northern Mountain Resort region. Among rural regions, injury crash rates were highest in Northwest Colorado and the Central Mountains.

Exhibit II-5.
Drivers Involved in Injury Crashes by County and Region of Residence, 1999–2000

<i>County/Region Name</i>	<i>Percentage of the 16+ Population Involved in Injury Crashes</i>		<i>Index of Drivers in Injury Crashes (State Average = 1.00)</i>	
	<i>1999</i>	<i>2000</i>	<i>1999 Rank</i>	<i>2000 Index</i>
Pueblo	1.9%	1.9%	1	1.21
Denver	1.8%	1.9%	4	1.21
Arapahoe	1.8%	1.8%	2	1.19
Adams	1.8%	1.8%	3	1.14
El Paso	1.5%	1.6%	10	1.01
Jefferson	1.5%	1.5%	6	1.00
Boulder	1.5%	1.5%	7	0.99
Weld	1.5%	1.4%	8	0.92
Mesa	1.5%	1.4%	9	0.92
Douglas	1.6%	1.4%	5	0.91
Larimer	1.4%	1.4%	11	0.88
Northwest Colorado Region	1.3%	1.2%	12	0.79
Central Mountain Region	1.3%	1.2%	13	0.76
Southwest Colorado Region	1.3%	1.1%	13	0.71
Eastern Plains Region	1.1%	1.1%	16	0.68
Northern Mountain Resort Region	1.2%	1.0%	15	0.63
San Luis Valley Region	1.3%	1.0%	14	0.65
Gunnison Valley Region	0.9%	0.9%	17	0.54

Note: An "injury crash" is one where an evident incapacitating injury was observed or where there was a fatality. Percentages are calculated by dividing the number of drivers residing in a city who were involved in an injury crash in Colorado in 2000 by the 16+ population of that city. The statewide average was 1.6 percent. The state average of the index is 1.0. The index is adjusted for the driving-age population in each city.
Source: BBC Research & Consulting from 1999 and 2000 CDOT crash data and 2000 population data from the Colorado Division of Local Government.

The maps at the end of this section show the location of fatal and injury crashes that occurred on Colorado's state system in 2000. Off-system crashes cannot be mapped from available data.

Fatalities

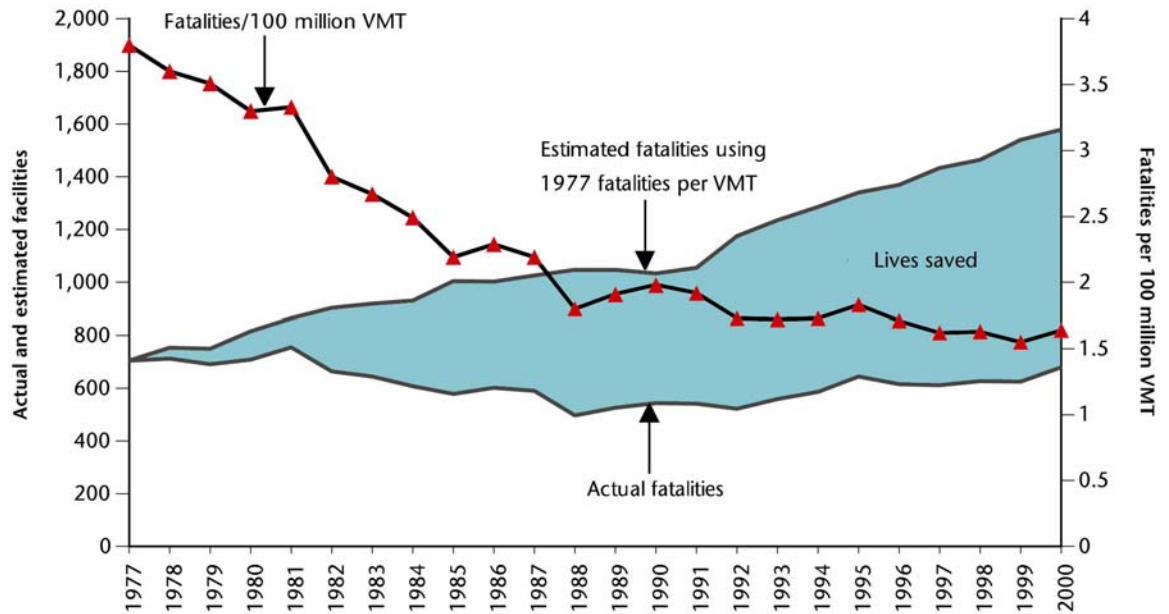
Annual fatalities on Colorado’s roads declined throughout most of the 1980s, increased somewhat in the mid-1990s, and had been stable from the mid-1990s through 1999, even in the face of increasing vehicle miles traveled (VMT). Fatalities in 2000 sharply increased, growing by 9 percent while VMT increased by only 2.5 percent. As a result, fatalities per 100 million VMT increased in 2000, as shown in Exhibit II-6 below.

Data for 2001 suggests a continued upsurge in fatalities—737 based upon FARS data from CDOT, an 8.2 percent increase from 2000.

This jump in fatalities and fatal crashes in the past two years is contrary to the long-term trend. Fatalities per 100 million VMT has dramatically decreased since 1977. In fact, 900 more people would have been killed on Colorado roads in 2000 if fatality rates per 100 million VMT had remained at 1977 levels. Exhibit II-6 shows the actual fatalities, fatalities per 100 million VMT and estimated annual fatalities if fatal crashes had grown in lockstep with VMT. Through 2000, over 11,400 fewer people were killed on Colorado roads than would have been if the decline in the fatal crash rates had not occurred.

Exhibit II-6.

Estimated Number of Lives Saved Annually through Reductions in Fatalities per 100 million VMT, 1977-2000



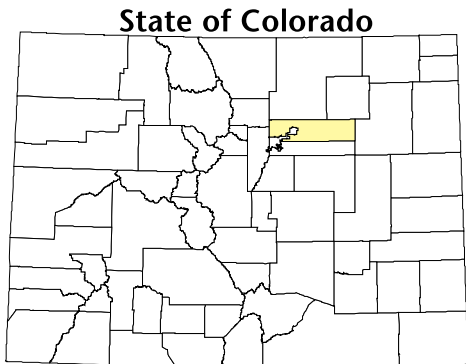
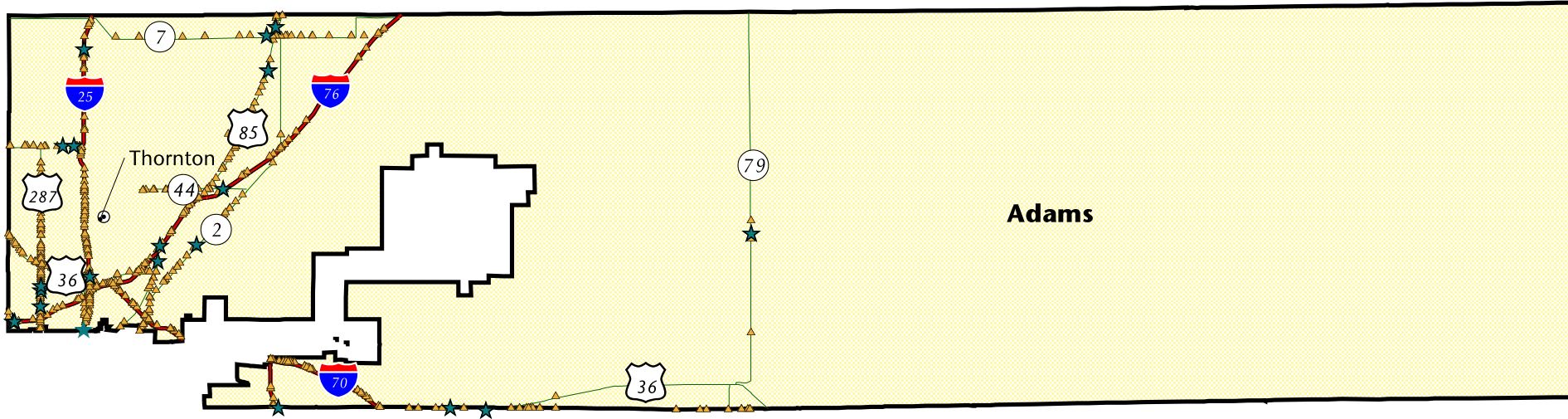
Note: Estimated lives saved are calculated as the difference between actual fatalities and those projected using 1977 rates.
 Source: BBC Research & Consulting from FARS data from CDOT.

The growth in fatal and injury crashes from 1999 to 2000 may be related to a number of factors ranging from external conditions to driver behavior. The nature of fatal crashes occurring in 1999 and 2000 is explored in more detail in Section III, while behavioral influences on injury crashes (including fatal crashes) comprise the remainder of the report.

Adams County

Location of Injury and Fatal Crashes, 2000

State and U.S. Highways Only



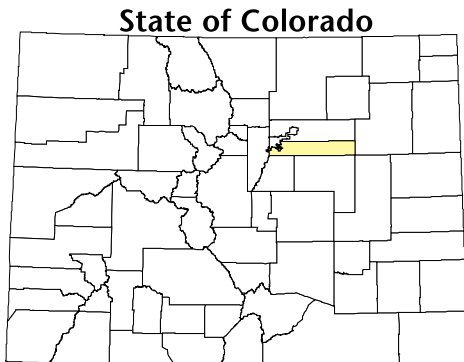
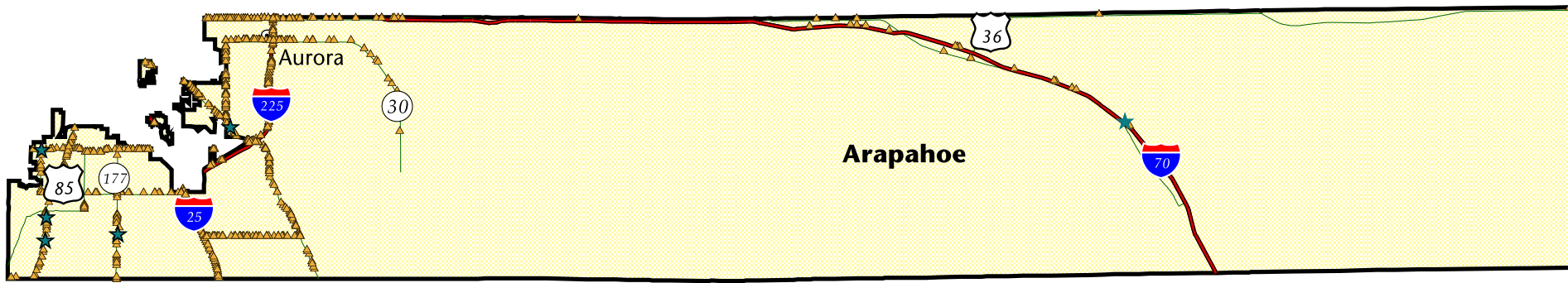
★ Location of Fatal Crash
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▲ Location of Injury Crash
(Total = 1,034)

Arapahoe County

Location of Injury and Fatal Crashes, 2000

State and U.S. Highways Only

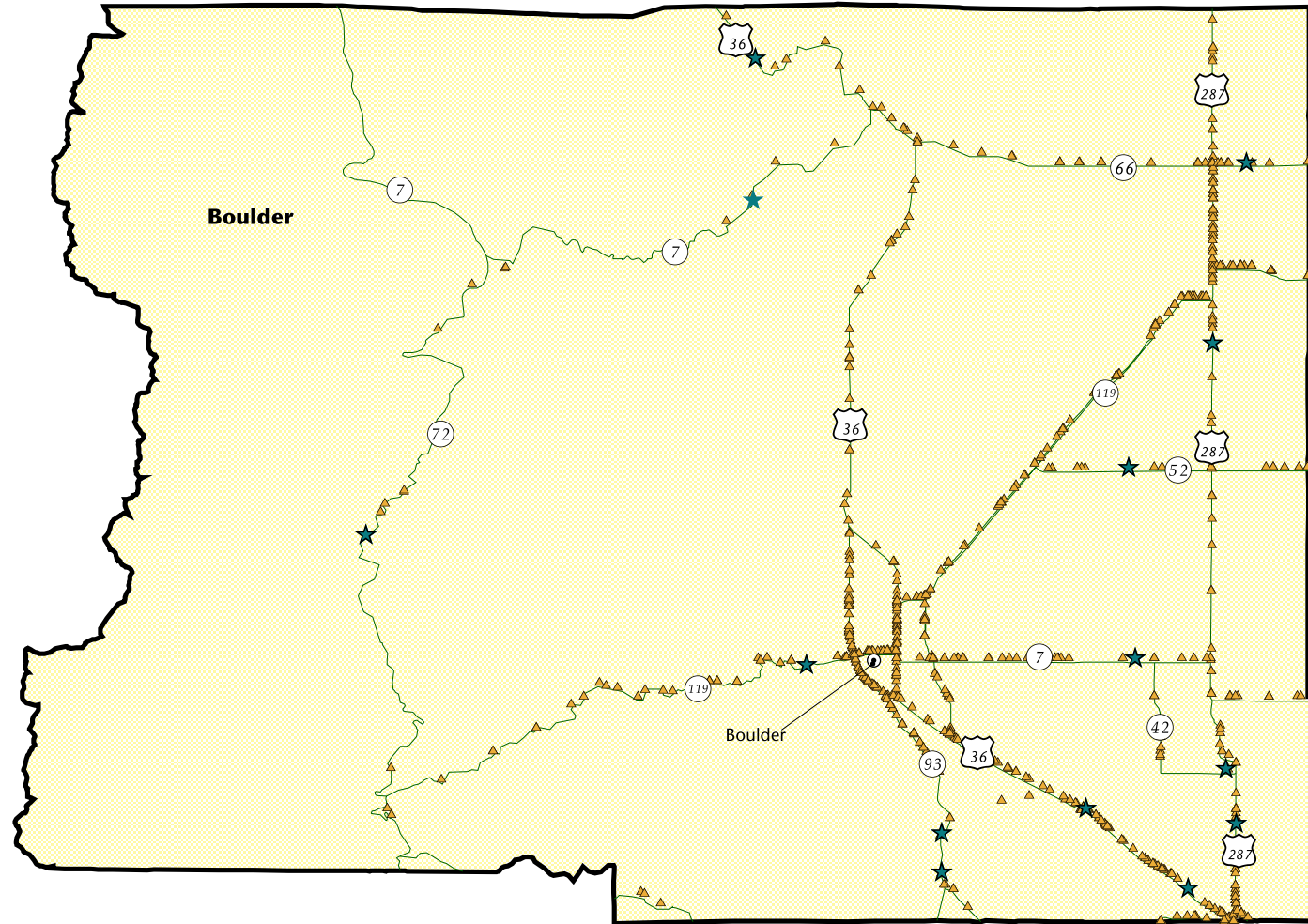
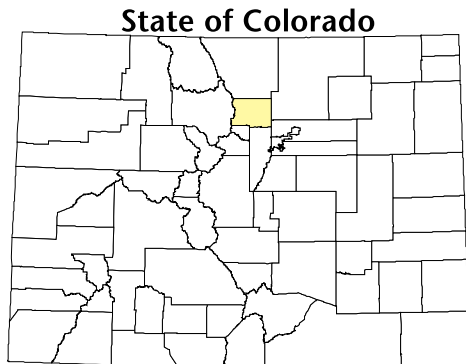


★ Location of Fatal Crash
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▲ Location of Injury Crash
(Total = 1,545)

Boulder County Location of Injury and Fatal Crashes, 2000

State and U.S. Highways Only



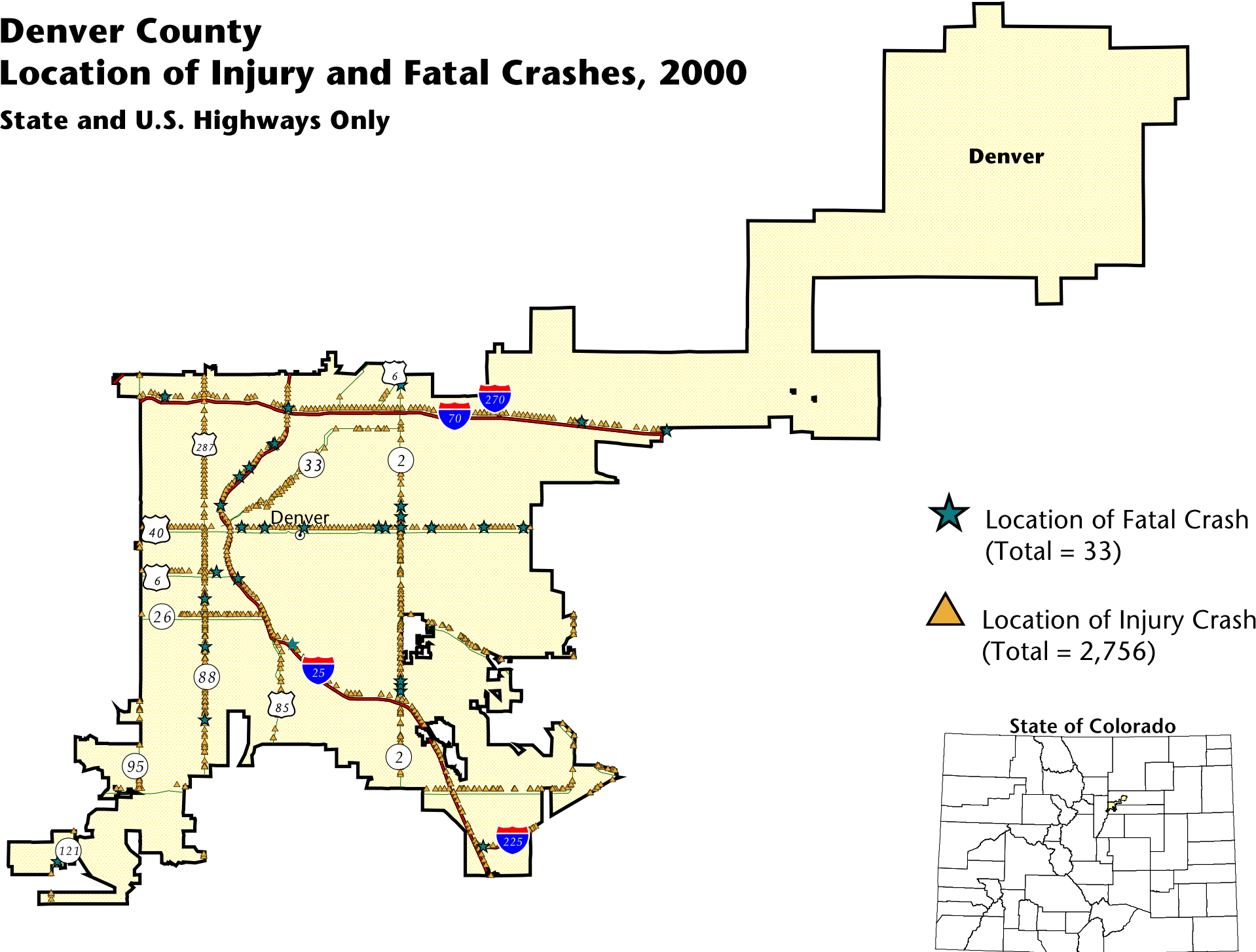
★ Location of Fatal Crash
(Total = 14)

▲ Location of Injury Crash
(Total = 1,031)

Denver County

Location of Injury and Fatal Crashes, 2000

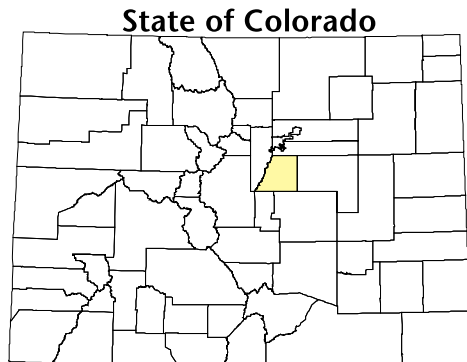
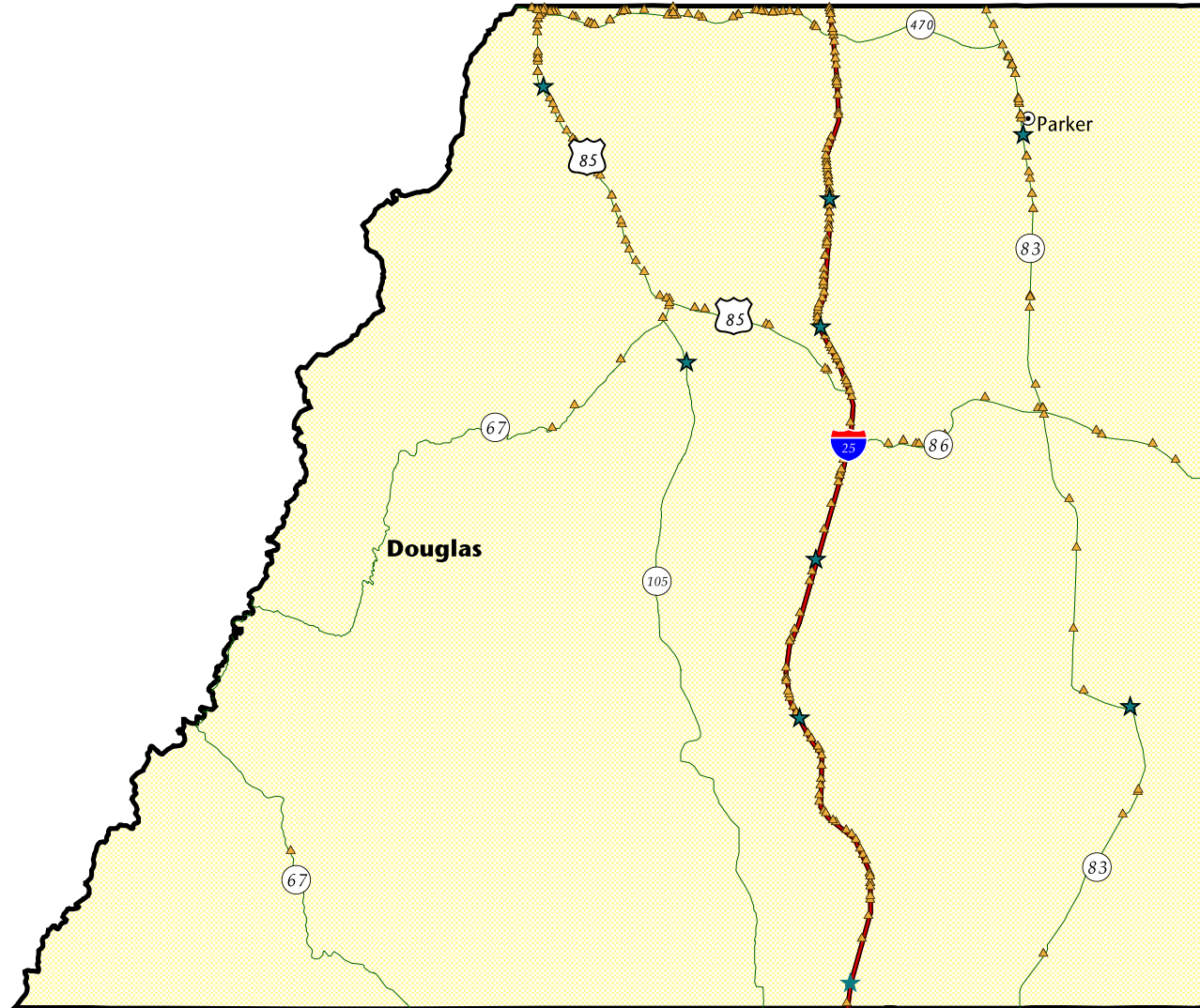
State and U.S. Highways Only



Douglas County

Location of Injury and Fatal Crashes, 2000

State and U.S. Highways Only



★ Location of Fatal Crash
(Total = 9)

▲ Location of Injury Crash
(Total = 479)

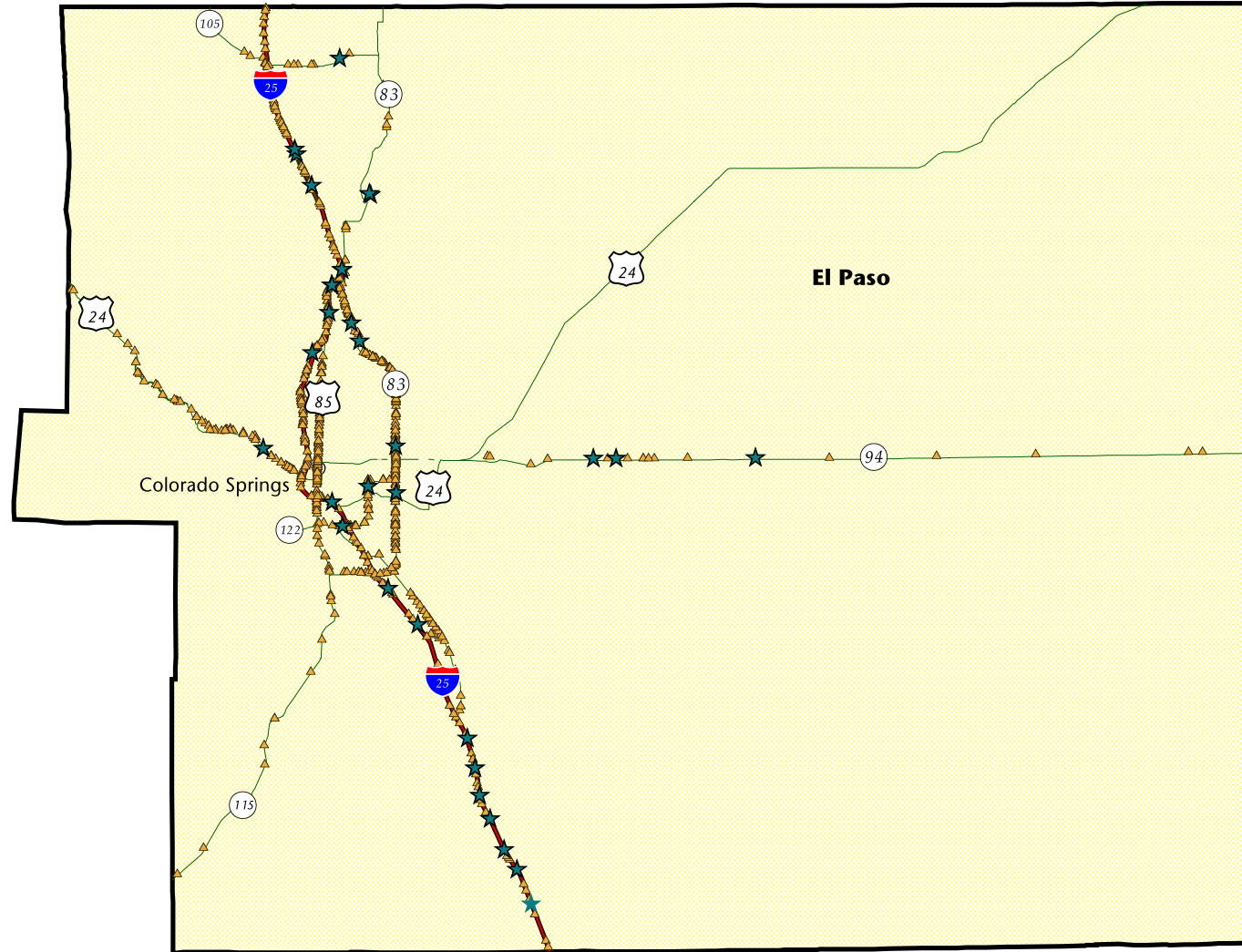
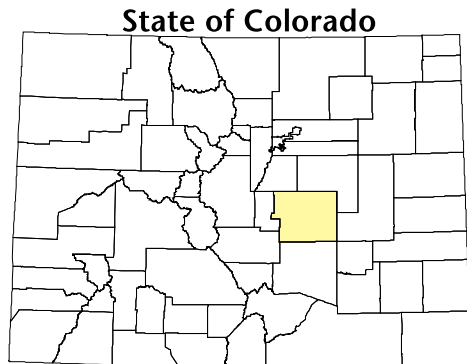
El Paso County

Location of Injury and Fatal Crashes, 2000

State and U.S. Highways Only

★ Location of Fatal Crash
(Total = 30)

▲ Location of Injury Crash
(Total = 1,435)

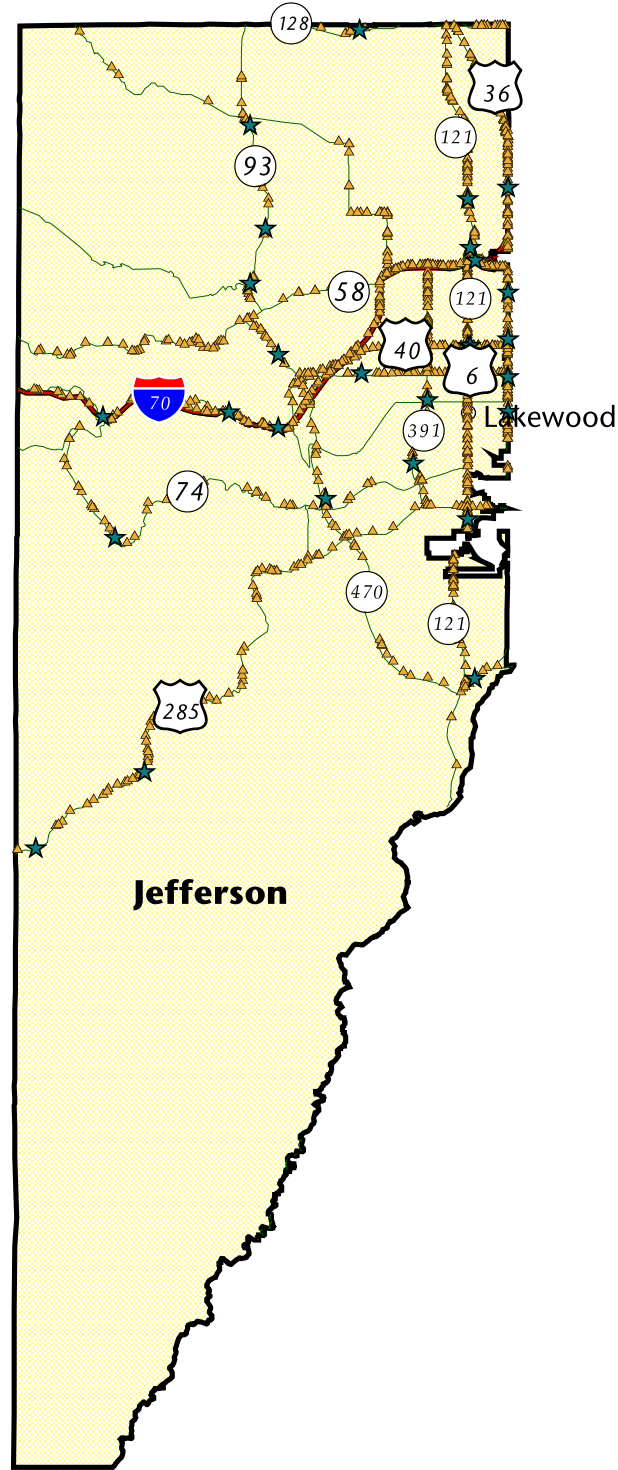
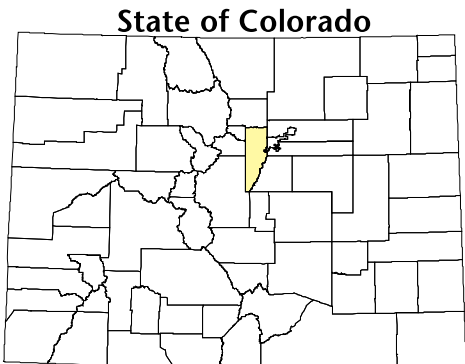


Jefferson County Location of Injury and Fatal Crashes, 2000

State and U.S. Highways Only

★ Location of Fatal Crash
(Total = 27)

▲ Location of Injury Crash
(Total = 1,897)



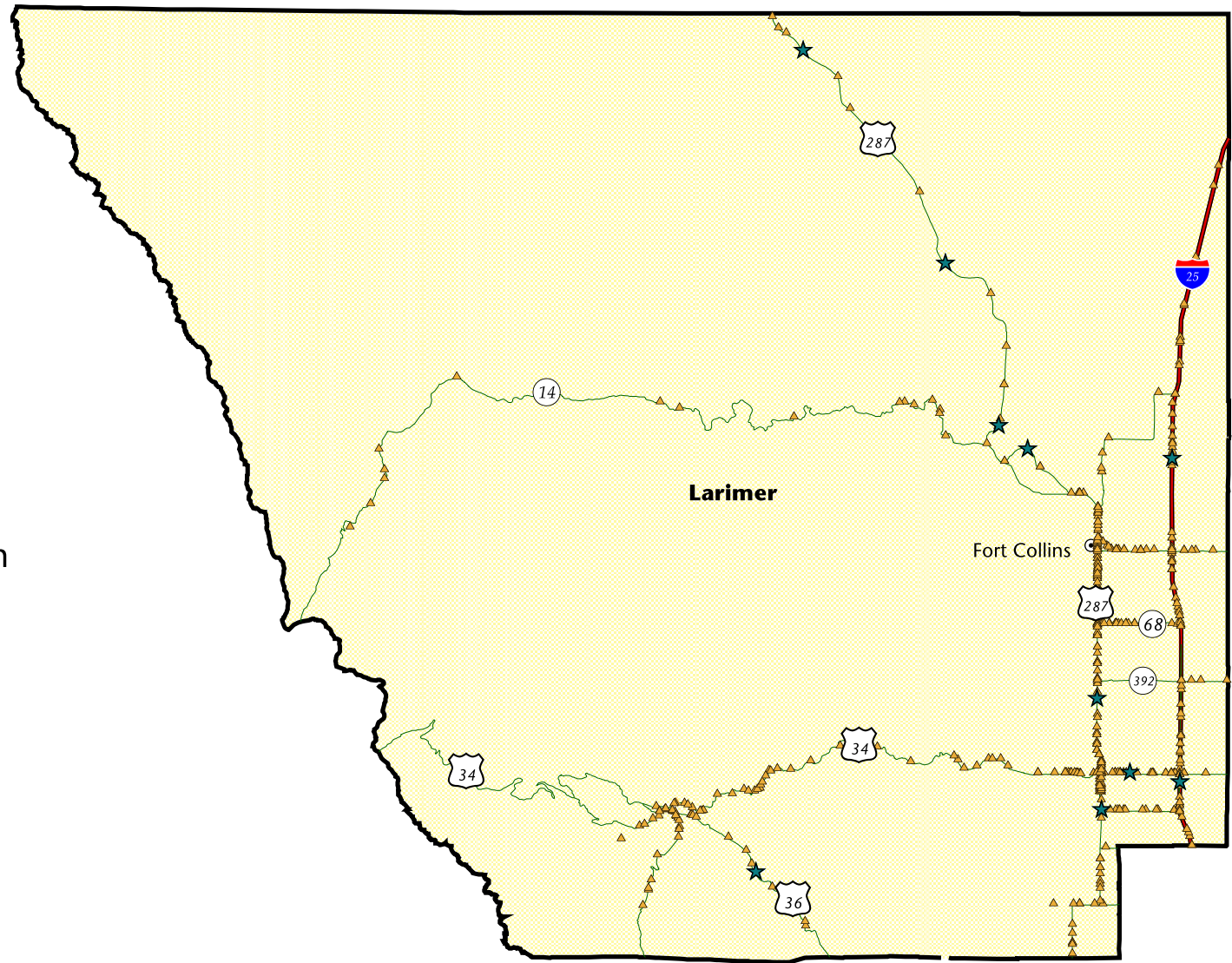
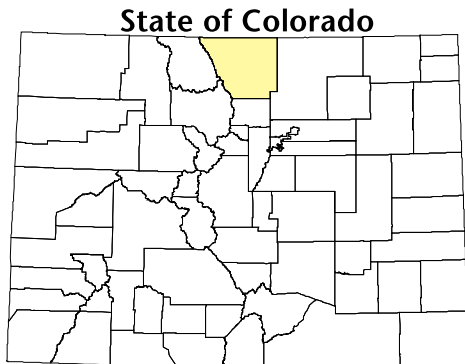
Larimer County

Location of Injury and Fatal Crashes, 2000

State and U.S. Highways Only

★ Location of Fatal Crash
(Total = 11)

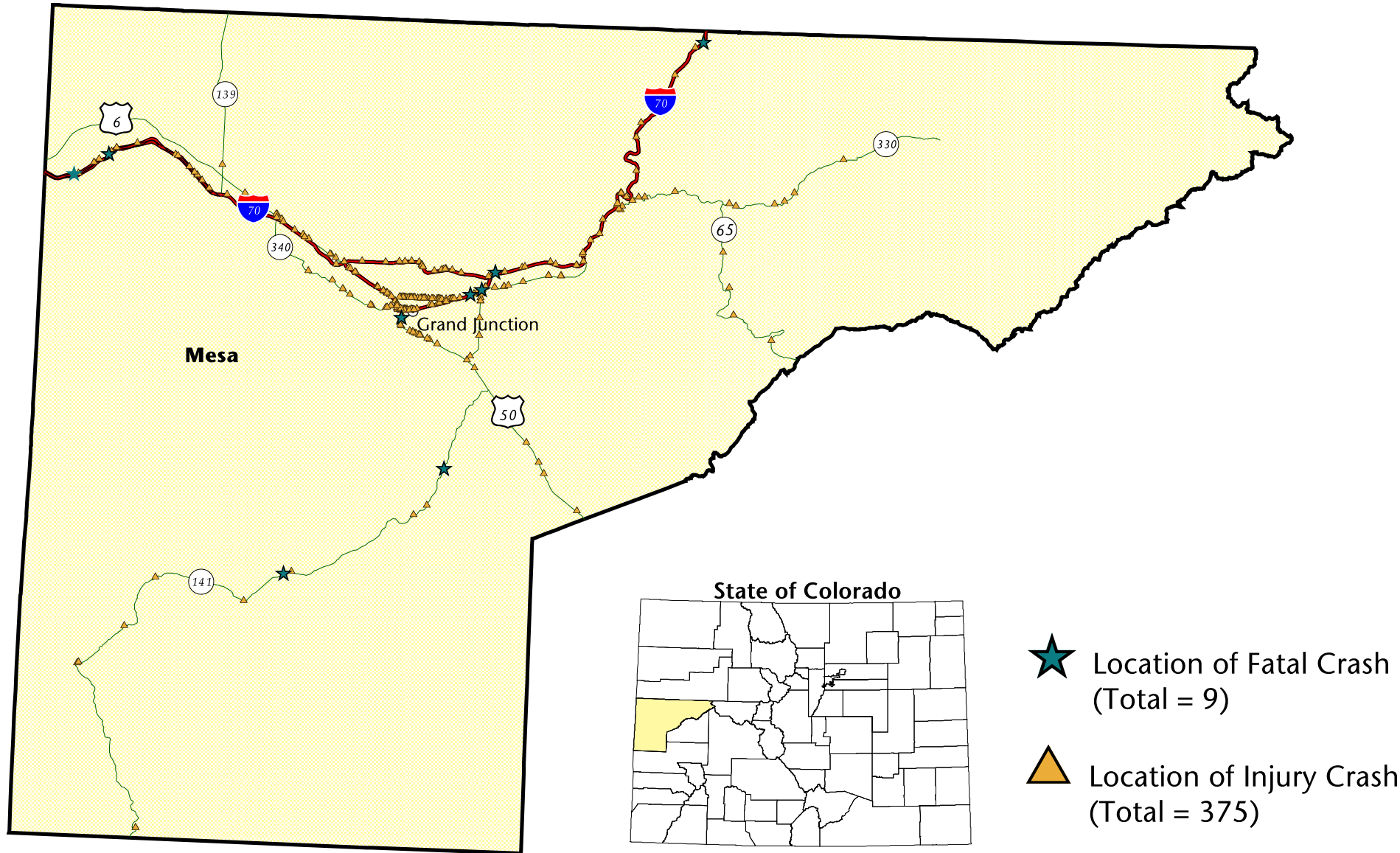
▲ Location of Injury Crash
(Total = 694)



Mesa County

Location of Injury and Fatal Crashes, 2000

State and U.S. Highways Only

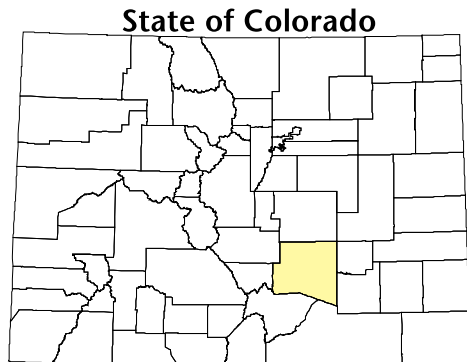


Pueblo County

Location of Injury and Fatal Crashes, 2000

State and U.S. Highways Only

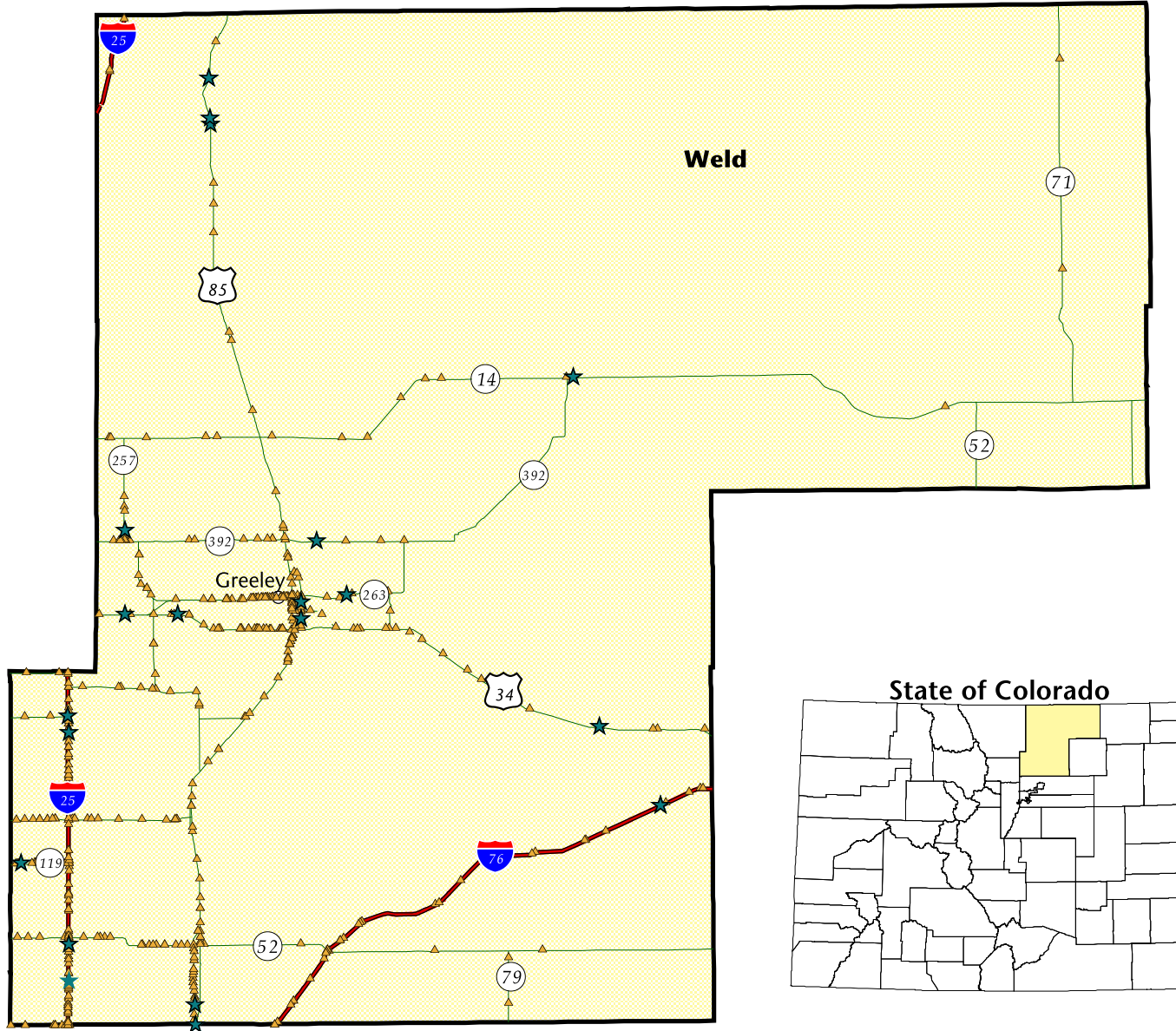
- ★ Location of Fatal Crash
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- ▲ Location of Injury Crash
(Total = 546)



Weld County

Location of Injury and Fatal Crashes, 2000

State and U.S. Highways Only



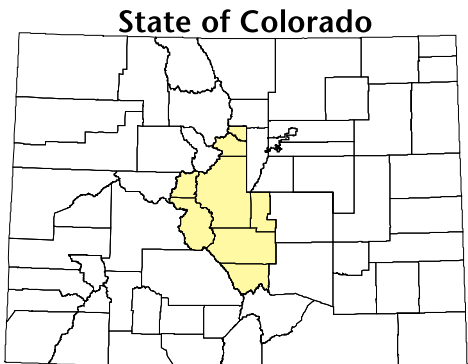
- ★ Location of Fatal Crash (Total = 22)
- ▲ Location of Injury Crash (Total = 614)

Central Mountain Region Location of Injury and Fatal Crashes, 2000

State and U.S. Highways Only

★ Location of Fatal Crash
(Total = 39)

▲ Location of Injury Crash
(Total = 634)

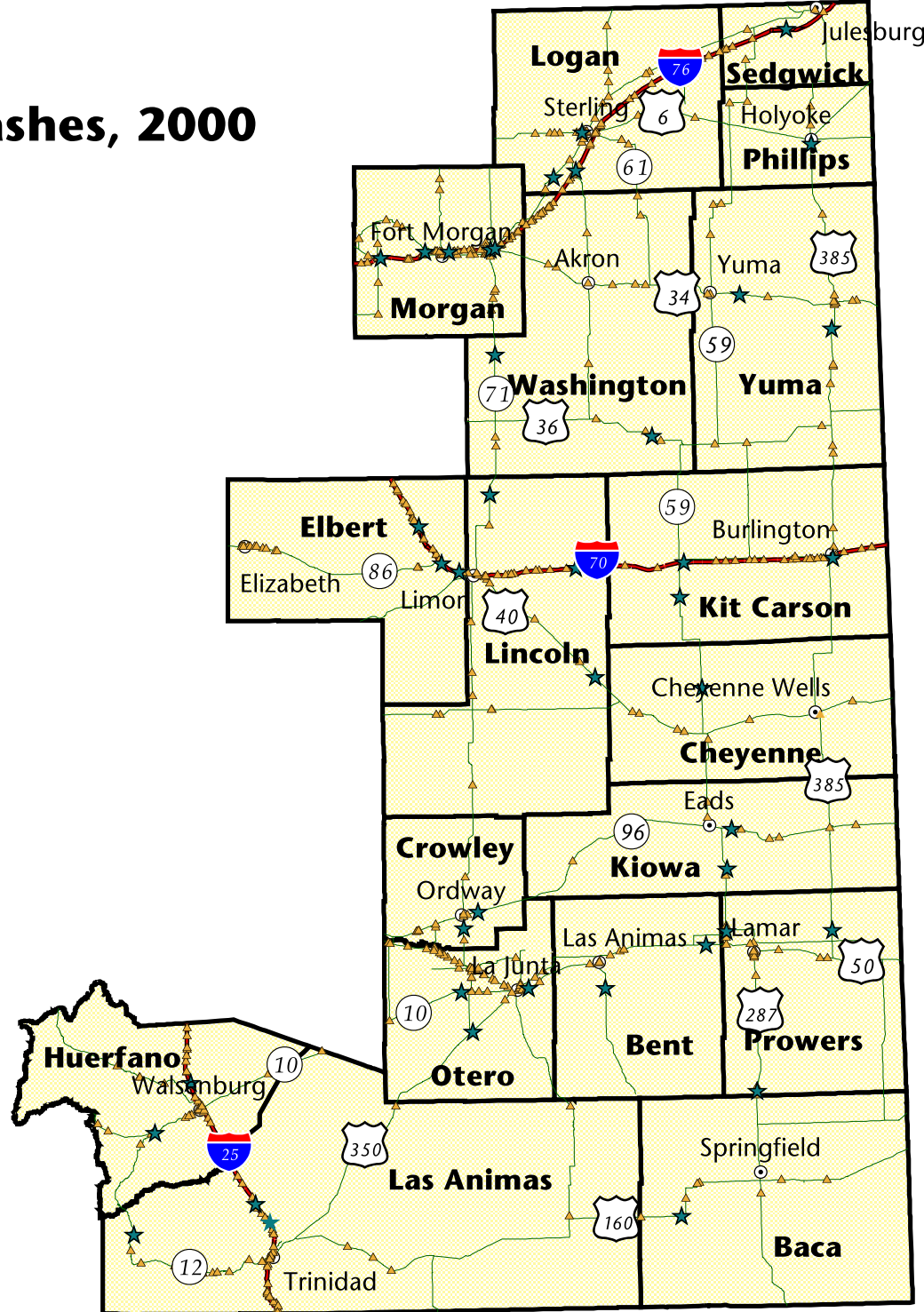
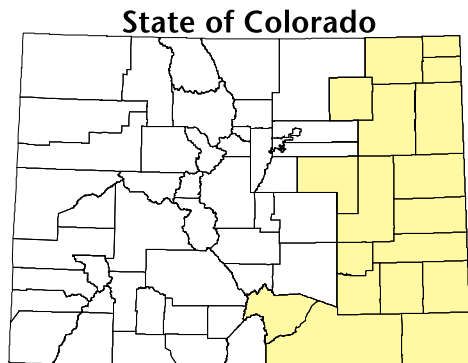


Eastern Plains Location of Injury and Fatal Crashes, 2000

State and U.S. Highways Only

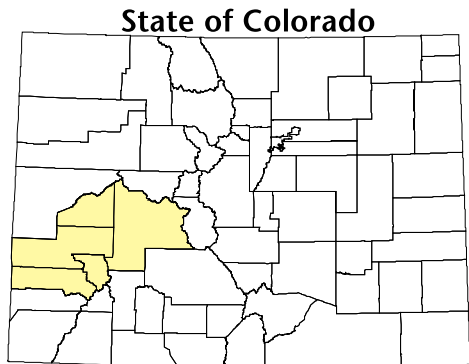
★ Location of Fatal Crash
(Total = 42)

▲ Location of Injury Crash
(Total = 588)



Gunnison Valley Location of Injury and Fatal Crashes, 2000

State and U.S. Highways Only



★ Location of Fatal Crash
(Total = 11)

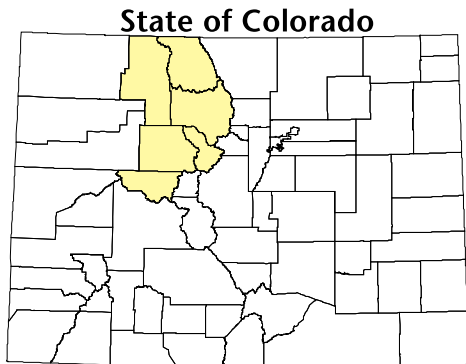
▲ Location of Injury Crash
(Total = 284)

Northern Mountain Resort Location of Injury and Fatal Crashes, 2000

State and U.S. Highways Only

★ Location of Fatal Crash
(Total = 26)

▲ Location of Injury Crash
(Total = 646)

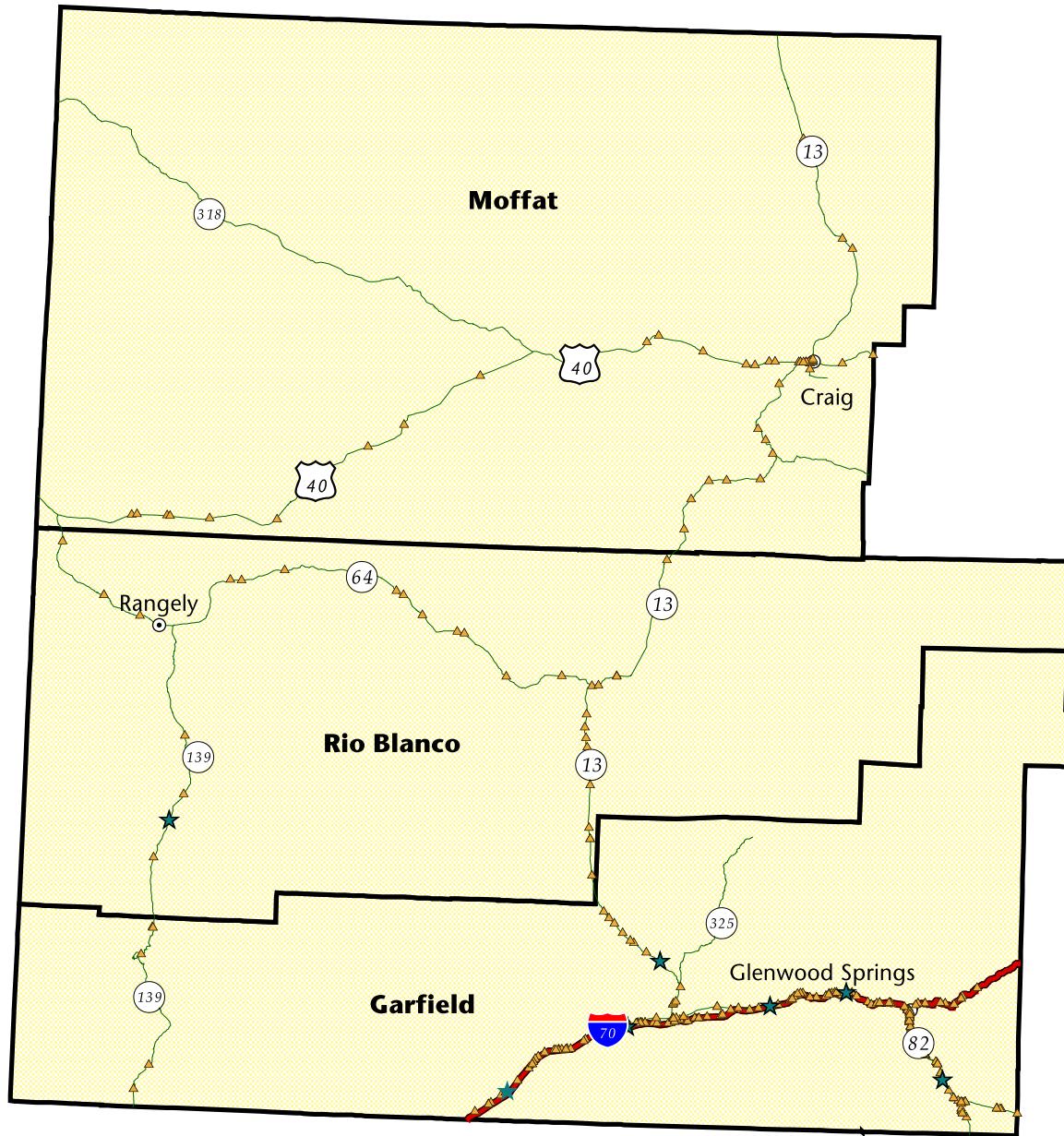
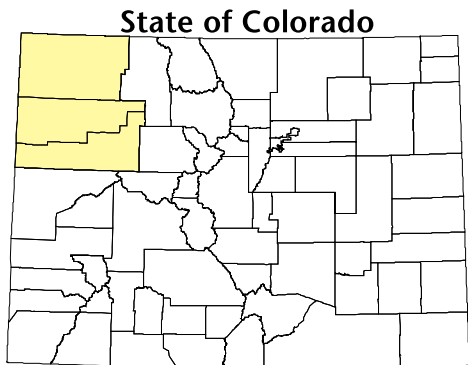


Northwest Colorado Location of Injury and Fatal Crashes, 2000

State and U.S. Highways Only

★ Location of Fatal Crash
(Total = 7)

▲ Location of Injury Crash
(Total = 326)



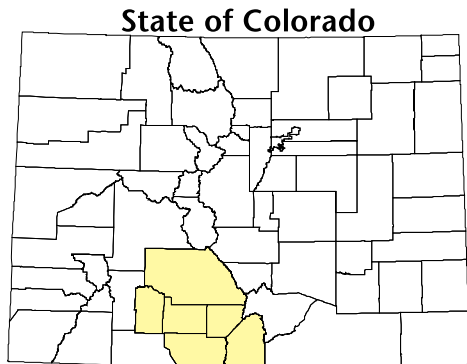
San Luis Valley

Location of Injury and Fatal Crashes, 2000

State and U.S. Highways Only

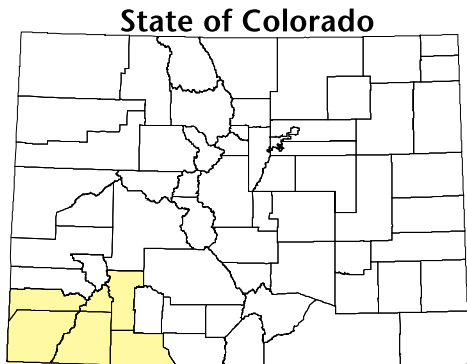
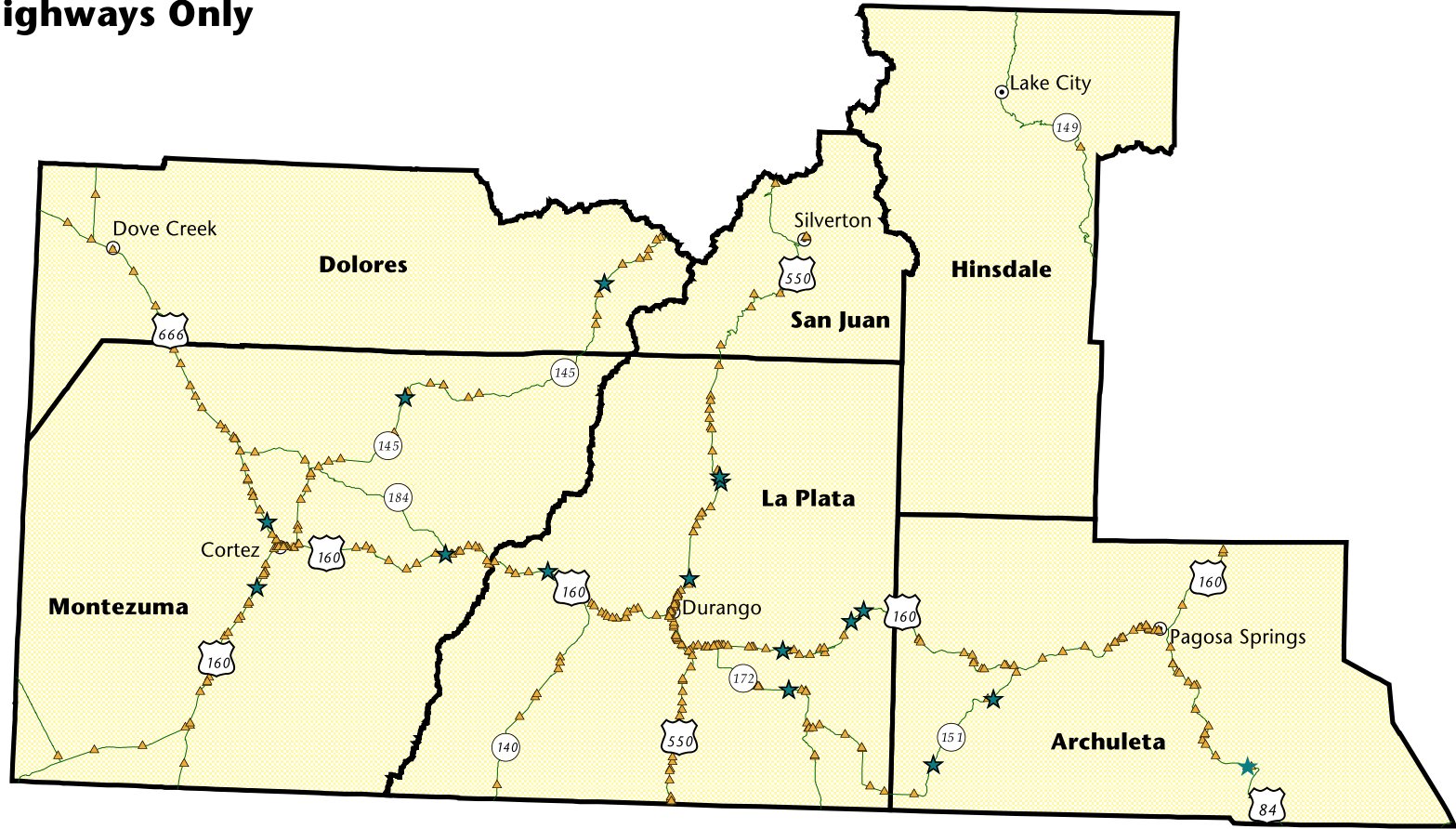
★ Location of Fatal Crash
(Total = 6)

▲ Location of Injury Crash
(Total = 156)



Southwest Colorado Location of Injury and Fatal Crashes, 2000

State and U.S. Highways Only



★ Location of Fatal Crash
(Total = 16)

▲ Location of Injury Crash
(Total = 395)

SECTION III.

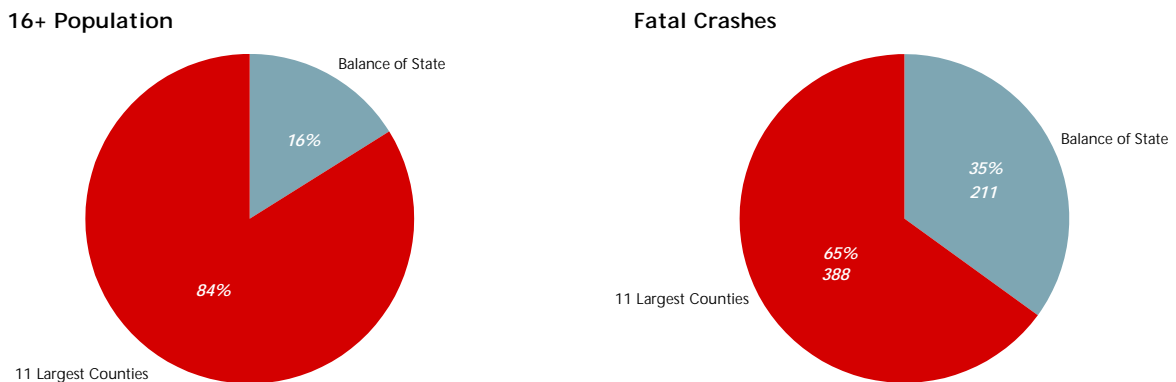
Analysis of Fatal Crashes

As demonstrated in the previous section, Colorado fatal crashes and fatalities increased in 2000 and 2001. The rate of increase in fatal crashes and fatalities outpaced statewide increases in injury crashes. The nature and underlying cause of the increase in fatal crashes in 1999 and 2000 is explored in detail in this section using FARS data and data from CDOT's crash record database, which has somewhat fewer fatal crashes than indicated in the more comprehensive FARS database. Fatal crashes that occurred in 2001 are also analyzed in this section but in less detail due to limited FARS data.

Location of Fatal Crashes

The majority of fatal crashes occurred in Colorado's 11 most populous counties, however, fewer fatal crashes took place in these large counties than expected based on their population. Exhibit III-1 compares the distribution of Colorado's population between the 11 largest counties and the balance of the state with the distribution of fatal crashes between these two geographic segments. The 11 largest counties account for 84 percent of Colorado's population, but only 65 percent of Colorado's fatal crashes in 2000 (and in 1999). Percentage growth in the number of fatal crashes taking place in rural regions nearly matched the statewide increase from 1999 to 2000. In 2001, 67 percent of Colorado's fatal crashes took place in the 11 largest counties.

Exhibit III-1.
The Largest Counties and Balance of State: Comparison of Driving Age Population and the Number of Fatal Crashes, 2000



Source: BBC Research & Consulting from 2000 CDOT crash data and Colorado Division of Local Government population data.

Large counties. Exhibit III-2 plots the number of fatal crashes in 1999, 2000 and 2001 for the 11 most populous Colorado counties against the 2000 driving age population of each county. As in most years, more fatal crashes occurred within Denver than any other county. The 77 fatal crashes taking place in Denver in 2000 were substantially higher than 1999 (44 fatal crashes) and 2001 (62

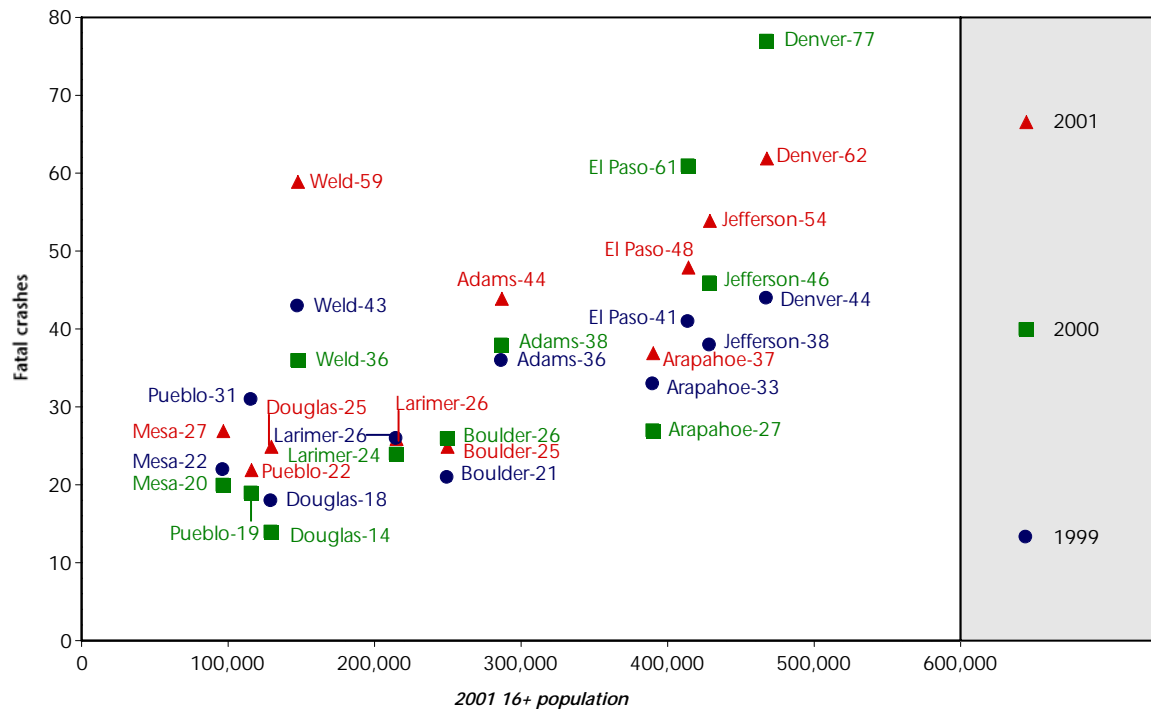
fatal crashes). El Paso County also experienced a large increase in the number of these crashes in 2000 (41 in 1999, growing to 61 in 2000 and dropping to 54 in 2001). The statewide growth in fatal crashes in 2000 was primarily due to increases in Denver and El Paso County.

The number of fatal crashes statewide would have been even higher in 2000 if some areas had not experienced reductions in the number of fatal crashes. As shown in Exhibit III-2, Pueblo County had the largest decrease in fatal crashes. Several other counties experienced modest decreases in the number of fatal crashes.

In 2001, Weld County was second to Denver in its number of fatal crashes followed by Jefferson and El Paso counties. Together, these four counties made up one-third of fatal crashes that occurred statewide in 2001.

In addition to portraying the change in fatal crashes from 1999 to 2001, Exhibit III-2 also provides an indication of whether the number of fatal crashes occurring in a county is in line with its population. Counties with fatal crashes well above communities with similar populations include Weld County. Similarly, Arapahoe and Boulder counties have fewer fatal crashes than one would expect given just their population size.

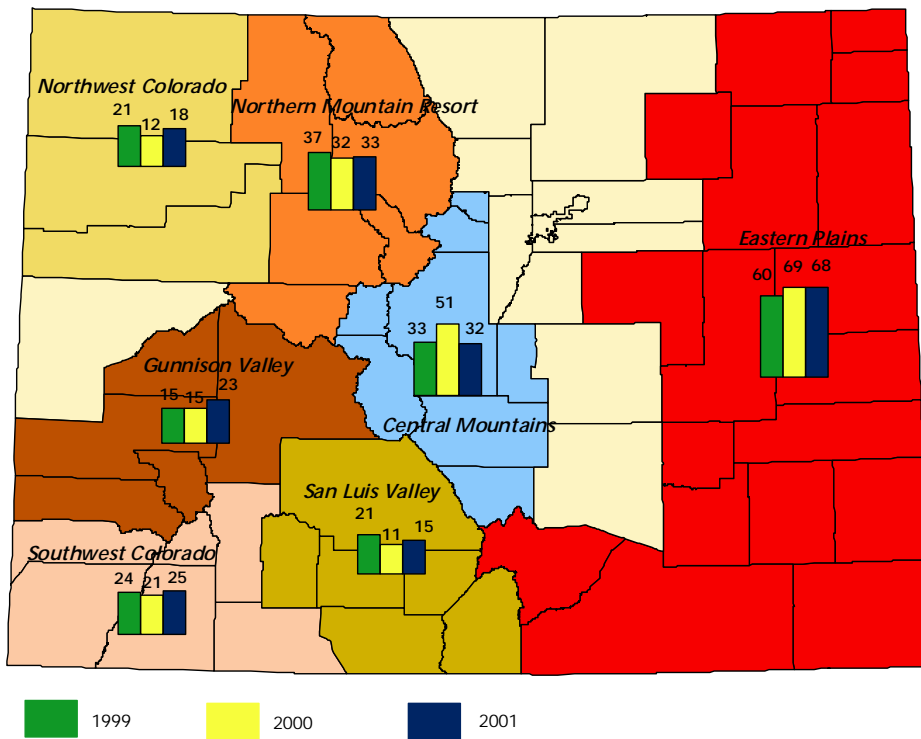
Exhibit III-2.
Fatal Crashes in the 11 Largest Colorado Counties, 1999 - 2001



Source: BBC Research & Consulting from 1999 and 2000 CDOT crash data and 2001 FARS data from CDOT and Colorado Division of Local Government population data.

Balance of the state. As shown in Exhibit III-3, growth in fatal crashes in the Central Mountains explains most of the growth in rural crashes from 1999 to 2000. Fatal crashes also increased in the Eastern Plains. Fatal crashes were stable or declined in other regions in 2000. Between 2000 and 2001, fatal crashes increased in nearly every rural region except the Central Mountains, which had 19 fewer fatal crashes.

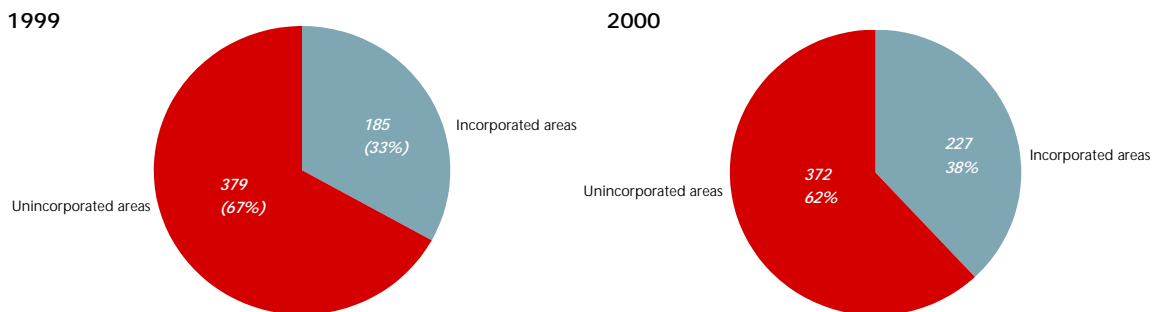
Exhibit III-3.
Fatal Crashes by Rural Region, 1999 – 2001



Source: BBC Research & Consulting from 1999 and 2000 CDOT crash data and 2001 FARS data from CDOT.

Location of crashes by jurisdiction. Sixty-two percent of the fatal crashes in Colorado in 2000 took place outside incorporated cities and towns, down from 67 percent in 1999 (see Exhibit III-4). The number of fatal crashes in incorporated areas grew between 1999 and 2000.

Exhibit III-4.
Location of Fatal Crashes by Jurisdiction, 1999 and 2000



Source: BBC Research & Consulting from 1999 and 2000 CDOT crash data and Colorado Division of Local Government population data.

Location of crashes by jurisdiction—large counties. Even in more urbanized counties, a substantial portion of fatal crashes occurred in unincorporated areas (Exhibit III-5). More than one-half of the fatal crashes occurred outside municipal boundaries in El Paso, Boulder, Larimer, Weld, Douglas and Mesa counties. In Weld County, all but 11 of its 79 fatal crashes in 1999-2000 took place in unincorporated portions of the county.

**Exhibit III-5.
Fatal Crashes by Location in County, 1999 and 2000**

County	Largest City	1999			Total	2000			Total
		Crashes in Largest City	Crashes in Other Incorporated Areas	Crashes in Unincorporated Areas		Crashes in Largest City	Crashes in Other Incorporated Areas	Crashes in Unincorporated Areas	
Denver	Denver	44	0	0	44	77	0	0	77
Jefferson	Lakewood	6	9	23	38	16	11	19	46
El Paso	Colorado Springs	17	0	24	41	28	0	33	61
Arapahoe	Aurora	17	7	9	33	11	7	9	27
Adams	Thornton	5	17	14	36	4	18	16	38
Boulder	Boulder	5	7	9	21	0	9	17	26
Larimer	Fort Collins	6	3	17	26	3	3	18	24
Weld	Greeley	4	3	36	43	2	2	32	36
Douglas	Parker	1	0	17	18	1	1	12	14
Pueblo	Pueblo	16	0	15	31	10	0	9	19
Mesa	Grand Junction	2	0	20	22	6	0	14	20
Balance of State		—	16	195	211	—	18	193	211
Total State		123	62	379	564	158	69	372	599

Source: BBC Research & Consulting from 1999 and 2000 CDOT crash data.

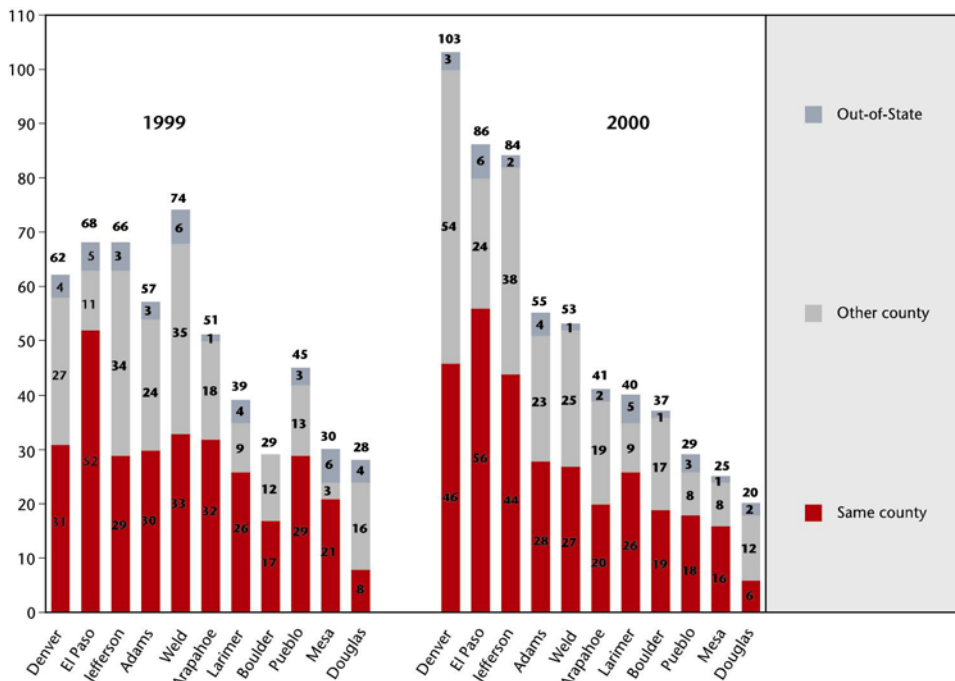
Place of Residence of Drivers in Local Fatal Crashes

By examining the place of residence of drivers in fatal crashes, one can better understand whether the increases in fatal crashes in Denver and El Paso County, and consistently high number of crashes in areas such as Weld and Pueblo counties are related to the driving behavior of local residents or people driving into the county from other communities. These data also show how out-of-state drivers contribute to statewide fatal crashes. Exhibit III-6 on the following page compares the residence of fatal crashes for the state's largest counties.

- Eight percent of drivers in a fatal crash in Colorado in 2000 were from outside the state, down from 1999 (10 percent). El Paso County had more out-of-state drivers involved in fatal crashes than any other large Colorado county.
- In 2000, Denver drivers involved in Denver fatal crashes grew to 46, a 50 percent increase. Non-Denver drivers involved in Denver fatal crashes nearly doubled from 1999 to 2000. Denver residents comprised nearly half of all drivers involved in Denver fatal crashes in 2000.

- Weld County had 53 drivers involved in the 36 fatal crashes within the county in 2000. About one-half of the drivers (27) were from the county. As shown in Exhibit III-6, the number of residents of a county in fatal crashes in the same county was the same or higher in Weld County than a number of more populous counties. Weld County's high number of fatal crashes can only be partially explained by the number of non-county residents involved in fatal crashes in the county.
- Pueblo County's relatively high number of fatal crashes cannot be explained by involvement of non-residents in these crashes. Of the 29 drivers in fatal crashes in Pueblo County in 2000, 18 were county residents.
- El Paso County had the highest number of drivers involved in fatal crashes in 2000 that were local residents (56). This was 10 more than the number of Denver drivers involved in fatal Denver crashes. While drivers from other counties made up a smaller portion of the county's fatal crash drivers (24), most of the 1999 to 2000 growth in fatal crashes in El Paso County was due to non-local drivers.
- Jefferson County fatal crashes included a near-even split between county residents and drivers from other parts of the state. Most of the growth in fatal crashes came from county residents.

Exhibit III-6.
Place of Residence of Drivers in Fatal Crashes Occurring in Large Counties



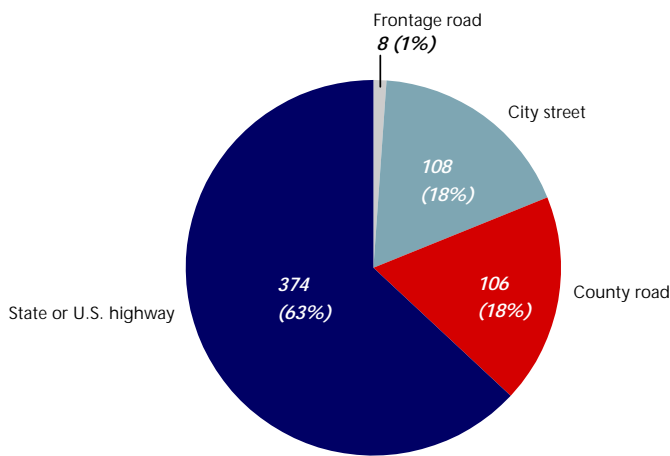
Source: BBC Research & Consulting from 1999 and 2000 CDOT crash data and Colorado Division of Local Government population data.

Vehicle and Road Type

Examining the type of road on which fatal crashes occur may uncover useful patterns for safety planning, enforcement and crash prevention. The type of vehicle involved may provide helpful data as well.

Type of road. Almost two-thirds of fatal crashes in Colorado in 2000 occurred on state or U.S. highways. Crashes on county roads outside municipalities accounted for 18 percent of fatal crashes in 2000. Only 18 percent of fatal crashes in Colorado were on municipal streets that were not state or U.S. highways (Exhibit III-7). The maps at the end of this section plot the location of 2000 fatal crashes occurring on state and U.S. highways.

Exhibit III-7.
Type of Road for Fatal Crashes in Colorado, 2000

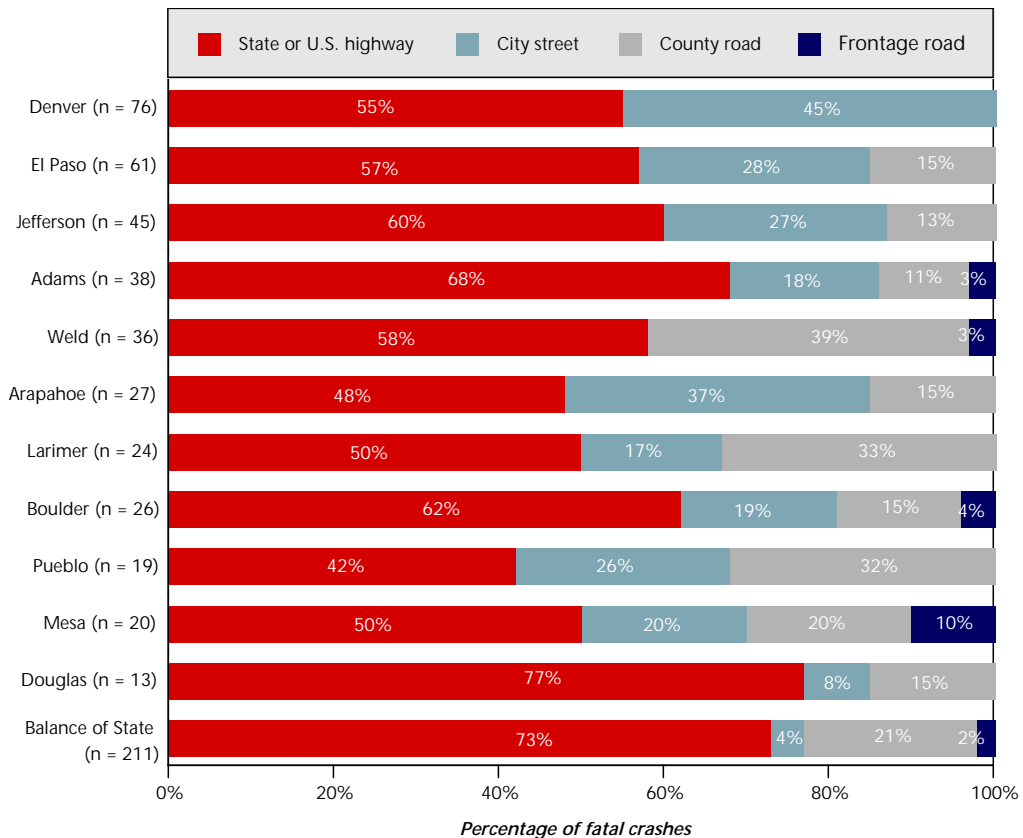


Note: Data for 1999 were not available.

Source: BBC Research & Consulting from 2000 CDOT crash data.

In some counties (e.g., Weld, Pueblo), a larger share of fatal crashes occur on county roads than the state average. Exhibit III-8 compares the distribution of fatal crashes by road type for the largest counties and the balance of the state. Appendix C maps the location of fatal crashes that occurred on State or U.S. highways in 2000.

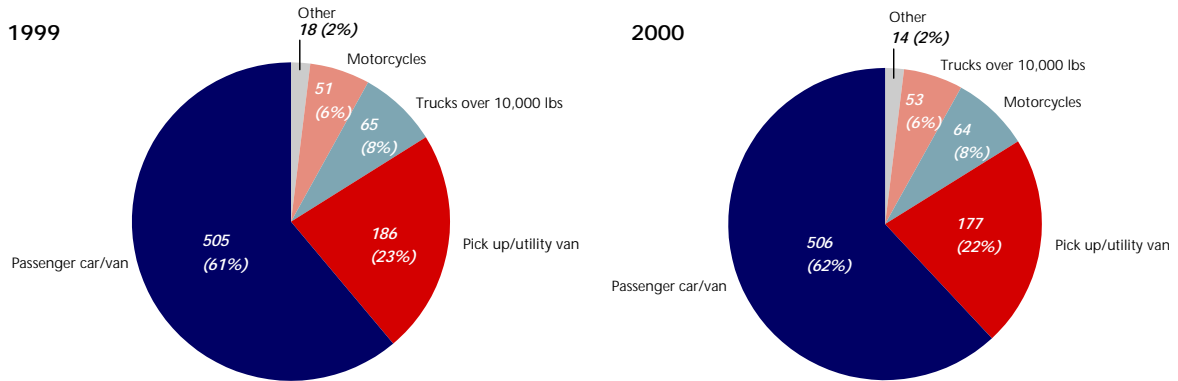
Exhibit III-8.
Type of Road for Fatal Crashes in the Largest Counties and Balance of State, 2000



Source: BBC Research & Consulting from 2000 CDOT crash data.

Type of vehicle. Most fatal crashes in Colorado involve cars or trucks (see Exhibit III-9). However, compared to registrations, motorcycles comprised a disproportionately large portion of vehicles in fatal crashes in 2000 (64 motorcycles involved in fatal crashes, or 8 percent of all crashes). The share of motorcycle fatal crashes in Colorado is higher than the national rate of 5 percent. Commercial trucks over 10,000 pounds gross weight were 53 (6 percent) of the vehicles in fatal crashes in 2000.

Exhibit III-9.
Vehicles Involved in Fatal Crashes, 1999 and 2000



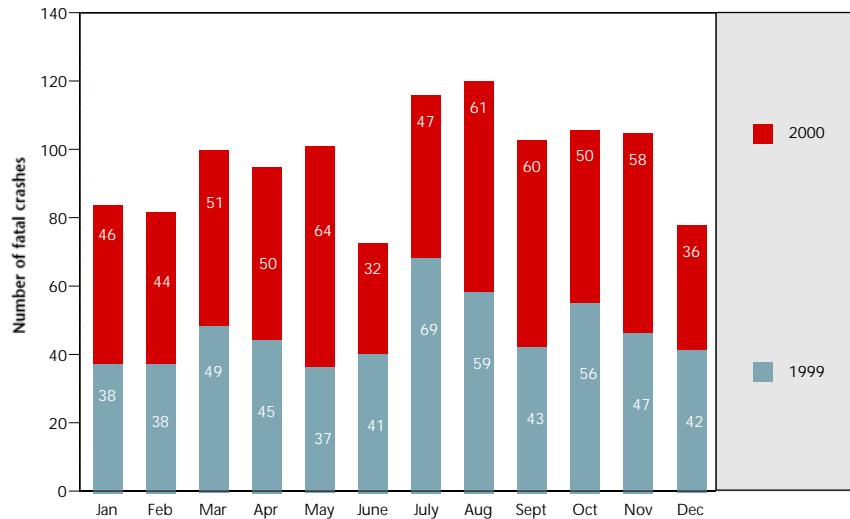
Source: BBC Research & Consulting 1999 and 2000 CDOT crash data.

Time of Year and Day

Fatal crashes may occur with more frequency at different times of the year, days of the week or time of day. Understanding the association between these external factors and fatal crashes may have implications for impaired driving enforcement, studies of traffic congestion, or other enforcement or prevention activities.

Month of the year. There is relatively little seasonal variation in fatal crashes in Colorado, similar to the national pattern. While peak months for fatal crashes in Colorado tend to be in the May through August season, summer months can have relatively few fatal crashes as well (see Exhibit III-10). Similarly, alcohol-related fatal crashes can be high in both summer and non-summer months. In 1999 and 2000, peak months for impaired-related fatal crashes were April and August, and low months were June, November and December.

Exhibit III-10.
Fatal Crashes in Colorado by Month, 1999 and 2000



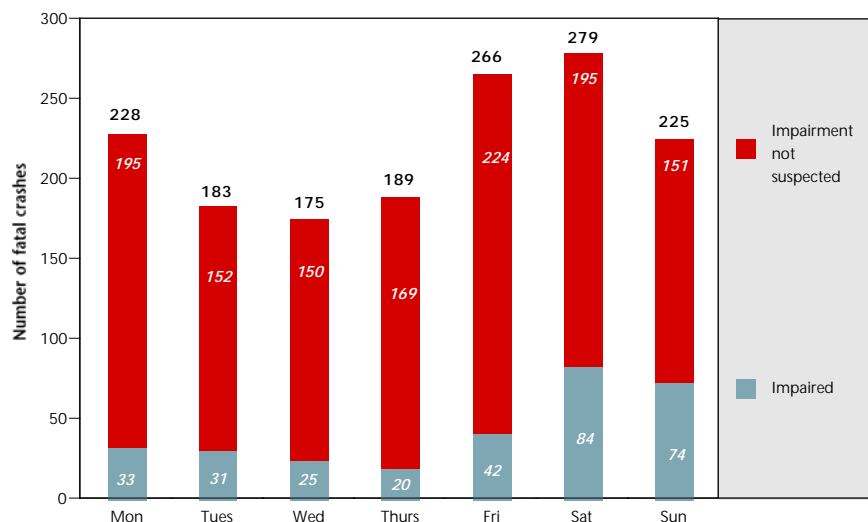
Source: BBC Research & Consulting from 1999 and 2000 CDOT crash data.

Day of week. Day of week has a pronounced influence on the number of crashes (see Exhibit III-11). For this analysis, a “day” is assumed to start at 3:00 a.m. and extend through 2:59 a.m. of the next morning.

- The fewest number of crashes during 1999 and 2000 took place on Wednesdays. Of the 175 drivers in fatal crashes in these two years on Wednesdays, 25 involved a driver suspected of alcohol or drug impairment.
- In 1999 and 2000, more fatal crashes took place on Saturday (including the first three hours of Sunday morning) than any other day of the week. Of the 277 drivers in fatal crashes on Saturday in these two years, 84 were suspected of alcohol or drug impairment (probably a minimum estimate based upon how the data are recorded).
- Fridays had the highest number of fatal crashes that did not involve a driver suspected of impairment.

Exhibit III-11.

Drivers Involved in Fatal Crashes by Day of Week, 1999 – 2000



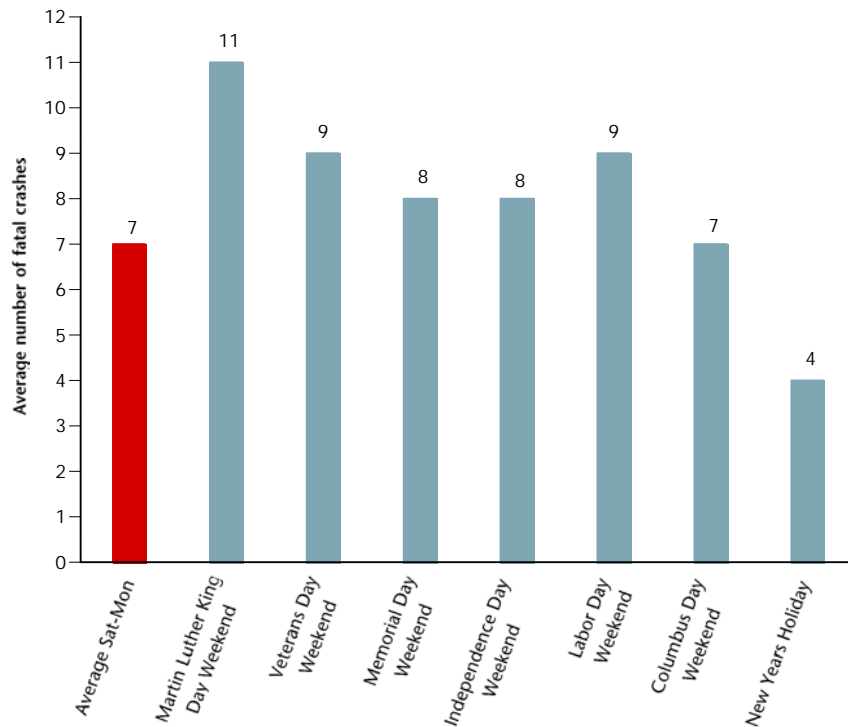
Note: Impaired drivers are those drivers involved in a fatal crash who were also suspected of alcohol or drug use. For this analysis, a “day” is assumed to start at 3:00 a.m. and extend through 2:59 a.m. of the next morning.

Source: BBC Research & Consulting from 1999 and 2000 CDOT crash data.

Time of day. The peak time period for fatal crashes during 1999-2000 was between 3 and 6 p.m. on Fridays and Mondays. The peak times for fatal crashes involving impaired drivers were the three hours after midnight on Friday and Saturday nights. In 1999-2000, 34 drivers were involved in fatal crashes during the peak morning commute on Wednesdays (6 to 9 a.m. time period). A similar number of drivers were involved in fatal crashes between 6 p.m. and 9 p.m. on Wednesdays. While fatal crashes for these time periods on Fridays and Mondays were similar to Wednesdays, the number of drivers involved in fatal crashes during the 9 a.m. to 12 p.m. and 3 to 6 p.m. time periods on Mondays and Fridays was much higher than on Wednesdays.

Holidays. Perhaps because of greater enforcement and media attention concerning traffic crashes (and enforcement), Memorial Day, Labor Day and Fourth of July weekends in 1999 and 2000 did not see much of an increase in fatal crashes compared to a typical Saturday through Monday period. As shown in Exhibit III-12, Colorado averaged seven fatal crashes from Saturday through Monday for 1999 and 2000. For these two years, Memorial Day and Independence Day weekends averaged only eight fatal crashes. Labor Day weekends for these two years averaged nine fatal crashes. The peak three-day weekend for fatal crashes for 1999-2000 was the Martin Luther King Day weekend (averaging 11 fatal crashes). For 1999 and 2000, about 27 percent of drivers involved in fatal crashes on holidays or holiday weekends were suspected to be alcohol-impaired, no different from the average Saturday through Monday time period.

Exhibit III-12.
Average Fatal Crashes for 3-Day Holiday Weekends, 1999 – 2000



Note: The New Years Holiday includes only New Years Eve and New Years Day.

Source: BBC Research & Consulting from 1999 and 2000 CDOT crash data.

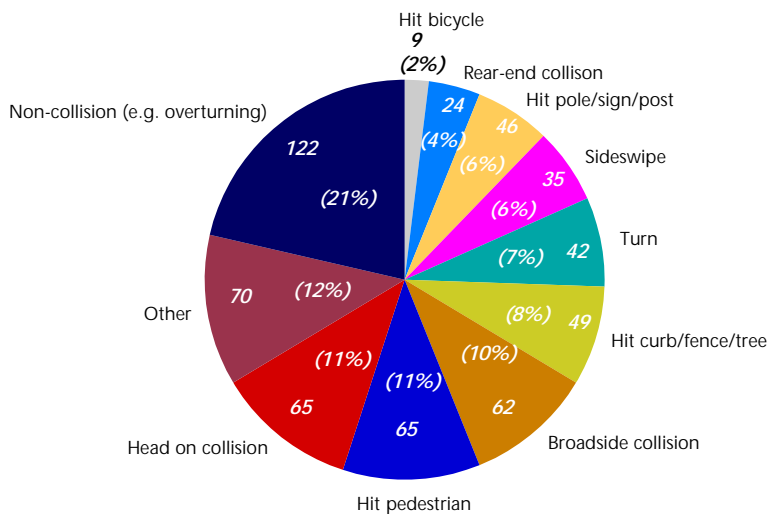
Cause of Crash

Numerous factors are associated with and may contribute to the number of fatal crashes. As previously demonstrated, fatal crashes may be higher in certain geographic areas, during particular times of day or on certain types of roads. In addition to these factors, other elements, including weather, driver behavior and driver characteristics, influence the probability of a fatal crash.

Weather conditions. Most fatal crashes in recent years happened when there were no adverse weather conditions reported on the accident form. Only one-in-eight 1999-2000 fatal crashes occurred during adverse weather conditions based upon weather information noted in the crash records. Snow, sleet or hail was recorded for 5 percent of fatal crashes, and 4 percent of fatal crashes occurred during rain. Adverse weather may have contributed more to fatal crashes on state and U.S. highways than crashes on city streets.

First harmful event. The crash records include an indication of the “first harmful event” in a crash (see Exhibit III-13). Over-turning or another “non-collision” was the first harmful event in 122 (21 percent) of the fatal crashes in Colorado in 2000. Hitting a pedestrian was the first harmful event in 65 (11 percent) of the fatal crashes. Hitting a bicyclist was the first harmful in nine fatal crashes.

Exhibit III-13.
“First Harmful Event” for Fatal Crashes, 2000



Note: Data for 1999 were not available.

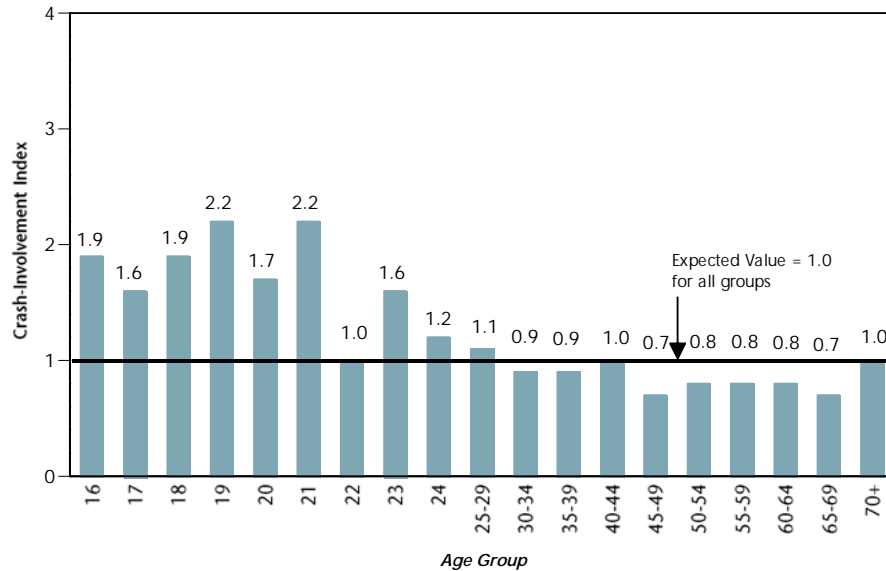
Source: BBC Research & Consulting from 2000 CDOT crash data.

The relative importance of different types of precipitating events varied by type of road. On city streets (not state or U.S. highways), hitting a pedestrian accounted for 21 percent of fatal crashes. Over-turning and other non-collisions were the first harmful event for 38 percent of fatal crashes on county roads outside municipal boundaries.

Contributing factors. Law enforcement officials sometimes record information on human contributing factors (in addition to alcohol or drug use). In many fatal crashes, no data are recorded. In part, this is due to the difficulties ascertaining human contributing factors for drivers killed in crashes. In other instances, data are not very instructive (e.g., 11 percent of drivers in fatal crashes in 1999-2000 were noted as being pre-occupied or distracted). However, 15 out-of-state drivers in fatal crashes in these two years were identified as being asleep at the wheel, accounting for 10 percent of fatal crashes involving out-of-state drivers. (This cause was noted for 41, or 3 percent, of crashes of Colorado residents.)

Fatal crash involvement by age. The youngest drivers are more likely than older drivers to be involved in a fatal crash (see Exhibit III-14). In 2000, 16-year-olds were nearly twice as likely to be involved in a fatal crash than would be expected given the number of 16-year-old drivers in the state. Although this figure is high, it is much lower than in recent years. Section IV explores the link between driver age and fatal and injury crashes in more depth.

Exhibit III-14.
Colorado Fatal Crash Involvement Index by Driver Age, 2000



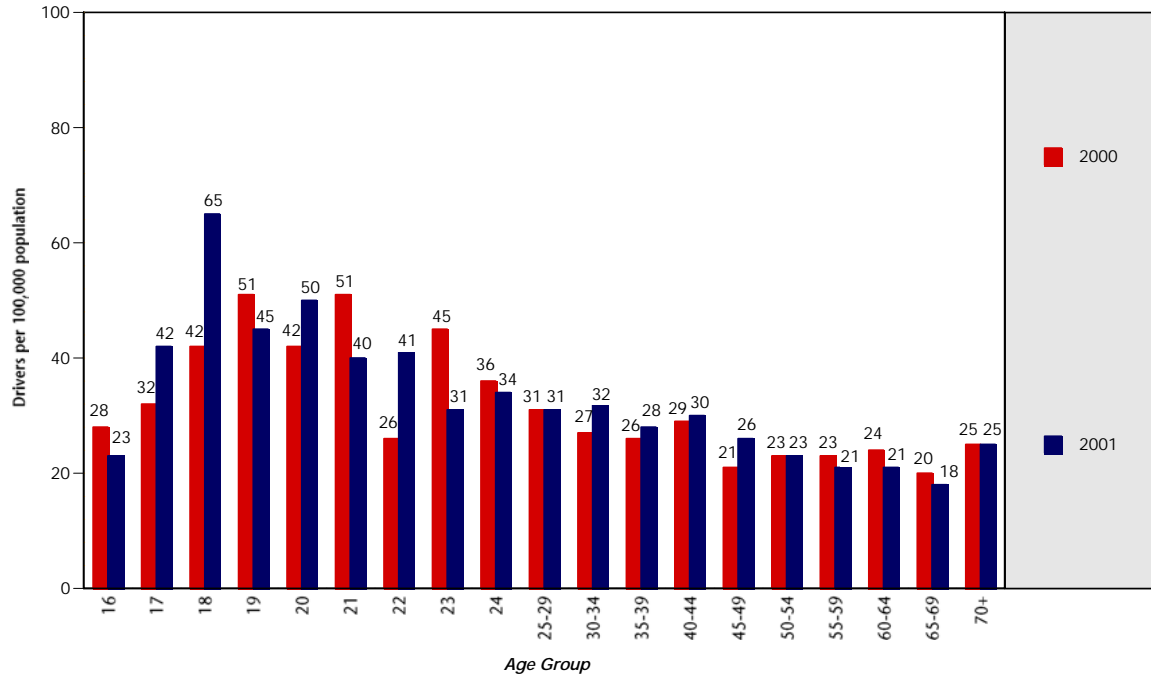
Note: The expected fatal crash involvement rate for each age cohort is 1.0. The index is equal to the ratio of two percentages. The first (the numerator) is equal to the percentage of all drivers involved in fatal crashes who are from this age group. The second percentage (denominator) is the percentage of all licensed drivers who are from this age group.

Source: BBC Research & Consulting using 2000 FARS data from CDOT, and 2000 licensed driver data from the Colorado Department of Revenue — Motor Vehicle Division.

From 2000 to 2001, the largest increase in the number of drivers involved in fatal crashes per 100,000 population by age occurred among 18 year old drivers (Exhibit III-15).

Exhibit III-15.

Drivers Involved in Fatal Crashes per 100,000 Population, 2000 and 2001

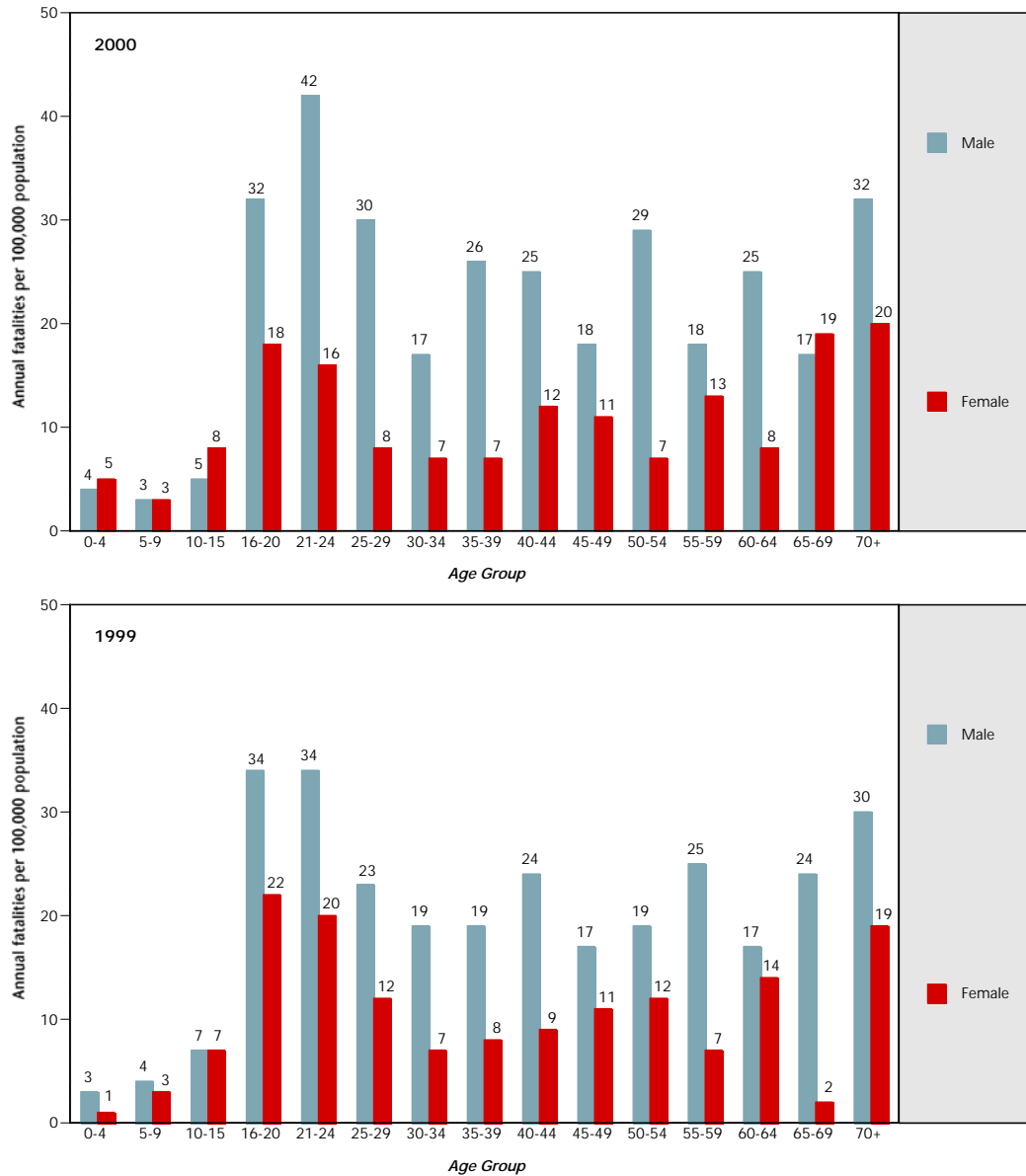


Source: BBC Research & Consulting using 2000 and 2001 FARS data from CDOT and 2000 population data from the Colorado Division of Local Government.

Traffic fatalities by age and gender. In 2000, men were twice as likely as women to die in a traffic crash. Fatality rates per 100,000 population for men and women by age are shown in Exhibit III-16. In every age cohort from 16 through 64 years of age, men have higher fatality rates than women. Some of the disparity between male and female fatality rates in Colorado may be due to the lower rate of seat belt use by men and the greater likelihood that men will drink and drive.

Men under 25 years of age have the highest fatality rates, followed by males ages 16 to 20 and 70 and older. This pattern is consistent with recent years. The role of age in fatal and injury crashes is explored in detail in Section IV.

Exhibit III-16.
Colorado Traffic Fatality Rates by Age and Gender

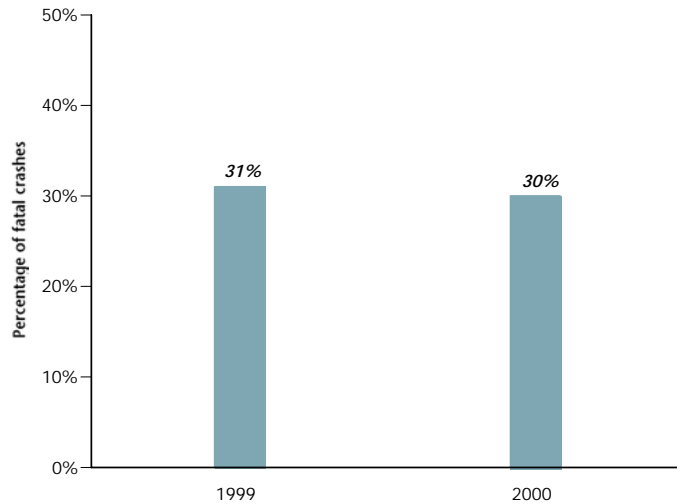


Source: BBC Research & Consulting using 1999 and 2000 FARS data from CDOT and 1999 and 2000 population data from the Colorado Division of Local Government.

Impaired driving. The statewide increase in fatal crashes cannot be explained by more drunk driving statewide. In 2000, Colorado saw the lowest percentage of alcohol-involvement in fatal crashes since record-keeping began. These trends are discussed in more detail in Section V.

Exhibit III-17.

Alcohol-related Fatal Crashes as a Percentage of All Fatal Crashes, 1999 and 2000

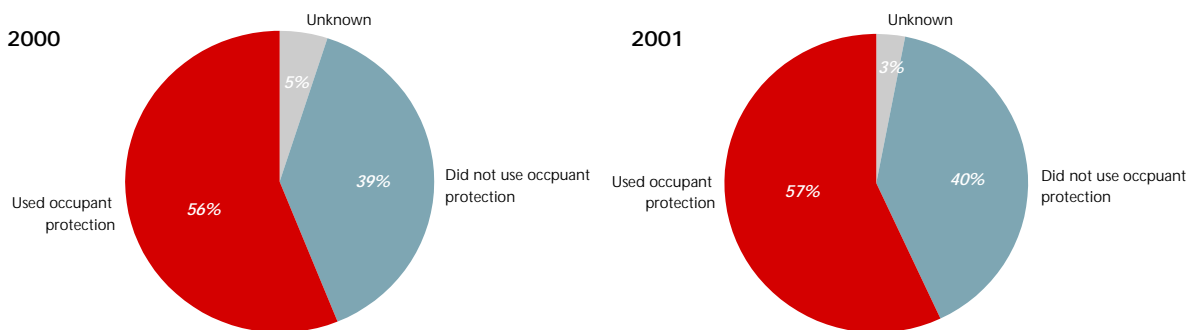


Source: BBC Research & Consulting from 1999 and 2000 FARS data.

Occupant protection. There was little change in occupant protection use among drivers in fatal crashes between 2000 and 2001 (Exhibit III-18). Over half of all fatal crash drivers in 2000 and 2001 used occupant protection. Occupant protection use is described in more detail in Section VI.

Exhibit III-18.

Occupant Protection Use by Drivers in Fatal Crashes, 2000 and 2001



Source: BBC Research & Consulting from 2000 CDOT crash data and 2001 FARS data from CDOT.

SECTION IV. Age and Traffic Crashes

Crash analyses that incorporate data on driver age show that some age cohorts are more likely to be involved in traffic crashes than are others. (Section III demonstrated this for fatal crashes.)

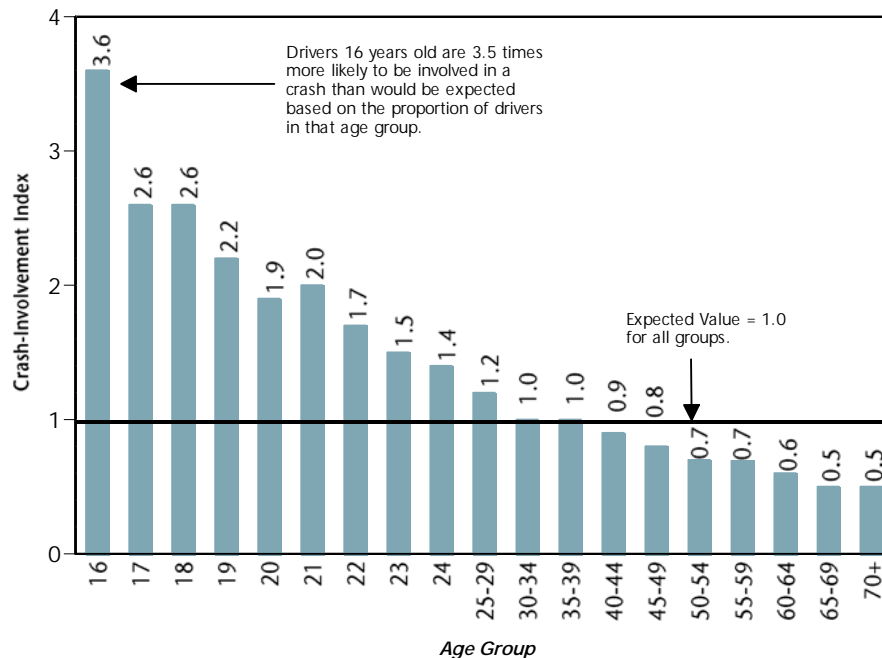
Identifying these high-risk age segments can help to create effective traffic safety programs. Analyses in this section further explore the relationship between age and involvement in traffic crashes. High-risk age groups are analyzed at the city and county level to identify areas within the state that would most benefit from targeted safety program efforts.

Crash Involvement by Age Cohort

Younger, less-experienced drivers are more likely to be involved in a traffic crash than are older drivers. As drivers age, their involvement in traffic crashes decreases. Senior drivers have the lowest likelihood of all age segments to be involved in traffic crashes.

Exhibit IV-1 shows the crash involvement index of the estimated Colorado driving population broken down by age. The index measures the likelihood of drivers from each age cohort to be involved in any type of reported crash. The expected value for all age cohorts is 1.0. Age cohorts that have a value greater than 1.0 are more likely to be involved in a traffic crash than would be expected given the proportion of drivers in their age group.

Exhibit IV-1.
Colorado Crash Involvement Index by Age Cohort, 2000



Note: The expected value for each age cohort is 1.0. The crash involvement index is equal to the ratio of two percentages. The first (the numerator) is equal to the percentage of all drivers involved in crashes who are from this age group. The second percentage (denominator) is the percentage of all licensed drivers who are from this age group.

Source: BBC Research & Consulting using 2000 crash data from CDOT, and 2000 licensed drivers from the Colorado Department of Revenue — Motor Vehicle Division.

Several trends relating to drivers involved in crashes in 2000 emerge from Exhibit IV-1.

- Sixteen-year-old drivers are the most likely age cohort to be involved in a traffic crash. This is likely attributable to their inexperience behind the wheel.
- Drivers 29 years old and younger are more likely to be involved in a traffic crash than is expected given their population.
- Twenty-one-year-old drivers are the only age group whose crash involvement index did not decrease from the preceding age cohort. They are more likely to be involved in a crash than are 20-year-old drivers. This may be due to greater alcohol use.
- Drivers 65 and older are least likely to be in a traffic crash. This may be because they drive less frequently than do drivers from other age segments.

Young Drivers

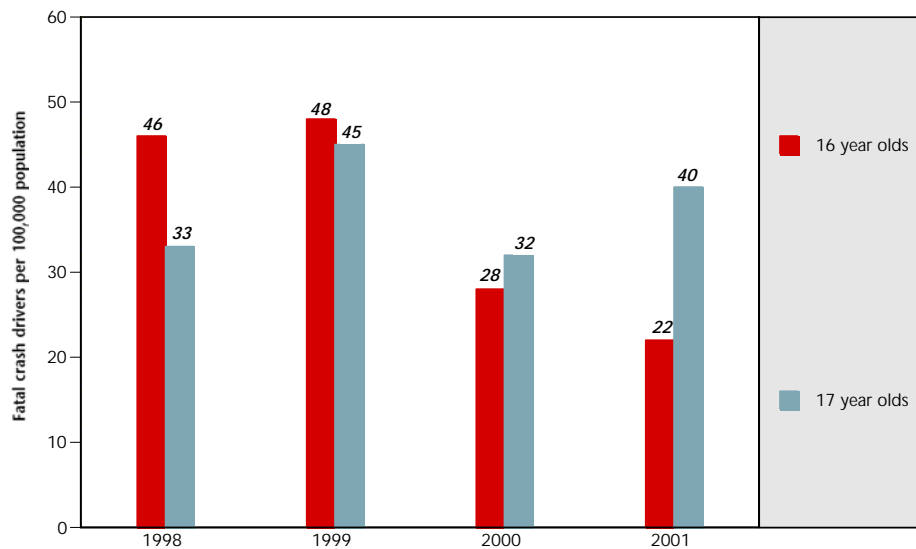
As demonstrated in the previous exhibit, the youngest drivers have the highest incidence of involvement in any type of crash among all drivers. In addition, nearly one-in-five of all injury crash drivers were between the ages of 16 and 20 from 1998 through 2000.

The purpose of Colorado's Graduated Driver Licensing Law (GDL) is to reduce young driver crash involvement by increasing their experience behind the wheel before they become fully licensed. This law became effective July 1, 1999, so data from 2000 represent the first full year of the law's implementation. The key components of the law include:

- Young drivers must log a minimum of 50 hours of behind-the-wheel training with a parent, guardian or other qualified adult. Ten of these training hours must be at night.
- All passengers of young drivers must use seat belts. The number of passengers cannot exceed the vehicle's number of seat belts.
- Other rules apply, including restrictions on driving between the hours of midnight and 5, and a requirement that learner's permits must be held for a full 6 months.

The fatal crash rate of the youngest drivers is shown in Exhibit IV-2. Data from 2000 and 2001 demonstrate preliminary results of the impact of GDL, as the law was in effect for only a portion of 1999. As shown in the exhibit, 48 out of every 100,000 16-year-olds were involved in a fatal crash in 1999. This rate fell to 28 per 100,000 16-year-olds in 2000 and 22 per 100,000 16-year-olds in 2001, a preliminary indication of GDL's impact. In order to evaluate GDL's impact, this rate should be monitored annually.

Exhibit IV-2.
Young Driver Fatal Crash Rate, 1998 - 2001



Note: The Graduated Driver Licensing Law (GDL) was enacted in July 1999 in Colorado.

Source: BBC Research & Consulting from 1998-2001 FARS data and population data from the Colorado Division of Local Government.

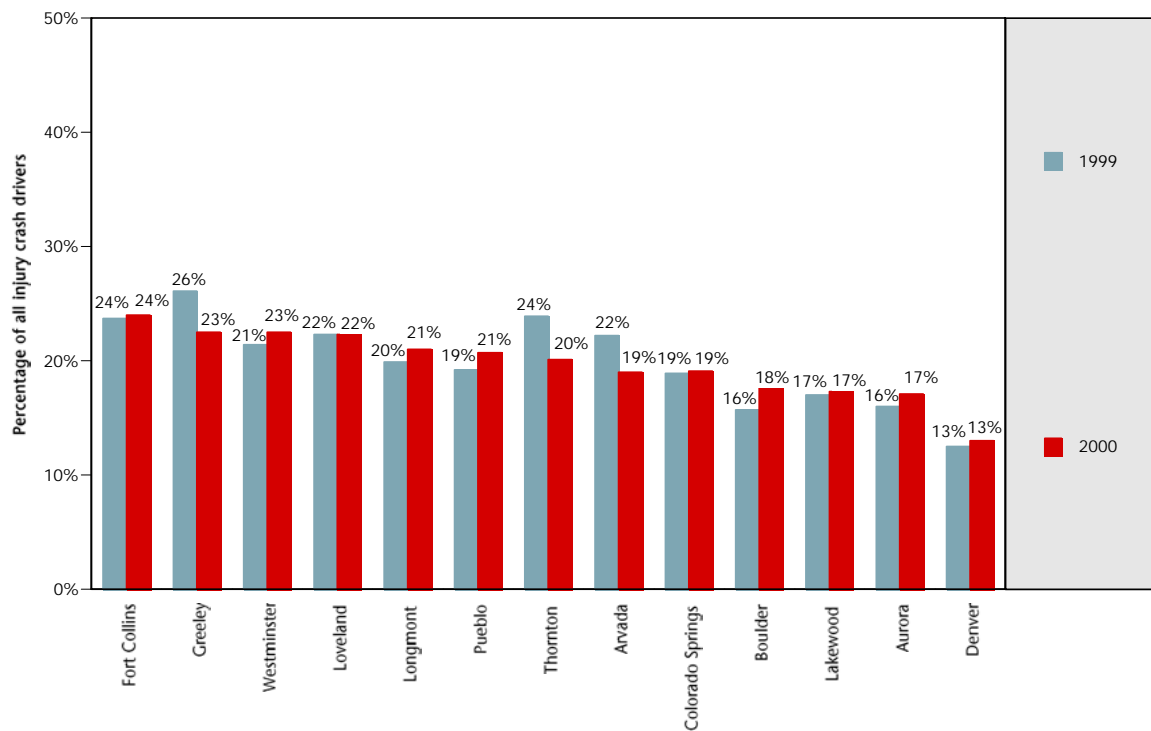
Geographic Differences in Young Driver Crash Rates

Crash rates vary across the state for drivers between the ages of 16 and 20 years old. Some cities and counties have had consistently high young driver crash rates.

Location of young driver injury crashes. Nearly one in five of all injury crash drivers who crashed in large cities in 2000 were between the ages of 16 and 20 years old (17 percent). Young drivers also represented a large portion of the injury crash driver population in rural parts of the state.

Cities. Among cities with populations of 50,000 or greater, young drivers made up the largest portion of all injury crash drivers in Fort Collins, Greeley and Westminster in 1999 and 2000 (see Exhibit IV-3). Conversely, Denver and Aurora have consistently ranked low among large cities.

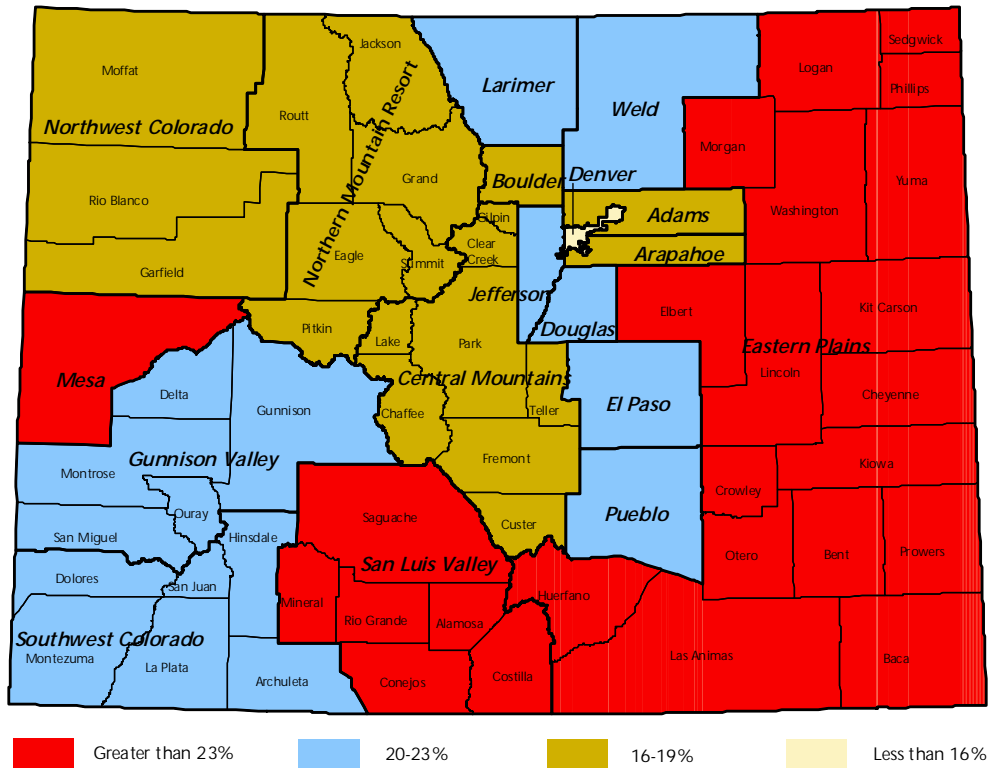
Exhibit IV-3.
Young Injury Crash Drivers by Large City of Crash, 1999 and 2000



Source: BBC Research & Consulting from 1999 and 2000 CDOT crash data.

Large counties and regions. Exhibit IV-4 shows young injury crash drivers as a percent of all injury crash drivers by location of crash. Nearly one-quarter of all drivers involved in injury crashes in Mesa County and the Eastern Plains and San Juan Valley regions were between the ages of 16 and 20 years old.

Exhibit IV-4.
Young Injury Crash Drivers as a Percentage of All Injury Crash Drivers by County and Region of Crash, 2000



Source: BBC Research & Consulting from 2000 CDOT crash data.

Residence of young drivers in injury crashes. Some communities are home to large young injury crash driver populations and could benefit from targeted traffic safety education programs.

Young driver crash rates—cities. Cities with populations of 50,000 or more accounted for nearly 50 percent of all young drivers involved in injury crashes in 2000. These cities also represented half of the state’s young driver population.

While Denver has the largest young driver population and accounted for over 10 percent of all young injury crash drivers statewide, young drivers living in Longmont had the greatest likelihood of being in an injury crash out of all large cities in both 1999 and 2000. In 2000, they were 40 percent more likely than young drivers statewide to be in an injury crash.

Exhibit IV-5 compares 1999 and 2000 rankings of young driver crash indices for cities with populations of 50,000 or more and lists each city’s 2000 crash index.

**Exhibit IV-5.
Young Driver Injury Crash Rate Rankings, Large Cities, 1999 and 2000**

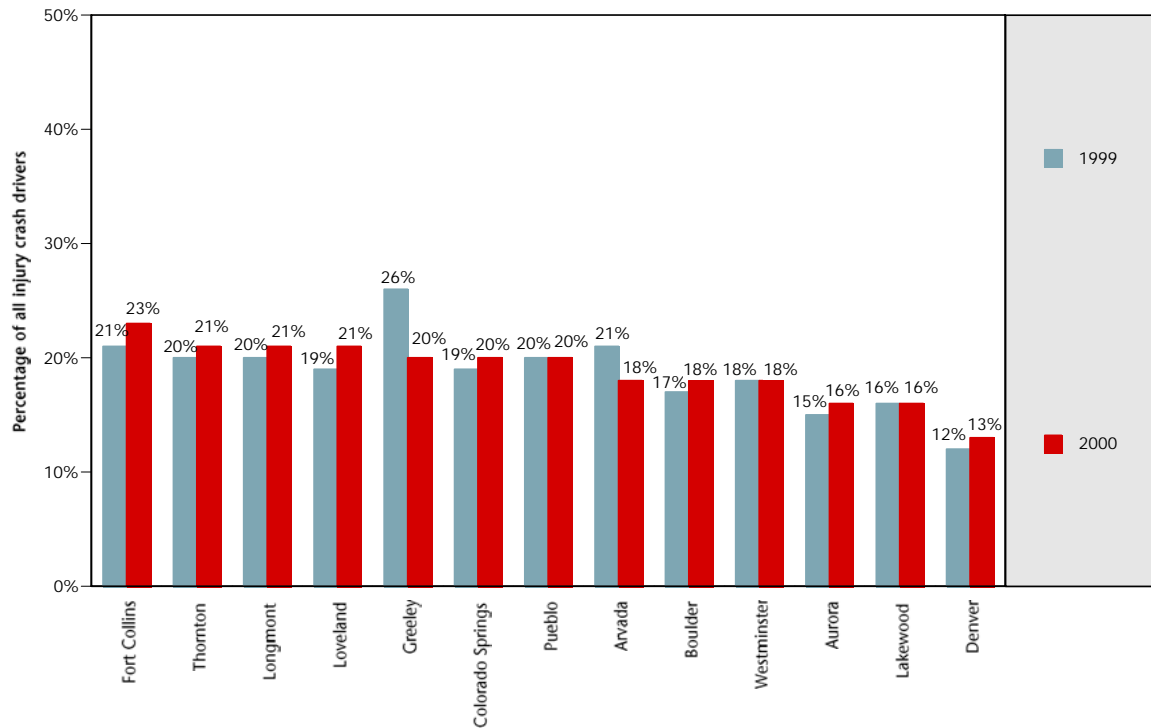
<i>City Name</i>	<i>1999 Rank</i>	<i>2000 Rank</i>	<i>2000 Index</i>
Longmont	1	1	1.40
Aurora	5	2	1.33
Pueblo	2	3	1.25
Thornton	6	4	1.23
Colorado Springs	7	5	1.14
Loveland	4	6	1.11
Arvada	3	7	1.11
Denver	10	8	1.04
Lakewood	9	9	1.02
Westminster	8	10	.99
Fort Collins	12	11	.68
Greeley	11	12	.53
Boulder	13	13	.47

Note: Young drivers are between the ages of 16 and 20. Includes only those cities with 2000 populations greater than 50,000. These crash rates are adjusted for size of the young driver population in the city.

Source: BBC Research & Consulting using 1999 and 2000 crash data from CDOT and 1999 and 2000 population data from the Colorado Division of Local Government.

Young drivers' role in injury crashes—cities. On average, about 20 percent of the injury crash drivers from large cities are between the ages of 16 and 20. Few large cities saw a decrease in the percentage of young driver involvement in injury crashes from 1999 to 2000. One notable exception was the city of Greeley, which had a large reduction in the share of injury crashes involving young drivers.

Exhibit IV-6.
Young Drivers as a Percentage of All Injury Crash Drivers from Large Cities, 1999 and 2000



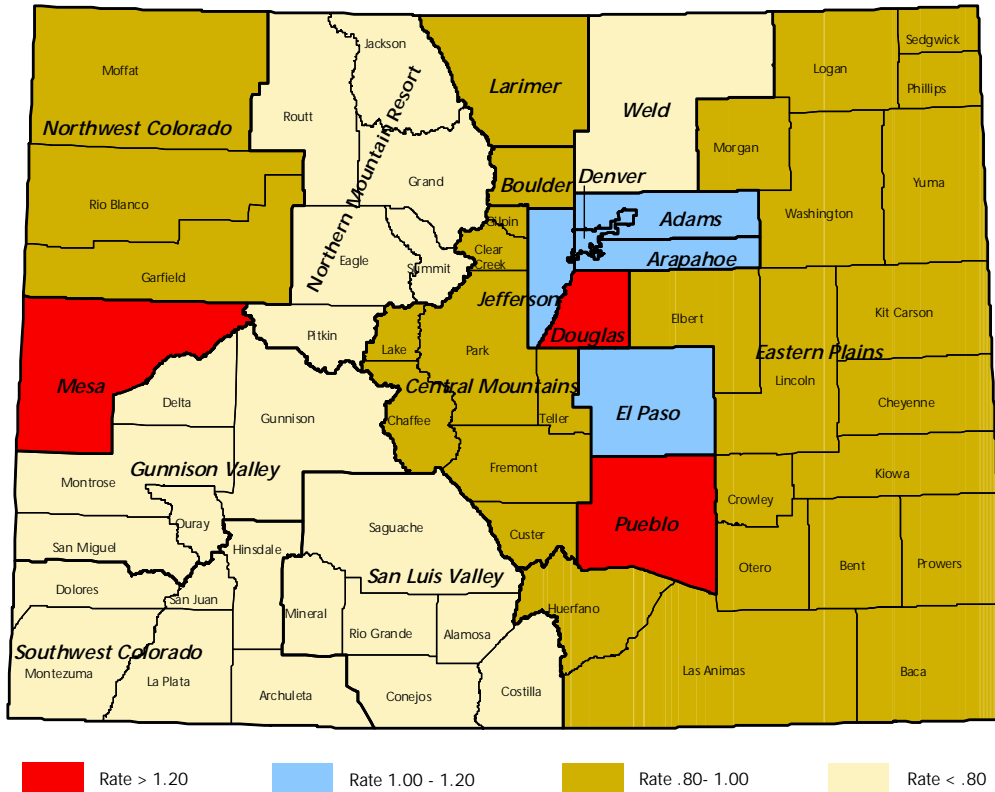
Note: Young drivers are between the ages of 16 and 20.

Source: BBC Research & Consulting from 1999 and 2000 CDOT crash data and population data from the Colorado Division of Local Government.

Young driver injury crash rates—counties and regions. In 2000, nearly 90 percent of all young drivers who were involved in an injury crash were from large counties. Crash rates were highest for young drivers in Mesa County and along the Front Range (see Exhibit IV-7).

Exhibit IV-7.

Counties with Young Driver Injury Crash Rates Greater than the State Average, 2000

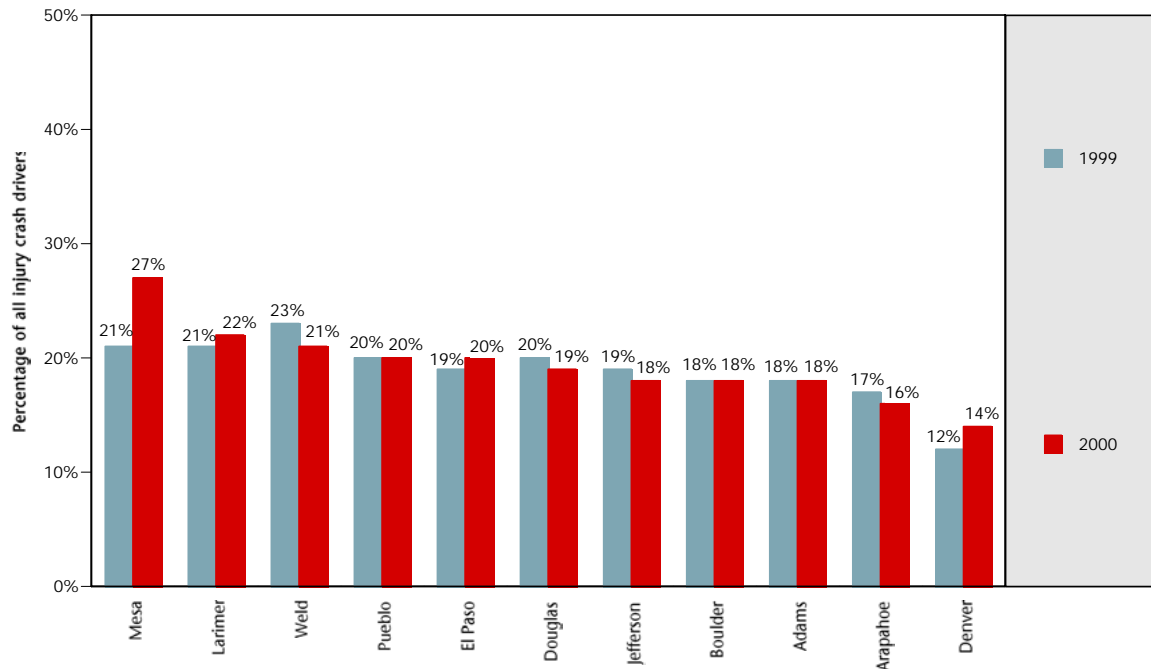


Note: Young drivers are between the ages of 16 and 20. The injury crash rates are adjusted for the size of the young driver population in each county. The state average is 1.0.

Source: BBC Research & Consulting using 2000 CDOT crash data and Department of Revenue crash data and 2000 population data from the Colorado Division of Local Government.

Young drivers' role in injury crashes—large counties. In Mesa County, young drivers made up over a quarter of all injury crash drivers in 2000 (Exhibit IV-8). One-fifth of all injury crash drivers living in Pueblo and Weld counties were between 16 and 20 years old.

Exhibit IV-8.
Young Drivers as a Percentage of All Drivers in Injury Crashes,
Large Counties, 1999 and 2000



Source: BBC Research & Consulting from 1999 and 2000 CDOT crash data.

Senior Drivers

Similar to 1998 and 1999, drivers 65 years of age and older were under-represented in injury crashes in 2000 given their licensed driver population. Approximately 12 percent of all licensed drivers in 2000 were 65 years old or older but only 6 percent of all injury crashes statewide involved 65-plus drivers. While senior drivers do not currently contribute to traffic safety problems on a large scale, there may be cause for concern in the future. The U.S. Census Bureau estimates that roughly 10 percent of Colorado's total population in 2000 was 65 years old or older. By 2025, the Bureau projects that this age cohort will represent 20 percent of the state's total population.

SECTION V. Driver Impairment and Injury Crashes

Since 1981, when 425 people lost their lives in Colorado in alcohol-related crashes, the State, law enforcement agencies and local communities have made it a priority to reduce impaired driving. Alcohol-related crash fatalities have fallen dramatically since that time (209 fatalities in 2000) but they still represent over 30 percent of statewide crash fatalities. Identifying communities with the greatest impaired driving problems and allocating safety program resources to these communities is an important way to combat impaired driving.

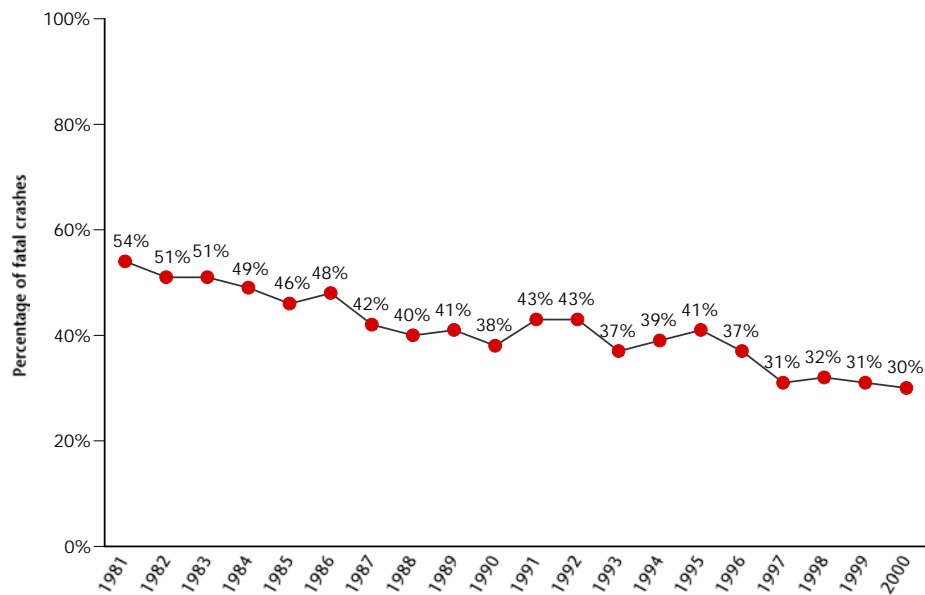
Overview

In 2000 there were 3,277 injury crash drivers suspected of alcohol or drug use in Colorado, up slightly from 3,204 impaired drivers in 1999. Statewide, approximately 6 percent of all drivers involved in injury crashes were impaired drivers. Certain age groups and geographic areas are largely responsible for the number of impaired injury and fatal crashes that take place in Colorado each year.

The Role of Alcohol in Fatal Crashes

In 1981, more than half of all fatal crashes in Colorado were alcohol-related. Since then, the role of alcohol in fatal crashes has dropped substantially. In 2000, 30 percent of Colorado fatal crashes involved alcohol, compared to 40 percent nationally. Exhibit V-1 shows alcohol-related fatal crashes as a percentage of all fatal crashes for the period 1981 through 2000.

Exhibit V-1.
Alcohol-Related Fatal Crashes as a Percentage of All Fatal Crashes in Colorado, 1981–2000

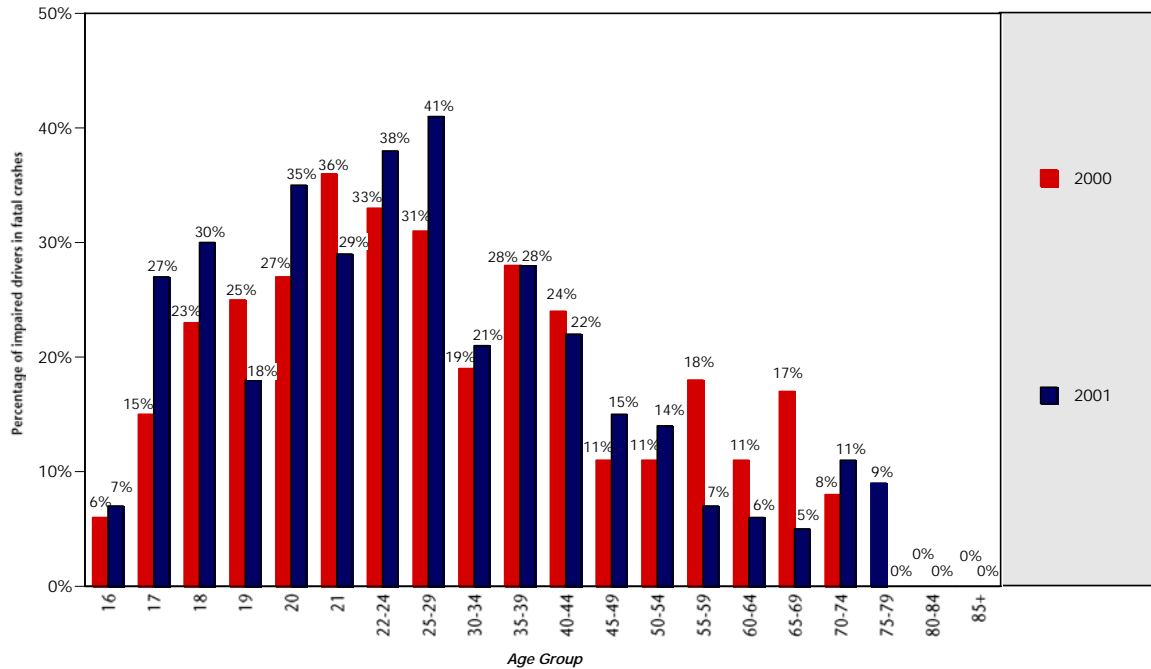


Note: Alcohol-related fatal crashes are those where at least one driver was found to have a BAC of 0.05 or greater.

Source: BBC Research & Consulting using FARS data from CDOT.

Driver age and alcohol-related fatal crashes. Young drivers make up the largest portion of all drivers involved in alcohol-related fatal crashes. In 2001, over one-third of all drivers between the ages of 21 and 29 who were involved in a fatal crash were impaired. A quarter of all 18- to 20-year-old drivers and 35- to 44-year-old drivers in fatal crashes were impaired. (Drivers were considered impaired if they had a BAC of 0.01 or greater.) Exhibit V-2 shows the percentage of fatal crash drivers by age in 2000 and 2001 who were impaired.

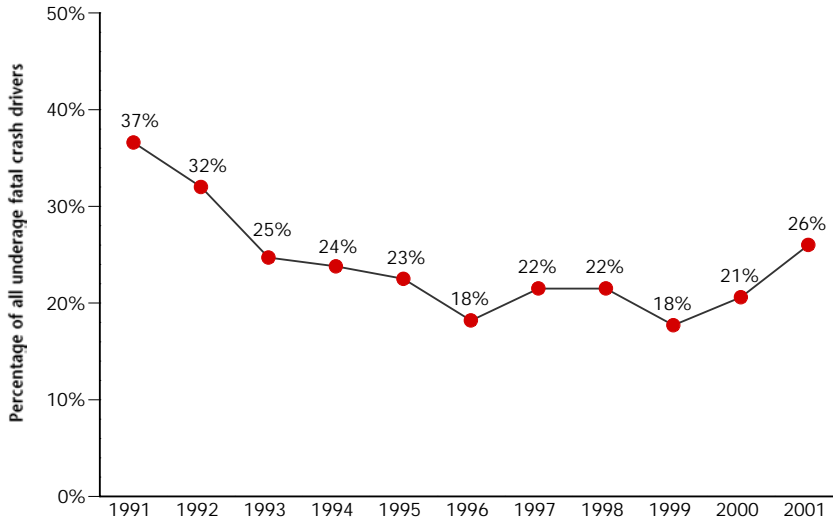
Exhibit V-2.
Colorado Drinking Drivers Involved in Fatal Crashes by Age, 2000 and 2001



Note: Drinking drivers are those with BACs of 0.01 or greater as reported in the 2000 FARS database.
 Source: BBC Research & Consulting using 2000 and 2001 FARS data from CDOT.

The role of underage drinking drivers in fatal crashes. About one in four drivers under the age of 21 who were involved in a fatal crash in 2001 were suspected of impairment. This is an increase from 1999 and 2000, as shown in Exhibit V-3. In 2000, underage drivers made up 13 percent of all fatal crash drivers who were suspected of impairment.

Exhibit V-3.
Colorado Underage Drinking Drivers Involved in Fatal Crashes, 1991–2001



Note: Underage drinking drivers are younger than 21 and had BACs greater than 0.01. This graph shows underage fatal crash drivers suspected of impairment as a percentage of all underage fatal crash drivers.

Source: BBC Research & Consulting using FARS data from CDOT.

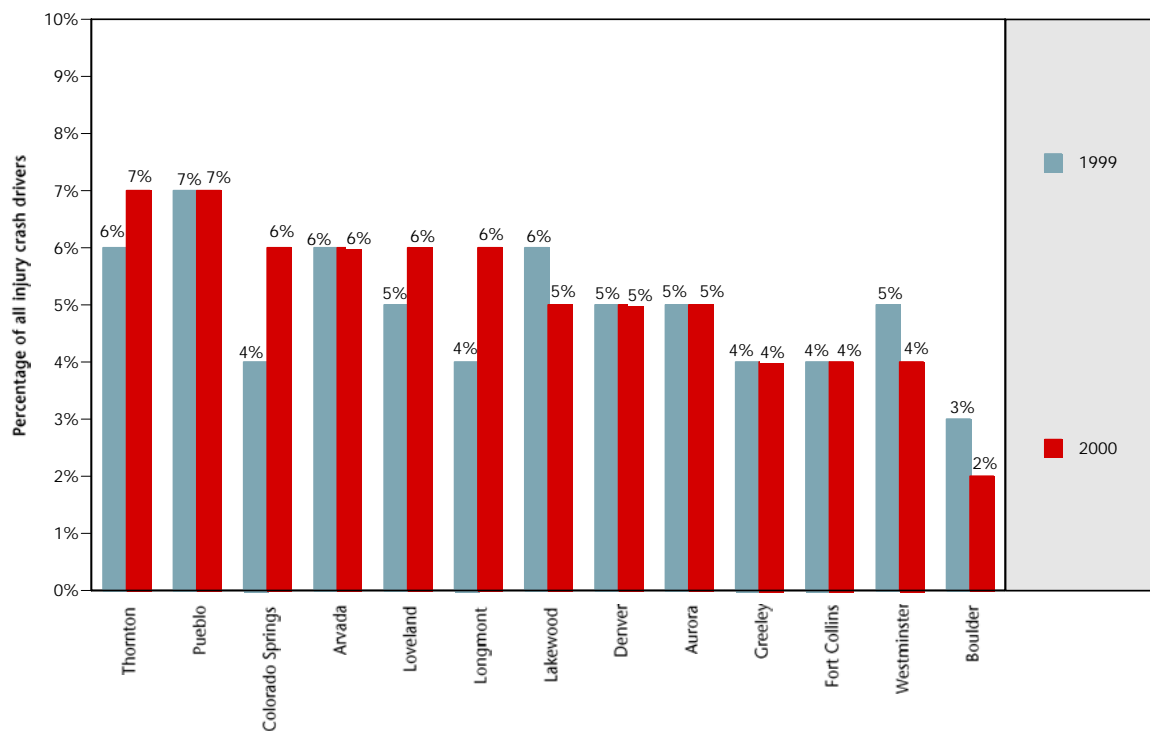
Geographic Differences in Drinking and Driving

The distribution of impaired injury crash drivers varies in cities and counties throughout the state. The analyses in this section look at large cities and counties and regions where impaired injury crash drivers crash and where they live.

Impaired injury crash drivers by location of crash. Identifying areas of the state where impaired driving is a problem is useful for law enforcement purposes. More detailed impaired driver crash data are provided for law enforcement agencies throughout the state at the end of this section.

Large cities. One-half of all impaired injury crash drivers crashed in cities with populations of 50,000 or more in 2000. Denver, Colorado Springs, Aurora and Loveland had the greatest number of impaired injury crash drivers. Exhibit V-4 shows impaired injury crash drivers as a percent of all injury crash drivers in large cities for both 1999 and 2000. A relatively large share of injury crashes in Thornton and Pueblo involved impaired drivers.

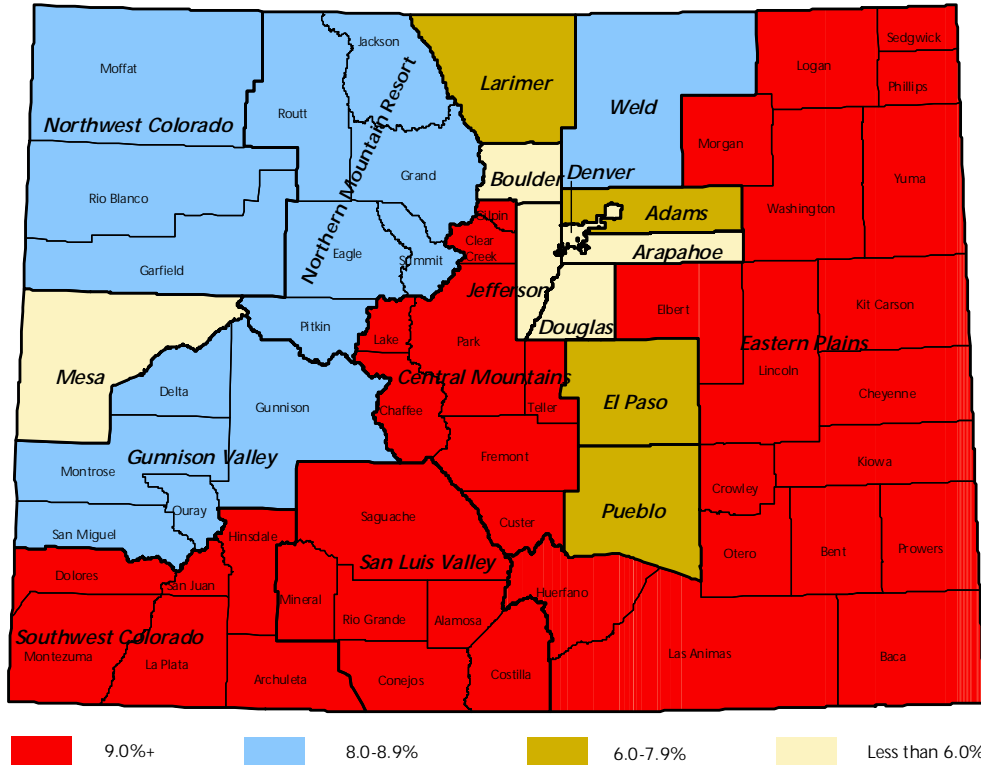
Exhibit V-4.
Percent of All Injury Crash Drivers Who Were Impaired by Large City of Crash, 1999 and 2000



Source: BBC Research & Consulting from 1999 and 2000 CDOT crash data.

Large counties and regions. Over 80 percent of all impaired drivers involved in injury crashes in 2000 crashed in large counties. However, impaired drivers make up a smaller percentage of all injury crash drivers in these large counties than they do in rural portions of the state. As shown in Exhibit V-5, 9 percent or more of all injury crash drivers who crashed in the Eastern Plains, Southwest Colorado, San Luis Valley and Central Mountains regions were impaired.

Exhibit V-5.
Percent of All Injury Crash Drivers Who Were Impaired by County and Region of Crash, 2000



Source: BBC Research & Consulting from 1999 and 2000 CDOT crash data.

Residence of impaired drivers in injury crashes. Drivers living in urban areas are more likely to be in an alcohol-related injury crash than are drivers from rural parts of the state. Drivers living in Pueblo are the most likely to be in an injury crash that involves alcohol. Impaired driving crashes are also a greater problem in Northwest and Southwest portions of the state.

Drinking driver injury crash rates—cities. Over half of all impaired drivers involved in injury crashes in 2000 lived in large cities with populations of 50,000 or more. Denver had the greatest number of impaired drivers, followed by Colorado Springs, Aurora and Pueblo. However, when examining crash rates, Pueblo led all large cities in both 1999 and 2000. Denver, Longmont and Aurora residents are also much more likely to be impaired and involved in injury crashes. Exhibit V-6 shows impaired driver injury crash rate rankings for large cities in 1999 and 2000.

Exhibit V-6.
Impaired Driver Injury Crash Rate Rankings, Large Cities, 1999 and 2000

<i>City Name</i>	<i>1999 Rank</i>	<i>2000 Rank</i>	<i>2000 Index</i>
Pueblo	1	1	1.68
Denver	2	2	1.36
Longmont	10	3	1.30
Aurora	3	4	1.30
Loveland	4	5	1.25
Colorado Springs	11	6	1.20
Thornton	5	7	1.02
Fort Collins	6	8	.94
Greeley	8	9	.92
Lakewood	9	10	.89
Arvada	12	11	.76
Westminster	7	12	.67
Boulder	13	13	.57

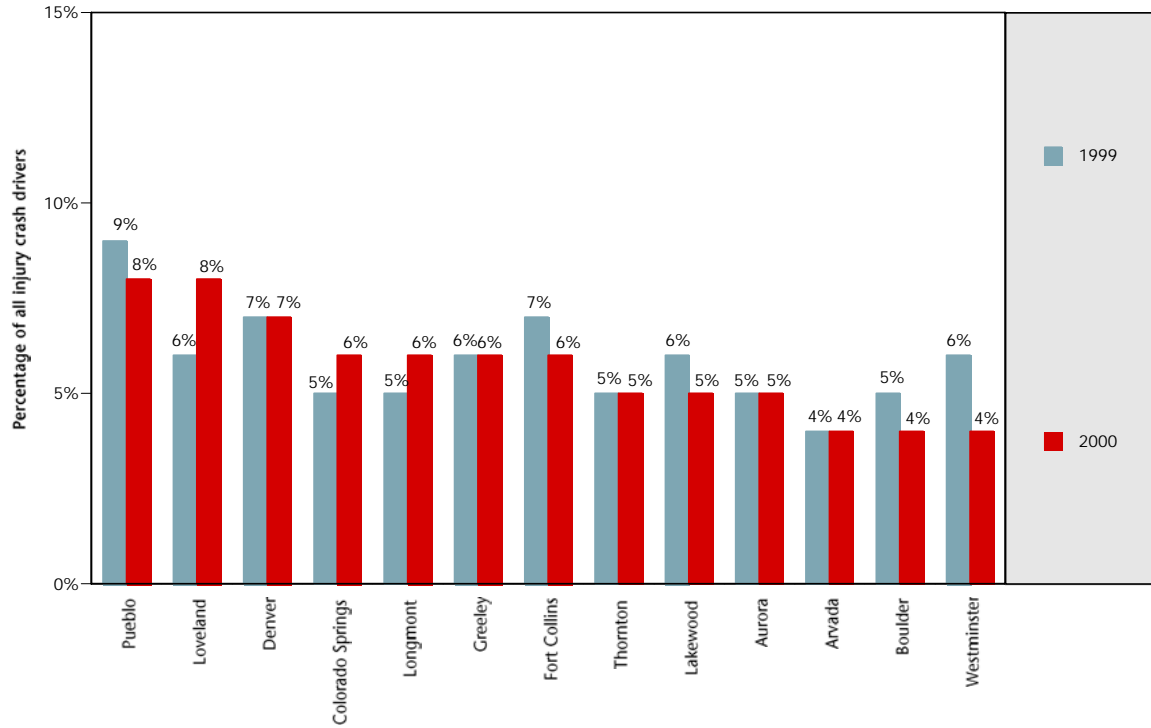
Note: The state average is 1.0. Includes cities with 2000 populations greater than 50,000. This index is adjusted for the driving-age population in each city.

Source: BBC Research & Consulting using 1999 and 2000 crash data from CDOT and population data from the Colorado Division of Local Government.

Percentage of injury crash drivers who were impaired—cities. The percentage of impaired injury drivers in Pueblo ranked high in both 1999 and 2000. In 2000, Loveland, Colorado Springs and Longmont all saw increases in the proportion of injury crash drivers who were impaired.

Exhibit V-7.

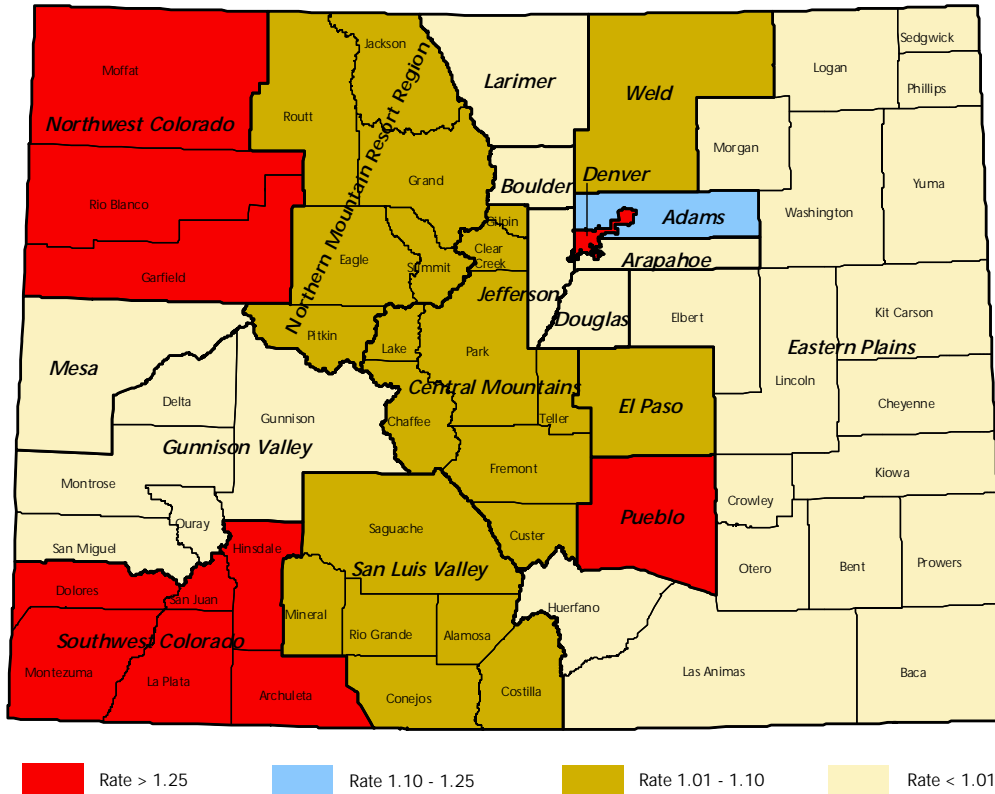
Percentage of All Injury Crash Drivers who were Impaired, Large Cities, 1999 and 2000



Source: BBC Research & Consulting from 1999 and 2000 CDOT crash data.

Drinking driver injury crash rates—counties and regions. Drivers from Northwest and Southwest Colorado, Denver and Pueblo County lead all regions in the rate of impaired driver involvement in injury crashes.

Exhibit V-8.
Drinking Driver Injury Crash Rates, Counties and Regions, 2000

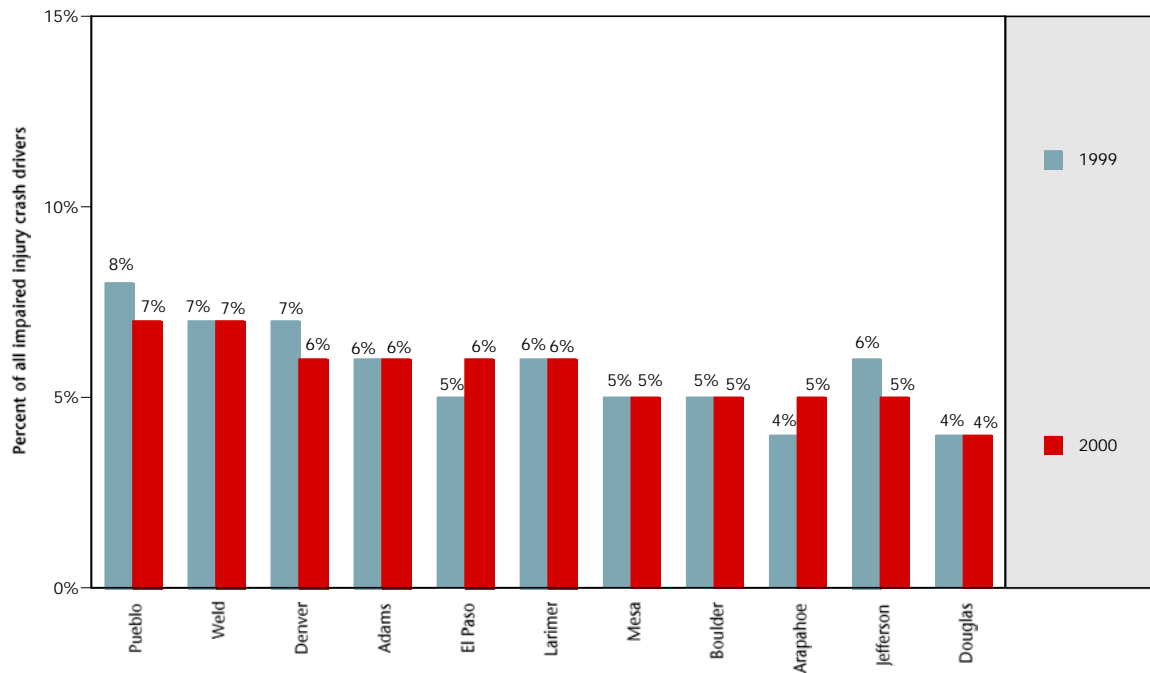


Note: The state average is 1.0. This index is adjusted for the driving population in each county and region.
 Source: BBC Research & Consulting using 2000 crash data from CDOT and 2000 Colorado Division of Local Government population data.

Percentage of injury crash drivers who were impaired—large counties. Approximately 8 percent of all injury crash drivers living in rural areas were impaired compared with 6 percent statewide and 5.5 percent in large counties. Exhibit V-9 shows the percentage of all injury crash drivers in 1999 and 2000 who were impaired and living in large counties.

Exhibit V-9.

Resident Drivers Suspected of Impaired Driving as a Percentage of All Injury Crash Drivers, Large Counties, 1999 and 2000



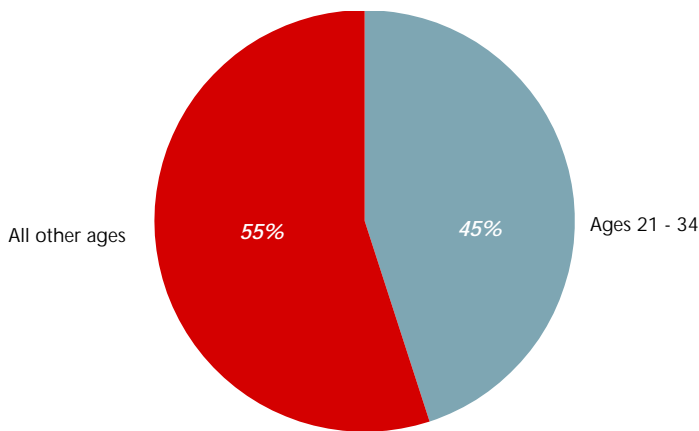
Source: BBC Research & Consulting from 1999 and 2000 CDOT crash data.

Age and Drinking and Driving

The extent to which drinking and driving is a problem in varying communities may in part be explained by the distribution of younger drivers throughout the state. As was previously discussed, younger drivers are responsible for more alcohol-related fatal crashes than are other age cohorts. Not surprisingly, they also make up a large portion of alcohol-related injury crashes.

The role of 21-34 year-olds in impaired crashes. For the period 1998 through 1999 and again in 2000, nearly half of all impaired drivers involved in an injury crash were between 21 and 34 years old. Men were over 80 percent of impaired drivers ages 21 to 34 in 2000.

Exhibit V-10.
Drinking Drivers Involved in Injury Crashes by Age, 2000



Note: Among all drivers involved in serious crashes who were suspected of impaired driving, 45 percent were between the ages of 21 and 34.
Source: BBC Research & Consulting using 2000 crash data from CDOT.

21-34-year-old drinking drivers—cities. Drivers 21 to 34 years old living in Pueblo were almost twice as likely as 21- to 34-year-old drivers statewide to be involved in an impaired injury crash in 2000. Drivers from some large cities, including Boulder, Westminster and Fort Collins, had a relatively low likelihood of being in an impaired injury crash compared with drivers statewide, as shown in Exhibit V-11. Drivers from Littleton, Trinidad and Commerce City who were 21 to 34 years old were two times more likely than drivers statewide to be in an alcohol-related injury crash in 2000. The role of underage drinking among college students may be underrepresented in college cities because their licenses report their permanent home addresses.

Within cities that have populations of 50,000 or more, men made up nearly 85 percent of all impaired drivers between the ages of 21 and 34. Denver and Colorado Springs had the greatest number of impaired male drivers from this age cohort in 2000.

Exhibit V-11.
Injury Crash Rates Rankings of Drinking Drivers Between the Ages of 21 and 34,
Large Cities, 1999 and 2000

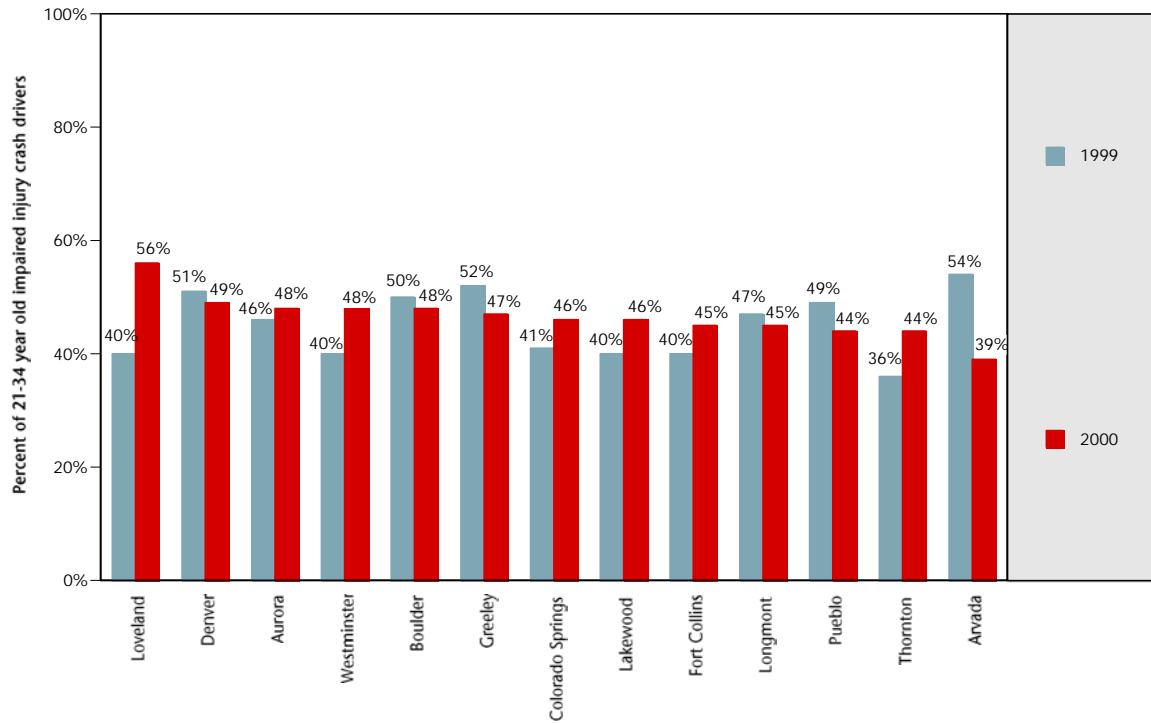
<i>City Name</i>	<i>1999 Rank</i>	<i>2000 Rank</i>	<i>2000 Index</i>
Pueblo	1	1	1.82
Loveland	3	2	1.69
Longmont	7	3	1.24
Colorado Springs	9	4	1.13
Aurora	5	5	1.12
Denver	2	6	1.11
Lakewood	8	7	.87
Greeley	6	8	.81
Arvada	4	9	.79
Thornton	11	10	.79
Fort Collins	12	11	.67
Westminster	10	12	.60
Boulder	13	13	.41

Note: The state average is 1.0. The index is adjusted for the size of each city's 21- to 34-year-old population.

Source: BBC Research & Consulting using 2000 crash data from CDOT and 2000 Colorado Division of Local Government population data.

Percentage of 21 to 34-year old impaired drivers in injury crashes—cities. Among drivers age 21 to 34 who were involved in injury crashes, a substantial percentage were suspected of impairment. In 2000, 56 percent of the 21 to 34-year olds from Loveland who were involved in injury crashes were suspected of impaired driving.

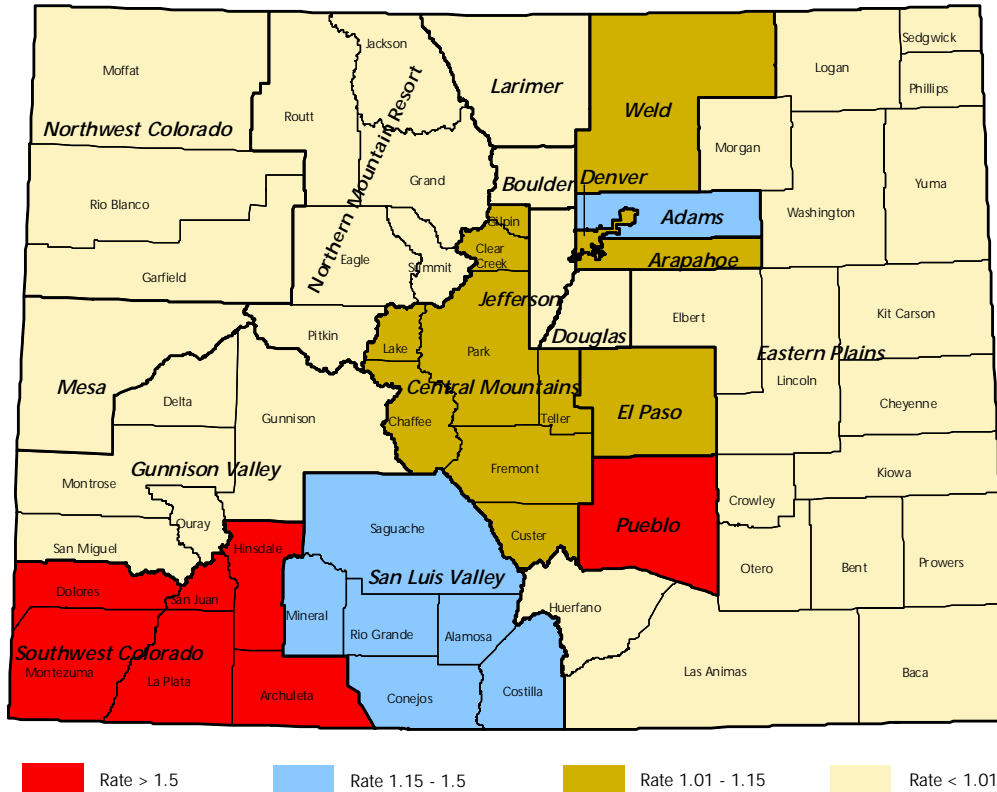
Exhibit V-12.
Resident 21-34 Year Olds Suspected of Impaired Driving, Large Cities, 1999 and 2000



Source: BBC Research & Consulting from 1999 and 2000 CDOT crash data.

21-34-year-old drinking drivers—counties and regions. Twenty-one- to 34-year-old drivers living in Pueblo, Adams and Denver counties had the greatest likelihood of all 21- to 34-year-old injury crash drivers from large counties to be impaired in 2000. Drivers from this age group living in Southwest Colorado were 60 percent more likely to be in an alcohol-related crash than were drivers statewide (Exhibit V-13).

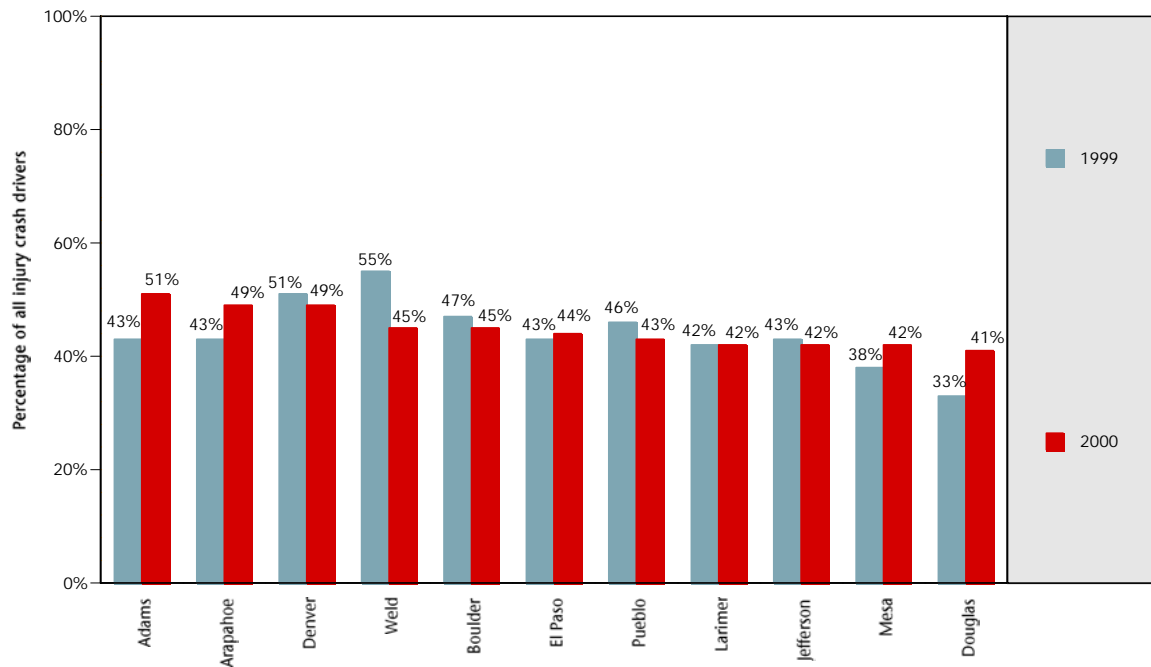
Exhibit V-13.
Injury Crash Rates of Drinking Drivers Between the Ages of 21 and 34,
Counties and Regions, 2000



Note: The state average is 1.0. The index is adjusted for the size of each county's 21 to 34 year-old population.
 Source: BBC Research & Consulting using 2000 crash data from CDOT and 2000 Colorado Division of Local Government population data.

Percentage of 21 to 34-year old impaired drivers in injury crashes—counties. Exhibit V-14 shows the percentage of 21- to 34-year-old drivers in injury crashes who were suspected of impaired driving. In every large county in 2000, over 40 percent of all 21- to 34-year-old crash drivers were impaired.

Exhibit V-14.
Percent of All Resident 21-34 Year Olds in Injury Crashes Suspected of Impaired Driving, Large Counties, 1999 and 2000



Source: BBC Research & Consulting from 1999 and 2000 CDOT crash data.

Law Enforcement Assistance Fund (LEAF)

As mentioned at the beginning of this section, alcohol-related fatal crashes have decreased substantially over the past couple of decades. This decrease is due in large part to the stepped-up efforts of the State and local law enforcement agencies to reduce impaired driving. In 1982, the Colorado Legislature established the Law Enforcement Assistance Fund (LEAF) Program to assist local law enforcement agencies with DUI enforcement and to increase public awareness about the consequences of driving while impaired. During the first year of the program, 28 law enforcement agencies throughout Colorado received funding to expand their DUI enforcement efforts. By 2001, 53 law enforcement agencies were receiving LEAF funding.

To more efficiently channel LEAF funds to areas of greatest need, BBC created a tier system that categorizes law enforcement agencies according to the number of impaired crashes that took place within their respective communities. The tables below and on the following pages list the agencies within each tier and show the number of impaired injury crashes that occurred in their jurisdictions in 2000. More comprehensive tier data is found in Appendix G.

Exhibit V-15.

Impaired Injury Crash Tier 1 for Local Agencies Throughout Colorado, 1999 and 2000

<i>Tier 1 (300+ Impaired Injury Crashes, 2000)</i>	<i>2000 Impaired Injury Crashes</i>	<i>% Change from 1999</i>	<i>2000 Impaired Injury Crashes as a % of All Injury Crashes</i>	<i>1999 Tier</i>
Colorado Springs Police Department	344	38.2%	11.6%	2
Denver Police Department	657	15.7%	10.6%	1

Exhibit V-16.

Impaired Injury Crash Tier 2 for Local Agencies Throughout Colorado, 1999 and 2000

<i>Tier 2 (100 to 299 Impaired Injury Crashes, 2000)</i>	<i>2000 Impaired Injury Crashes</i>	<i>% Change from 1999</i>	<i>2000 Impaired Injury Crashes as a % of All Injury Crashes</i>	<i>1999 Tier</i>
Larimer County Sheriff's Office	111	14.4%	20.6%	3
Weld County Sheriff's Office	100	-13.8%	17.3%	2
Adams County Sheriff's Department	149	-2.6%	16.8%	2
Pueblo Police Department	125	-0.8%	12.2%	2
Aurora Police Department	234	23.2%	9.6%	2

Exhibit V-17.

Impaired Injury Crash Tier 3 for Local Agencies Throughout Colorado, 1999 and 2000

<i>Tier 3 (25 to 99 Impaired Injury Crashes, 2000)</i>	<i>2000 Impaired Injury Crashes</i>	<i>% Change from 1999</i>	<i>2000 Impaired Injury Crashes as a % of All Injury Crashes</i>	<i>1999 Tier</i>
La Plata County Sheriff's Office	42	-14.3%	22.8%	3
Commerce City Police Department	44	33.3%	18.5%	3
Garfield County Sheriff's Office	36	2.9%	15.4%	3
Eagle County Sheriff's Office	30	15.4%	14.5%	3
Thornton Police Department	56	14.3%	14.4%	3
Pueblo County Sheriff's Office	34	-44.3%	13.5%	3
Mesa County Sheriff's Office	36	-23.4%	12.4%	3
Arvada Police Department	56	12.0%	11.6%	3
Boulder County Sheriff's Department	59	-4.8%	11.3%	3
Longmont Police Department	52	44.4%	10.9%	3
Jefferson County Sheriff's Office	93	-38.4%	10.8%	2
Lakewood Police Department	97	-10.2%	10.3%	2
Wheat Ridge Police Department	42	55.6%	9.4%	3
Arapahoe County Sheriff's Office	65	1.6%	8.9%	3
Douglas County Sheriff's Office	63	-7.4%	8.8%	3
Greeley Police Department	34	13.3%	8.3%	3
Fort Collins Police Services	62	-3.1%	7.8%	3
Westminster Police Department	36	9.1%	7.6%	3
Boulder Police Department	43	-28.3%	5.1%	3

Exhibit V-18.

Impaired Injury Crash Tier 4 for Local Agencies Throughout Colorado, 1999 and 2000

<i>Tier 4 (10 to 25 Impaired Injury Crashes, 2000)</i>	<i>2000 Impaired Injury Crashes</i>	<i>% Change from 1999</i>	<i>2000 Impaired Injury Crashes as a % of All Injury Crashes</i>	<i>1999 Tier</i>
Otero County Sheriff's Office	14	-30.0%	24.6%	4
Conejos County Sheriff's Office	11	-35.3%	23.9%	4
Park County Sheriff's Office	25	13.6%	20.2%	4
Fremont County Sheriff's Office	23	-8.0%	17.2%	4
Delta County Sheriff's Office	15	36.4%	16.1%	4
Grand County Sheriff's Office	13	44.4%	16.0%	5
Golden Police Department	20	5.3%	15.7%	4
Archuleta County Sheriff's Office	12	71.4%	14.0%	5
Sheridan Police Department	12	-20.0%	14.0%	4
Elbert County Sheriff's Office	12	20.0%	14.0%	4
Morgan County Sheriff's Office	17	0.0%	13.3%	4
Montezuma County Sheriff's Office	15	-31.8%	13.2%	4
Durango Police Department	16	33.3%	13.0%	4
Chaffee County Sheriff's Office	11	37.5%	12.9%	5
Littleton Police Department	26	52.9%	12.9%	4
Logan County Sheriff's Office	10	42.9%	11.8%	5
Teller County Sheriff's Office	10	42.9%	11.6%	5
El Paso County Sheriff's Office	69	331.3%	11.6%	4
Englewood Police Department	27	12.5%	11.2%	4
Summit County Sheriff's Office	17	-39.3%	10.5%	3
Clear Creek County Sheriff's Office	24	4.3%	10.5%	4
Northglenn Police Department	18	20.0%	10.4%	4
Loveland Police Department	26	13.0%	10.2%	4
Brighton Police Department	11	-15.4%	9.7%	4
Broomfield Police Department	21	75.0%	7.5%	4
Greenwood Village Police Department	15	-21.1%	5.1%	4
Grand Junction Police Department	22	-8.3%	4.7%	4

Exhibit V-19.
Impaired Injury Crash Tier 5 for Local Agencies Throughout Colorado, 1999 and 2000

<i>Tier 5 (Less than 10 Impaired Injury Crashes, 2000)</i>	<i>2000 Impaired Injury Crashes</i>	<i>% Change from 1999</i>	<i>2000 Impaired Injury Crashes as a % of All Injury Crashes</i>	<i>1999 Tier</i>
Telluride Police Department	2	100.0%	100.0%	5
Buena Vista Police Department	1		100.0%	5
Ignacio Police Department	6		66.7%	5
Eaton Police Department	1		50.0%	5
Black Hawk Police Department	3	0.0%	42.9%	5
Costilla County Sheriff's Department	8	33.3%	36.4%	5
Bent County Sheriff's Office	5	150.0%	33.3%	5
Dolores County Sheriff's Office	1	-88.9%	33.3%	5
La Salle Police Department	1	0.0%	33.3%	5
Meeker Police Department	2		28.6%	5
Snowmass Village Police Department	2		25.0%	5
Burlington Police Department	1		25.0%	5
Vail Police Department	8	300.0%	23.5%	5
Johnstown Police Department	2	100.0%	22.2%	5
San Juan County Sheriff's Office	2	-33.3%	22.2%	5
Yuma Police Department	2		22.2%	5
Baca County Sheriff's Office	3	50.0%	21.4%	5
Prowers County Sheriff's Office	6	-40.0%	20.7%	4
Avon Police Department	4	100.0%	20.0%	5
Morrison Police Department	2	100.0%	20.0%	5
Eagle Police Department	2	100.0%	20.0%	5
Sedgwick County Sheriff's Office	2	0.0%	20.0%	5
Hinsdale County Sheriff's Office	1		20.0%	5
Phillips County Sheriff's Office	3	50.0%	18.8%	5
Fort Lupton Police Department	4		18.2%	5
Manitou Springs Police Department	5	66.7%	17.2%	5
Glendale Police Department	9	125.0%	16.7%	5
Mineral County Sheriff's Office	2	100.0%	16.7%	5
Cripple Creek Police Department	1	-50.0%	16.7%	5
Lyons Police Department	1		16.7%	5
Wray Police Department	1		16.7%	5
Crowley County Sheriff's Office	3		15.8%	5
Lake County Sheriff's Office	6	-25.0%	15.0%	5
San Miguel County Sheriff's Office	7	-12.5%	14.9%	5
Cortez Police Department	6	100.0%	14.6%	5
Kiowa County Sheriff's Office	2		14.3%	5
Platteville Police Department	1		14.3%	5
Aspen Police Department	4	100.0%	13.8%	5
Wiggins Police Department	2		13.3%	5

Exhibit V-19.
Impaired Injury Crash Tier 5 for Local Agencies Throughout Colorado, 1999 and 2000
(continued)

<i>Tier 5 (Less than 10 Impaired Injury Crashes, 2000)</i>	<i>2000 Impaired Injury Crashes</i>	<i>% Change from 1999</i>	<i>2000 Impaired Injury Crashes as a % of All Injury Crashes</i>	<i>1999 Tier</i>
Trinidad Police Department	7	133.3%	13.2%	5
Silverthorne Police Department	3	200.0%	13.0%	5
Gilpin County Sheriff's Office	5	-58.3%	12.5%	4
New Castle Police Department	1		12.5%	5
Lamar Police Department	4	300.0%	11.8%	5
Elizabeth Police Department	2	0.0%	11.8%	5
Moffat County Sheriff's Office	5	-16.7%	11.4%	5
Evans Police Department	6	20.0%	11.3%	5
Florence Police Department	1		11.1%	5
Lakeside Police Department	1		11.1%	5
Routt County Sheriff's Office	9	-18.2%	10.5%	4
Rio Grande Sheriff's Office	4	-69.2%	10.3%	4
Alamosa County Sheriff's Department	6	-57.1%	10.2%	4
Steamboat Springs Police Services	3	-62.5%	10.0%	5
Las Animas Police Department	1	0.0%	10.0%	5
Frederick Police Department	1		10.0%	5
Yuma County Sheriff's Office	4	-33.3%	9.8%	5
Las Animas Sheriff's Office	6	-25.0%	9.5%	5
Hugo Marshal's Office	6		9.5%	5
Glenwood Springs Police Department	5	-50.0%	9.4%	4
Huerfano County Sheriff's Office	4	-63.6%	9.3%	4
Windsor Police Department	2	0.0%	9.1%	5
Gunnison Police Department	1		9.1%	5
Lafayette Police Department	9	80.0%	8.8%	5
Pitkin County Sheriff's Office	8	-50.0%	8.8%	4
Saguache County Sheriff's Office	3	0.0%	8.6%	5
Dacono Police Department	1	0.0%	8.3%	5
Sterling Police Department	4	100.0%	8.2%	5
Woodland Park Police Department	3	-25.0%	7.7%	5
Castle Rock Police Department	6	100.0%	7.5%	5
Cherry Hills Village Police Department	4	100.0%	7.4%	5
Fountain Police Department	3	-57.1%	7.0%	5
Ouray County Sheriff's Office	2	-71.4%	6.9%	5
Federal Heights Police Department	4	-20.0%	6.8%	5
Berthoud Police Department	1	-66.7%	6.7%	5
Edgewater Police Department	1	-66.7%	6.7%	5
Canon City Police Department	4	-42.9%	6.5%	5
Lincoln County Sheriff's Office	3	-40.0%	6.0%	5
Fort Morgan Police Department	3	0.0%	5.6%	5

Exhibit V-19.
Impaired Injury Crash Tier 5 for Local Agencies Throughout Colorado, 1999 and 2000
(continued)

<i>Tier 5 (Less than 10 Impaired Injury Crashes, 2000)</i>	<i>2000 Impaired Injury Crashes</i>	<i>% Change from 1999</i>	<i>2000 Impaired Injury Crashes as a % of All Injury Crashes</i>	<i>1999 Tier</i>
Craig Police Department	2	-66.7%	5.6%	5
Louisville Police Department	4	0.0%	5.3%	5
Washington County Sheriff's Office	2	-66.7%	5.3%	5
La Junta Police Department	2	-50.0%	5.3%	5
Kit Carson Sheriff's Office	2	-71.4%	5.1%	5
Custer County Sheriff's Office	1	-83.3%	5.0%	5
Rio Blanco Sheriff's Office	2	-75.0%	4.8%	5
Jackson County Sheriff's Office	1	-83.3%	4.8%	5
Rocky Ford Police Department	1	0.0%	4.5%	5
Breckenridge Police Department	1		3.7%	5
Alamosa Police Department	2	-60.0%	3.6%	5
Montrose Police Department	3	200.0%	3.5%	5
Parker Police Department	3	0.0%	3.4%	5
Estes Park Police Department	1	-50.0%	3.2%	5
Rifle Police Department	1	-66.7%	2.9%	5
Bow Mar Police Department	**	-100.0%		5
Del Norte Police Department	**	-100.0%		5
Mount Crested Butte Police Department	**	-100.0%		5
Columbine Valley Police Department	**	-100.0%		5
Carbondale Police Department	**	-100.0%		5
Idaho Springs Police Department	**	-100.0%		5
Dillon Police Department	**	-100.0%		5
Pagosa Springs Police Department	**	-100.0%		5
Salida Police Department	**	-100.0%		5
Fruita Police Department	**	-100.0%		5
Frisco Police Department	**	-100.0%		5
Cheyenne County Sheriff's Office	**	-100.0%		5
Aguilar Police Department	**			5
Alma Plice Department	**			5
Antonito Police Department	**			5
Ault Police Department	**			5
Basalt Police Department	**			5
Bayfield Police Department	**			5
Brush Police Department	**			5
Calhan Police Department	**			5
Cedaredge Police Department	**			5
Center Police Department	**			5
Central City Police Department	**			5
Collbran Police Department	**			5

Exhibit V-19.
Impaired Injury Crash Tier 5 for Local Agencies Throughout Colorado, 1999 and 2000
(continued)

<i>Tier 5 (Less than 10 Impaired Injury Crashes, 2000)</i>	<i>2000 Impaired Injury Crashes</i>	<i>% Change from 1999</i>	<i>2000 Impaired Injury Crashes as a % of All Injury Crashes</i>	<i>1999 Tier</i>
DeBeque Police Department	**			5
Empire Police Department	**			5
Erie Police Department	**			5
Fairplay Police Department	**			5
Firestone Police Department	**			5
Fowler Police Department	**			5
Georgetown Police Department	**			5
Gilcrest Police Department	**			5
Granada Police Department	**			5
Green Mountain Falls Police Department	**			5
Haxtun Police Department	**			5
Hayden Police Department	**			5
Holly Police Department	**			5
Holyoke Police Department	**			5
Hotchkiss Police Department	**			5
Kersey Police Department	**			5
Kremmling Police Department	**			5
La Jara Police Department	**			5
La Junta Police Department	**			5
La Veta Police Department	**			5
Leadville Police Department	**			5
Limon Police Department	**			5
Log Lane Police Department	**			5
Manassa Police Department	**			5
Manzanola Police Department	**			5
Milliken Police Department	**			5
Minturn Police Department	**			5
Monte Vista Police Department	**			5
Monument Police Department	**			5
Mountain View Police Department	**			5
Mountain Village Police Department	**			5
Nederland Police Department	**			5
Nucla Marshall's Office	**			5
Oak Creek Police Department	**			5
Olathe Police Department	**			5
Ordway	**			5
Ouray Police Department	**			5
Palisade Police Department	**			5
Palmer Lake Police Department	**			5
Paonia Police Department	**			5
Parachute Police Department	**			5
Rangley Police Department	**			5
Ridgway Police Department	**			5
Sanford Police Department	**			5
Silt Police Department	**			5
South Fork Police Department	**			5
Springfield Police Department	**			5
Stratton Police Department	**			5
Victor Police Department	**			5
Walden Police Department	**			5
Walsenburg Police Department	**			5

Source: BBC Research & Consulting from 1999 and 2000 CDOT crash data.

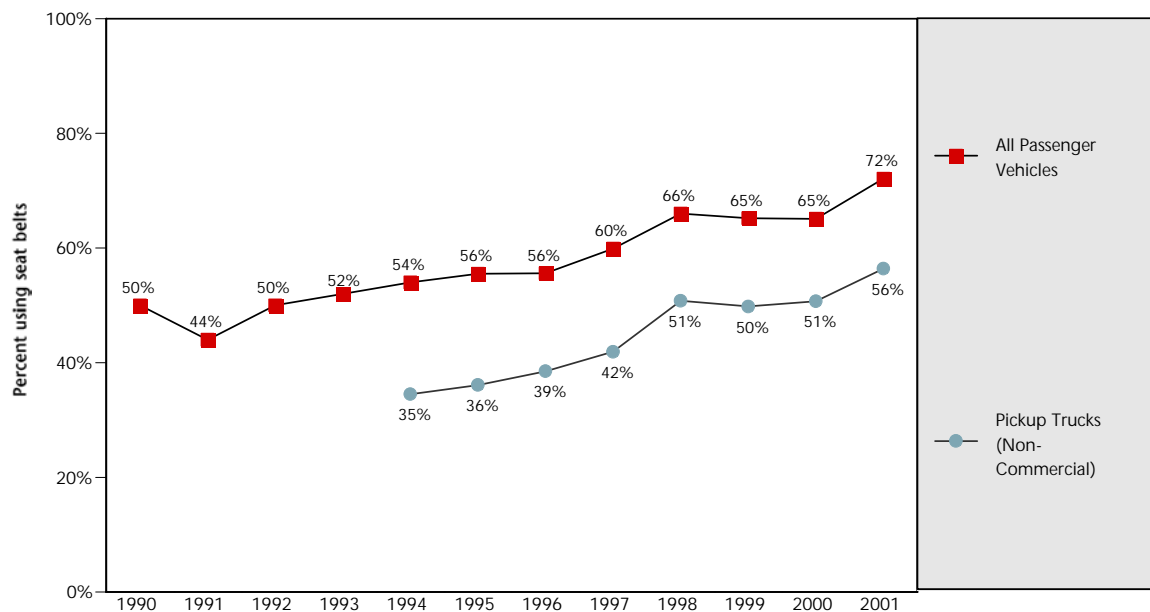
SECTION VI. Occupant Protection and Traffic Crashes

Use of occupant protection in Colorado may reduce the injury severity of traffic crashes and could potentially save lives. In addition to analyzing seat belt use among crash drivers, this section includes survey analyses of seat belt use among drivers and front seat passengers who were not involved in traffic crashes. Occupant protection use among juveniles and young children is also discussed.

Statewide Occupant Protection Trends

Seat belt use among drivers and front seat passengers steadily increased in Colorado for much of the 1990s. The 2001 Seat Belt Usage Survey conducted by the CSU Institute of Transportation Management on behalf of CDOT shows an overall seat belt usage rate for Colorado passenger vehicles of 72 percent (see Exhibit VI-1). This is a 7 percentage point increase over seat belt usage in 2000. The survey also found that seat belt use is greatest along the Front Range. Roughly three-fourths of all drivers and front seat passengers along the Front Range who were observed were wearing seat belts.

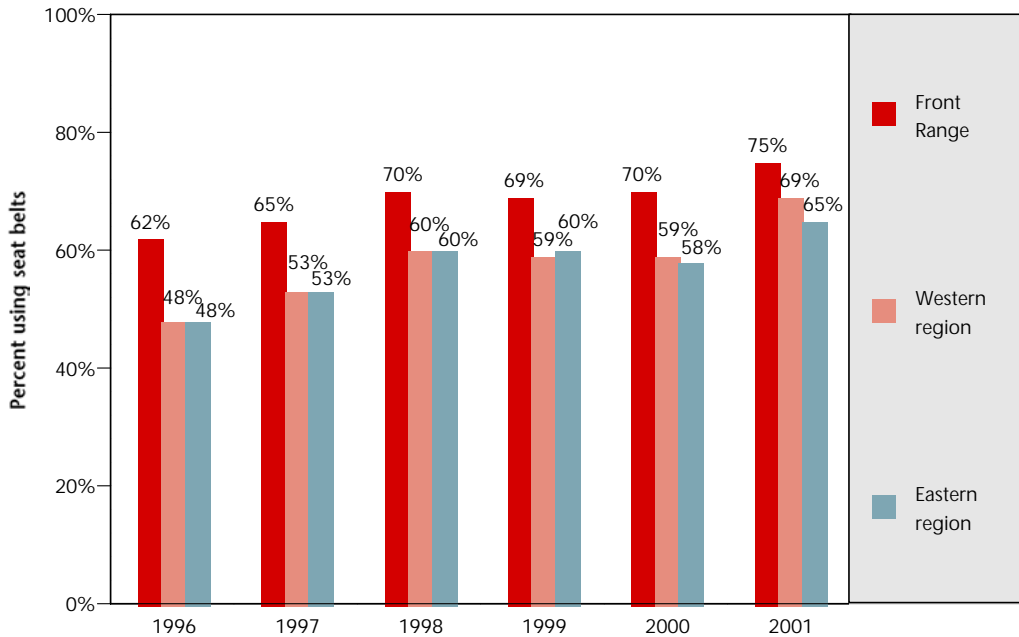
Exhibit VI-1.
Colorado Seat Belt use, 1990 – 2001



Source: Annual Seat Belt Surveys conducted by the CSU Institute of Transportation Management on behalf of CDOT.

Regional occupant protection trends. Over the past decade, seat belt use in rural areas (Eastern and Western regions) has been consistently lower than in urban areas (Front Range). Exhibit VI-2 shows the difference in seat belt usage among drivers and front seat passengers in rural and urban areas.

Exhibit VI-2.
Colorado Regional Seat-Belt Use, 1997 – 2001

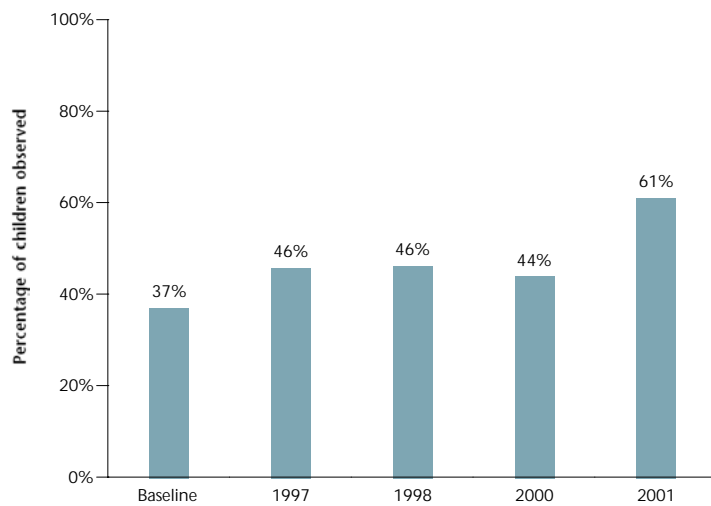


Source: Annual Seat Belt Surveys conducted by the CSU Institute of Transportation Management on behalf of CDOT.

Child occupant protection. Since 1997, the CSU Institute of Transportation Management has conducted a child and juvenile occupant restraint study on behalf of CDOT. This study highlights seat belt and car seat usage trends among Colorado’s child population.

Children 5 to 15 years of age. Between 1997 and 2000 (1999 data not available), children were much less likely than other Coloradans to wear a seat belt. In 2000, 44 percent of children 5 to 15 years old wore seat belts compared with the state’s overall seat belt use rate of 65 percent. In 2001, child seat belt use jumped to over 60 percent, as shown in Exhibit VI-3. While this is a dramatic improvement over juvenile seat belt use in recent years, it still falls short of the state usage rate and shows room for further improvement.

Exhibit VI-3.
Colorado Seat-Belt Use by Children Age 5 to 15, 1997 – 2001

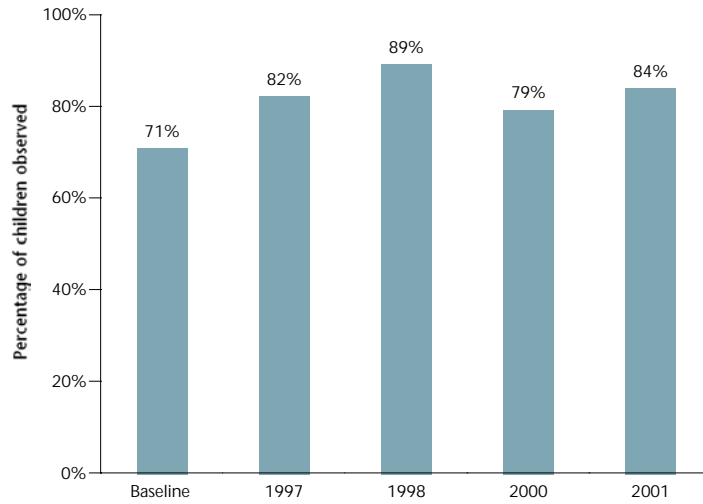


Note: A Child/Juvenile seat belt use study was not conducted in 1999.
Juveniles are between the ages of 5 and 15 years of age.

Source: 2001 Seat Belt Study State of Colorado, Colorado State University Institute of Transportation Management.

Car seat use. About 84 percent of all observed children age 0 to 4 were properly restrained in car seats in 2001. This is a 5 percentage point improvement over 2000. Car seat use rates for the period 1997 through 2001 are shown in Exhibit VI-4 (no study was conducted in 1999).

Exhibit VI-4.
Colorado Car Seat Use Children Age 0 to 4, 1997 – 2001



Note: A Child/Juvenile seat belt use study was not conducted in 1999.
Children are between the ages of 0 and 4 years of age.

Source: 2001 Seat Belt Study State of Colorado, Colorado State University Institute of Transportation Management.

Geographic Differences in Driver Seat Belt Use

Close to 40 percent of all incapacitating injury crash drivers with known seat belt use were not wearing a seat belt in 2000. There was little change in statewide seat belt use among these drivers between 1999 and 2000. Occupant protection usage in these crashes varied among communities throughout the state.

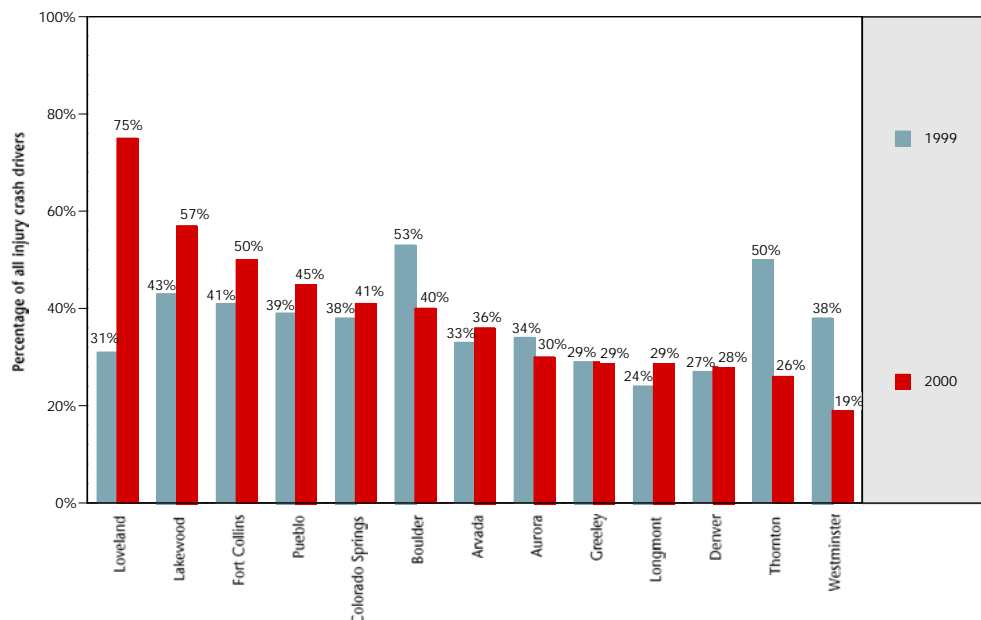
Crashes included in community-level analyses of driver occupant protection use. This section includes analyses of seat belt use among incapacitating injury crash drivers living in cities and counties throughout Colorado. “Incapacitating injury crash drivers” include drivers who either suffered an evident incapacitating injury or who were killed in a traffic crash. Drivers in less serious crashes are excluded from these analyses because data on their seat belt use are less reliable.

Drivers not wearing a seat belt by location of crash. Over 70 percent of all unbelted drivers in incapacitating injury crashes crashed in large counties in 2000. This represents a slight increase from 1999. Unbelted drivers in other parts of the state were fewer in number but represented a larger portion of all incapacitating injury crash drivers who crashed in their areas. In 2000, less than 40 percent of all incapacitating injury crash drivers who crashed in large counties were unbelted while over half of all rural incapacitating injury crash drivers were unbelted.

Large cities. Unbelted incapacitating injury crash drivers make up a substantial portion of all incapacitating injury crash drivers in large cities (see Exhibit VI-5). Over half of all incapacitating injury crash drivers who crashed in Fort Collins, Lakewood and Loveland in 2000 were not wearing a seat belt.

Exhibit VI-5.

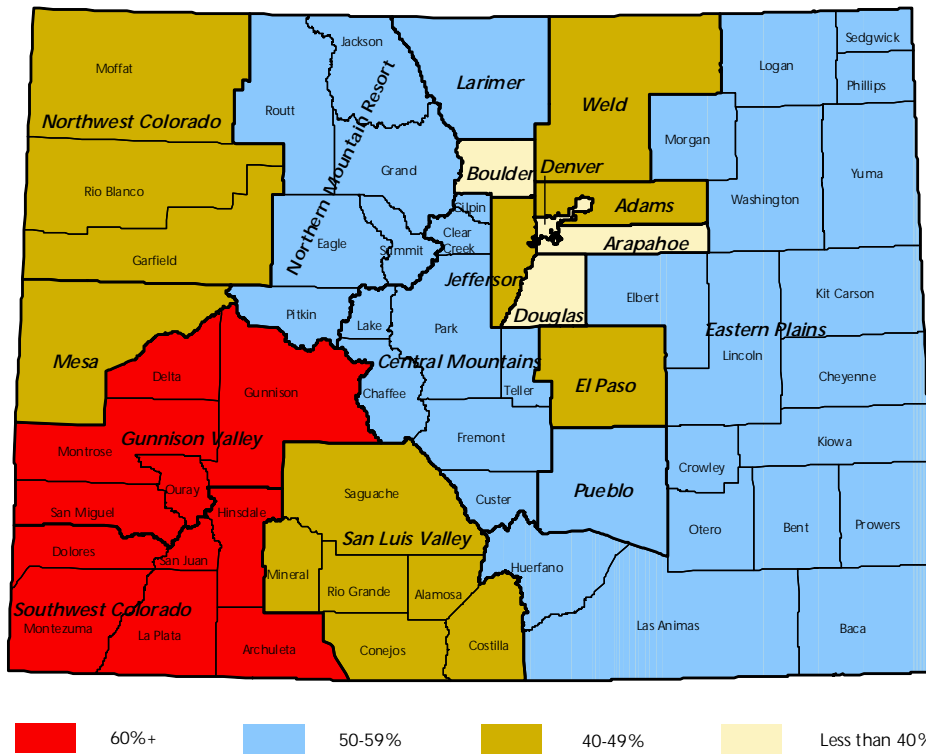
Percent of All Drivers in Incapacitating Injury Crashes Not Wearing a Seat Belt, by Large City of Crash, 1999 and 2000



Source: BBC Research & Consulting from 1999 and 2000 CDOT crash data.

Large counties and regions. Exhibit VI-6 shows the percentage of all incapacitating injury crash drivers crashing in large counties and regions who were not wearing a seat belt in 2000. The percentage of incapacitating injury crash drivers who were not wearing a seat belt is greater in rural portions of the state than in large counties. It was highest in Southwest Colorado and the Gunnison Valley.

Exhibit VI-6.
Percent of All Drivers in Incapacitating Injury Crashes by County and Region of Crash, 2000



Source: BBC Research & Consulting from 2000 CDOT crash data.

Residence of unbelted drivers in crashes. Understanding the distribution of where unbelted drivers in incapacitating injury crashes live could help in targeting communities for seat belt safety programs.

Drivers in incapacitating injury crashes not wearing seat belts—cities. Drivers from Loveland, Pueblo and Longmont were the most likely to be involved in incapacitating injury crashes and not be wearing a seat belt. Exhibit VI-7 shows 1999 and 2000 rankings of non-seat belt use rates among incapacitating injury crash drivers in large cities.

Exhibit VI-7.

Rate of Involvement of Driving Age Population as Unbelted Drivers in Incapacitating Injury Crashes, Large Cities, 1999 and 2000

<i>City Name</i>	<i>1999 Rank</i>	<i>2000 Rank</i>	<i>2000 Index</i>
Loveland	5	1	1.68
Pueblo	3	2	1.52
Longmont	1	3	1.43
Greeley	7	4	1.04
Aurora	4	5	1.03
Arvada	6	6	1.01
Colorado Springs	11	7	.94
Thornton	8	8	.88
Denver	9	9	.85
Lakewood	12	10	.81
Fort Collins	10	11	.61
Westminster	2	12	.50
Boulder	13	13	.43

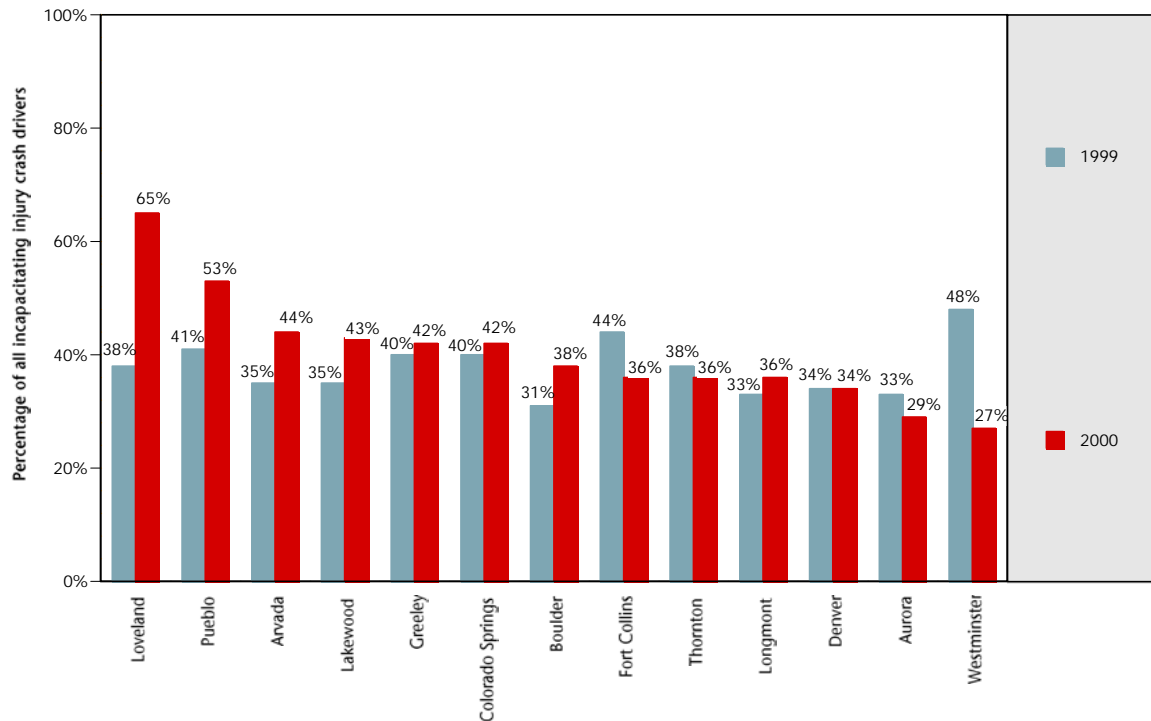
Note: Includes cities with 2000 populations greater than 50,000. Incapacitating injury crashes are those with evident, incapacitating or fatal injuries. The state average is 1.0. These rates are adjusted for the driving-age population in each city.

Source: BBC Research & Consulting using 1999 and 2000 crash data from CDOT and 2000 population data from the Colorado Division of Local Government.

Unbelted drivers as a percentage of all incapacitating injury crash drivers—cities. Similar to 1999, one-third of all incapacitating injury crash drivers from cities with populations of 50,000 or more were not wearing seat belts. As Exhibit VI-8 shows, Loveland, Pueblo, Arvada, and Lakewood had sizeable increases in non-seat belt use among incapacitating injury crash drivers between 1999 and 2000 while Fort Collins, Aurora and Westminster saw relatively fewer unbelted drivers in incapacitating injury crashes.

Exhibit VI-8.

Unbelted Drivers as a Percentage of All Incapacitating Injury Crash Drivers, Large Cities, 1999 and 2000



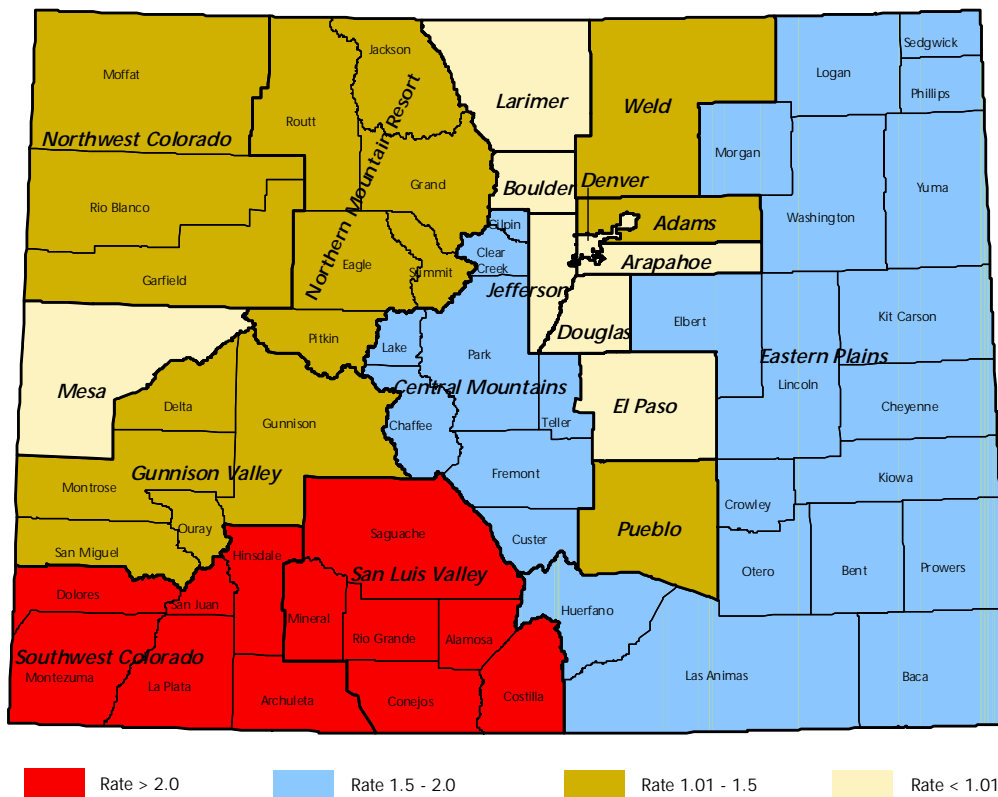
Note: Includes cities with 2000 populations greater than 50,000. Incapacitating injury crashes are those with evident, incapacitating or fatal injuries. "All Incapacitating Injury Crash Drivers" only includes drivers with known seat belt use.

Source: BBC Research & Consulting using 2000 crash data from CDOT.

Drivers in incapacitating injury crashes not wearing seat belts—counties and regions. Non-seat belt use among incapacitating injury crash drivers is more of a problem in rural areas than in urban areas. In 2000, rural residents were more than 50 percent more likely than drivers statewide to not be wearing a seat belt and be a driver in an incapacitating injury crash. While this suggests seat belt usage among rural resident drivers is below average, it also shows improvement from 1999 when incapacitating injury crash drivers from rural areas were over 75 percent more likely to not use occupant protection. Areas of greatest concern include the Southwest Colorado and San Luis Valley regions where drivers were more than twice as likely as drivers statewide to not wear seat belts and be involved in incapacitating injury crashes.

Among urban counties, Pueblo, Weld and Adams counties had rates of involvement in unbelted incapacitating injury crashes that exceeded the statewide average (see Exhibit VI-9).

Exhibit VI-9.
Unbelted Driver Incapacitating Injury Crash Rates, Counties and Regions, 2000



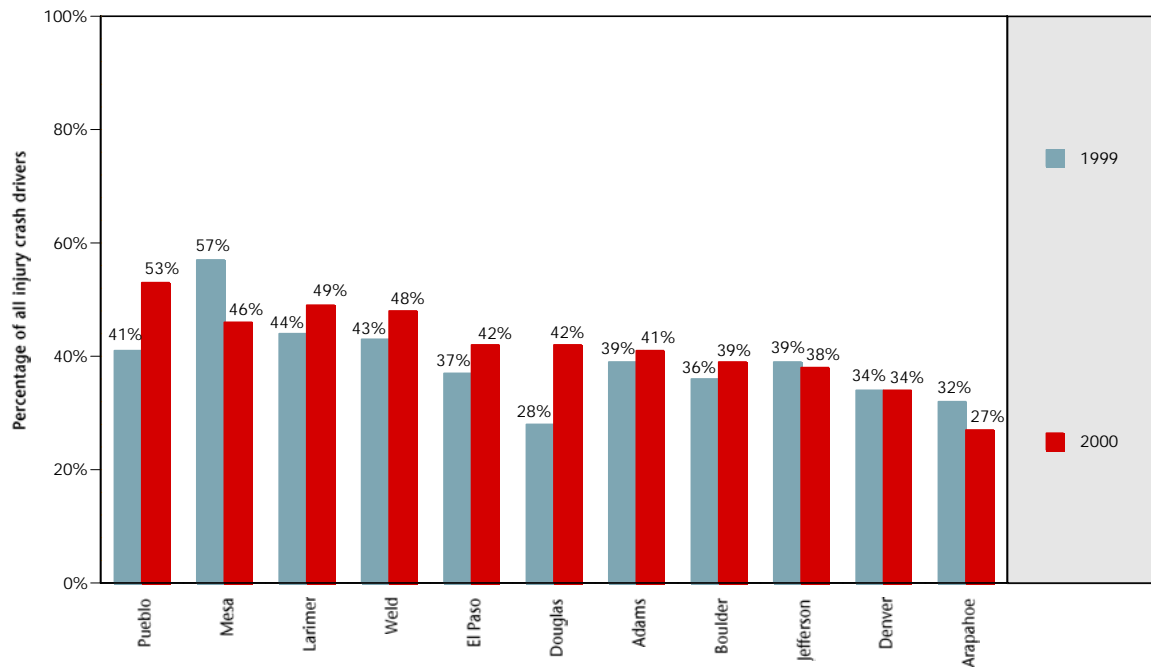
Note: Incapacitating injury crashes are those with evident, incapacitating or fatal injuries. The state average is 1.0. These rates are adjusted for the driving-age population in each county and region.

Source: BBC Research & Consulting using 2000 crash data from CDOT and 2000 population data from the Colorado Division of Local Government.

Unbelted drivers as a percentage of all incapacitating injury crash drivers—counties. In nine out of the 11 largest counties in Colorado in both 1999 and 2000, at least one-third of all incapacitating injury crash drivers were not wearing seat belts (Exhibit VI-10). Over 50 percent of incapacitating injury crash drivers in Pueblo County were not wearing a seat belt.

Exhibit VI-10.

**Unbelted Drivers as a Percentage of All Incapacitating Injury Crash Drivers
Large Counties, 1999 and 2000**



Note: Incapacitating injury crashes are those with evident, incapacitating or fatal injuries. "All Incapacitating Injury Crash Drivers" only includes drivers with known seat belt use.

Source: BBC Research & Consulting using 1999 and 2000 crash data from CDOT.

SECTION VII. Motorcycles, Bicycles and Pedestrians

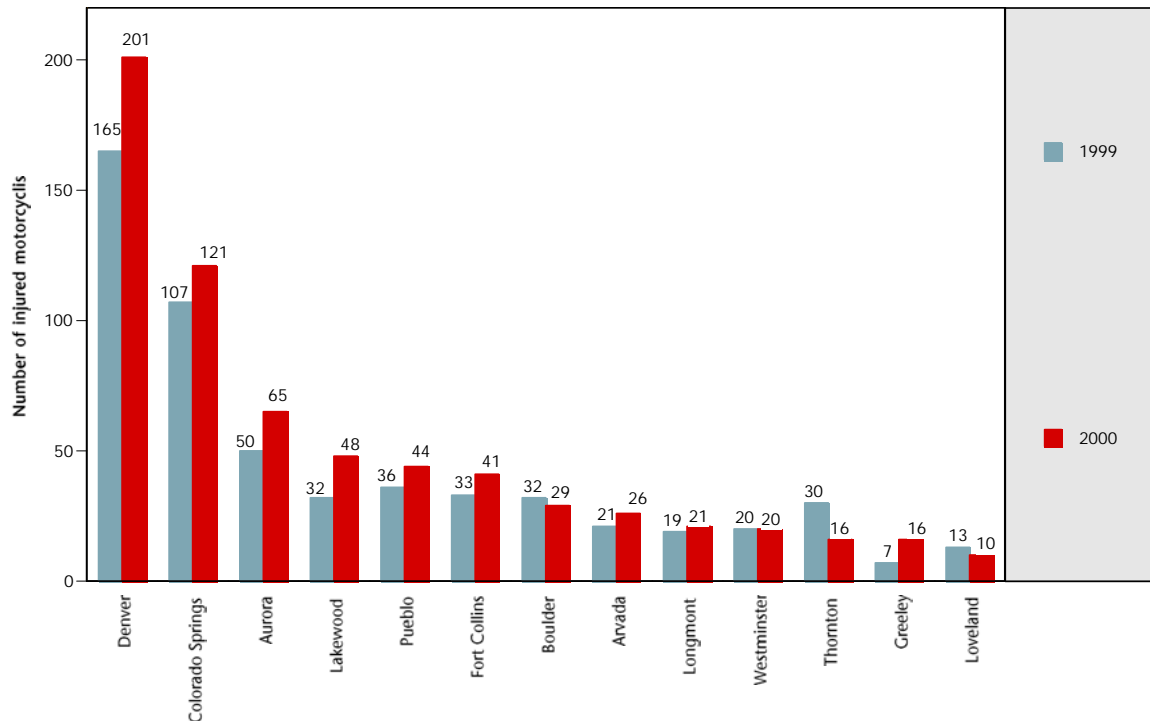
Motorcyclists Involved in Crashes

In 1999, there were 95,089 registered motorcycles in Colorado, which is less than 3 percent of all registered vehicles statewide. About 1.5 percent of these motorcycles were involved in an injury crash in 2000 (little change between 1999 and 2000).

Motorcyclists involved in crashes by location of crash. In 2000, Denver, Jefferson and El Paso counties accounted for about 40 percent of all motorcyclists who were involved in injury crashes.

Large cities. In 2000, half of all motorcycle injury crash drivers crashed in cities with populations of 50,000 or greater. As shown in Exhibit VII-1, Denver and Colorado Springs had the highest number of motorcyclists involved in injury crashes.

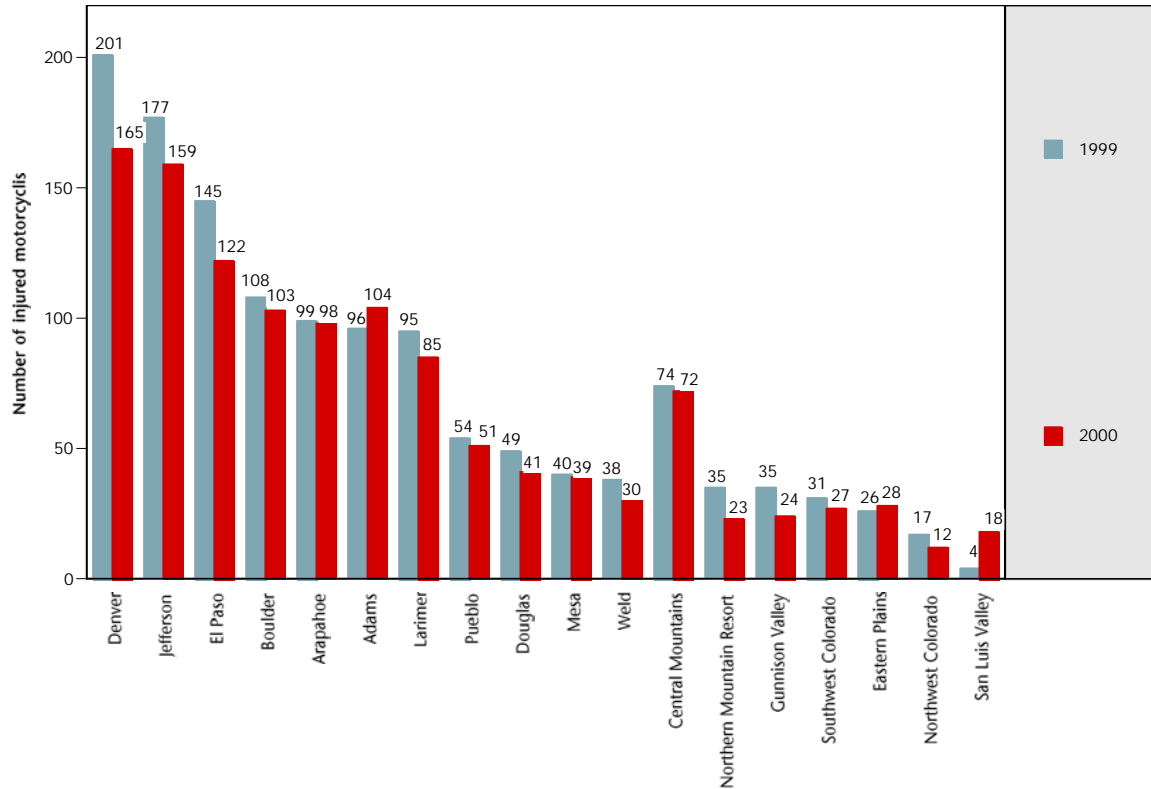
Exhibit VII-1.
Motorcyclists in Injury Crashes, Large Cities, 1999 and 2000



Source: BBC Research & Consulting from 1999 and 2000 CDOT crash data.

Large counties and regions. Among large counties, Denver, Jefferson, El Paso and Boulder had the greatest number of motorcyclists involved in injury crashes in both 1999 and 2000. Fewer motorcyclists crashed in rural areas of the state.

Exhibit VII-2.
Motorcyclists in Injury Crashes, Large Counties and Regions, 1999 and 2000

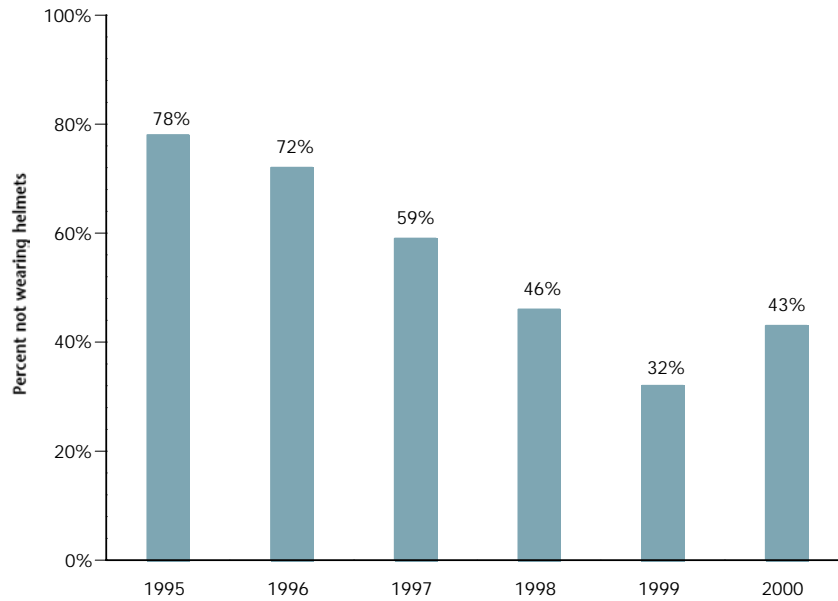


Source: BBC Research & Consulting from 1999 and 2000 CDOT crash data.

Helmet use among motorcyclists. Year 2000 data on helmet use is available from the Colorado State Patrol for motorcyclists killed in traffic crashes. In 2000, 43 percent of all motorcyclists killed in Colorado were not wearing helmets. This is an improvement from 1995 when over three-quarters of all motorcycle fatalities did not wear helmets. However, it is also an increase over 1999 and shows there is still a problem with helmet use among motorcyclists (see Exhibit VII-4).

Exhibit VII-4.

Percent of Motorcycle Fatalities Not Wearing Helmets, 1995 – 2000



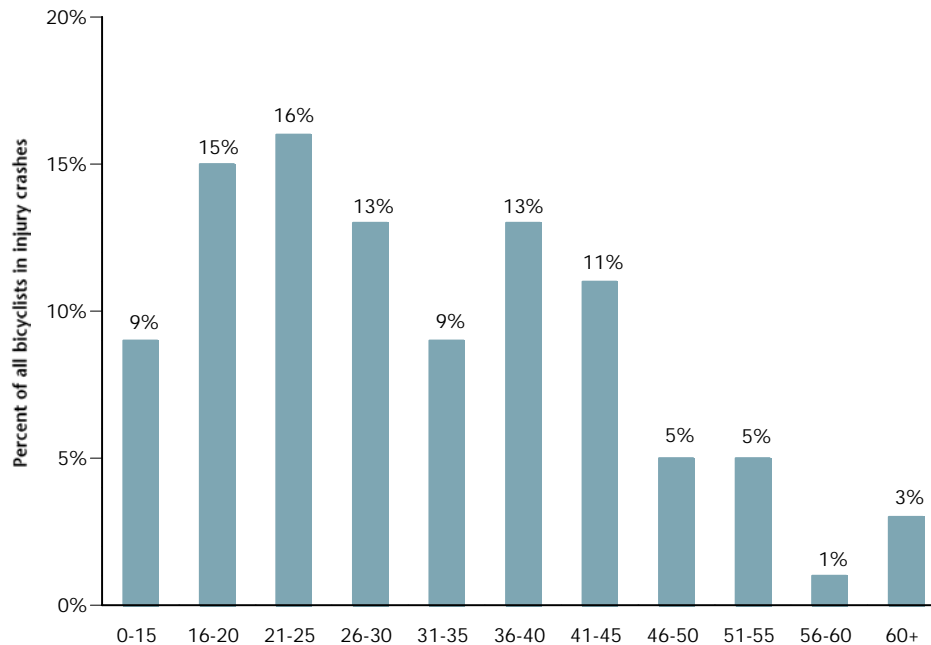
Source: Data obtained from Colorado State Patrol website, February 2002.

Crashes Involving Bicyclists

In 2000, six counties had at least 100 crashes reported that involved bicyclists—Denver, Boulder, Arapahoe, Larimer, El Paso and Jefferson. Together, these counties represented 75 percent of all reported bicycle crashes. Between 1999 and 2000, bicycle crashes decreased by close to 15 percent for Boulder, Larimer and Jefferson counties. Among large cities, the percentage of all crashes in Boulder, Loveland, Fort Collins and Greeley involving bicycles exceeded the statewide average. Nearly 5 percent of all crashes in Boulder involved a bicycle.

Colorado resident bicyclists in injury crashes. Approximately 240 Colorado residents were injured in bicycle crashes that were reported in 2000. As shown in Exhibit VII-5, 16- to 20-year-olds and 21- to 25-year olds comprised the largest share of all Coloradans involved in injury crashes. The incidence of injury crashes among bicyclists from these age groups may be a reflection of Colorado residents' outdoor lifestyle. In a 1999 bicycling and walking survey of Coloradans that was conducted by the Center for Research on Economic and Social Policy (CRESP) of the University of Colorado at Denver, nearly three-fourths of all respondents reported that they sometimes bicycle for exercise or recreation. Additionally, findings from the survey show that Coloradans are five times more likely than the national average to ride a bicycle to work.

Exhibit VII-5.
Colorado Resident Bicyclists as a Percent of All Bicyclists in Injury Crashes, by Age, 2000



Source: BBC Research & Consulting from 2000 CDOT crash data.

Pedestrian Crashes

There were 1,348 crashes reported in 2000 that involved pedestrians, which was 1 percent of all crashes statewide. Nearly one in four of these crashes took place in Denver. Arapahoe and El Paso counties each had close to 140 traffic crashes that involved a pedestrian.

SECTION VIII.

Key Findings and Recommendations

The key findings presented in this section relate to fatal crashes and the areas of key concern to CDOT.

Fatal crashes. The number of fatal crashes in Colorado increased in both 2000 and 2001. Most occurred in the state's most populous counties.

Denver and El Paso counties. The number of fatal crashes in Denver and El Paso counties should be closely monitored. From 1999 to 2000, both counties experienced very large increases in the number of fatal crashes followed by reductions in 2001.

Weld County. Fatal crashes are disproportionately high in Weld County. In 2001, 59 fatal crashes occurred in Weld County—an increase of 23 fatal crashes from 2000. In both 1999 and 2000, more than half of the drivers involved in Weld County fatal crashes lived elsewhere. This suggests that in addition to educational programs in the county, efforts to improve safety through visible enforcement of traffic laws should be increased.

Holidays. The number of fatal crashes in 2000 occurring during holiday weekends was similar to the number of fatal crashes that occur on the average non-holiday weekend. The Martin Luther King Day weekend was a notable exception. Highly visible enforcement on holiday weekends, particularly for DUI, may be successful in moderating driver behavior on these targeted dates. This may also suggest that other weekends be randomly selected for highly visible enforcement so that residents do not know “when the heat may be on” during non-holiday periods. Perhaps a statewide non-holiday impaired driving enforcement and public information program should be implemented.

Driver age. The youngest drivers continue to be at the highest risk of crash involvement. Despite this, since full implementation of Colorado's Graduated Licensing Law (year 2000), the fatal crash rate of 16-year-old drivers per 100,000 16-year-old population fell significantly. As 2000 was the first year of full implementation of the law, the long-term impact can only be gauged with time. Continued monitoring of the implementation of the Graduated Licensing Law across the state may provide additional insight into the success and challenges of this law.

Drivers over age 65 continue to be less likely than other drivers to be involved in an injury crash. The injury crash rates of older drivers should continue to be monitored.

Impaired drivers. Although the role of alcohol in fatal crashes in Colorado continues to decrease, it is still a factor in three out of every ten fatal crashes statewide. Men between the ages of 21 and 34 continue to be over-represented as impaired drivers in injury crashes. Comprehensive efforts to reduce the incidence of impaired driving among this age group should be expanded into new communities. Highly preliminary results from a Pueblo program focusing on this population segment indicate that awareness programs can be effective. El Paso County and Denver may be good candidates for similar projects.

Occupant protection. Occupant protection use in Colorado rose from 2000 to 2001, with the highest rates of use in the Front Range. Other areas of the state continue to be less likely to consistently use seat belts. In addition, efforts to design culturally-relevant and culturally-competent programs and messages to increase seat belt use in traditionally underserved populations (e.g., African Americans and Latinos) should be continued.