Draft January 2024

Taking Action on

regional vision zero

SAFER STREETS FOR METRO DENVER



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DENVER REGIONAL COUNCIL OF GOVERNMENTS

Acknowledgements

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Division of Regional Planning and Development

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MIG, Inc

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From Douglas W. Rex, DRCOG executive director

Month, Day, 2024

Transportation safety is important to us all, and too many are killed or seriously injured on the Denver region's roadways. The people in our communities are invaluable, and our streets are public spaces to be shared by everyone, irrespective of their mode of transportation. A future with zero serious injuries and deaths on our roadways necessitates a cultural shift toward acknowledging that even one traffic-related death is unacceptable.

In 2020, the Denver Regional Council of Governments Board of Directors adopted a Regional Vision Zero commitment aiming to eliminate traffic-related fatalities and serious injuries, prioritizing safety for all users of the transportation system. While we continue to make our roads safer through engineering, education and legislation, we must take further action and work together toward an inclusive approach to roadway safety.

I am honored to present this updated Regional Vision Zero Implementation Plan, outlining our renewed strategies for achieving our shared goals. The plan is the result of months of collaboration from stakeholders across our region through the Regional Vision Zero Working Group. Building on Metro Vision's objectives, this update outlines an ambitious set of actionable strategies to address roadway safety and implement Regional Vision Zero. With the support of regional partners, stakeholders, and you, we have the capacity to bring about real change.

Sincerely,



Douglas W. Rex

Executive Director

Denver Regional Council of Governments

regional vision zero
SAFER STREETS FOR METRO DENVER

Executive summary

In June 2020, the Denver Regional Council of Governments adopted a Vision Zero commitment to eliminate traffic-related fatalities and severe injuries on the region's roadways and make safety a priority for all transportation system users. Taking Action on Regional Vision Zero includes a toolkit for local governments to use when planning a Vision Zero strategy in their communities.

Local, regional, and state stakeholders collaborated robustly through the Regional Vision Zero Working Group and engaged with the public to guide the plan, which included creating a crowd-sourced map of regional safety issues. It includes intensive data analyses of fatal and serious-injury crash statistics over a five-year period in the region. The plan sets out Action Initiatives, an implementation timeline and measures that will help track regional progress toward safety improvements.



What is Vision Zero?

Vision Zero is a transportation safety philosophy based on the core belief that loss of life or serious injury is not an acceptable price for mobility. Reaching zero fatalities requires implementing a Safe System approach, founded on the principles that humans make mistakes and that human bodies have limited ability to tolerate crash impacts.

The Safe System approach focuses on human mistakes and vulnerability and designs a system with many redundancies to protect everyone. Six principles that form the basis of the Safe System approach are deaths and serious injuries are unacceptable, humans make mistakes, humans are vulnerable, responsibility is shared, safety is proactive and redundancy is crucial.

Core elements

Complete Streets

The Safe System approach is to design Complete Streets that give people walking, rolling, bicycling and taking transit the same access to safe and comfortable streets as those driving a motor vehicle.

Context-appropriate speeds

As crash speed increases, the likelihood of a severe injury or fatality also increases, especially for people walking and biking. The Safe System approach is to design and operate roads to achieve context-appropriate vehicle speeds that protect all roadway users.

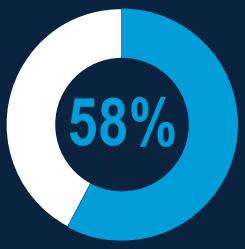
Equity

Disadvantaged communities are disproportionately affected by traffic safety issues. The Safe System approach prioritizes Complete Streets and roadway design and operation projects in disadvantaged communities and works to ensure that Vision Zero efforts improve – not exacerbate – negative, unintended consequences, particularly in communities of color and low-income communities.

Engaging the community for a people-first plan

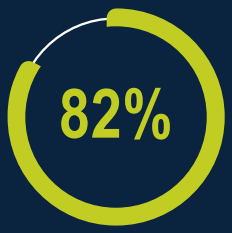
Engaging local communities, stakeholders and the public across the Denver region was critical to the plan's development. Continued engagement is necessary for successful plan implementation.

What We Heard



INDICATED THAT THEY KNOW SOMEONE WHO HAS BEEN HOSPITALIZED OR KILLED AS A RESULT OF A TRAFFIC CRASH.

Prioritizing safe travel of people over expeditious travel of motor vehicles is a core Vision Zero strategy:



OF RESPONDENTS WERE WILLING TO ADD ONE OR MORE MINUTES TO THEIR COMMUTE TOIMPROVE SAFETY.

The toolkit

Regional High-Injury Network

While there are more than 15,000 roadway miles in the Denver region, fatal and serious-injury crashes disproportionately occur on only 9% of these roads. Crash data from 2013 to 2017 was analyzed to identify the regional High-Injury Network or the roads in the region where the majority of serious-injury and fatal crashes occur. The regional High-Injury Network also identifies critical corridors, selected by isolating the regional High-Injury Network by county and finding the highest-density corridors for serious-injury and fatal crashes.

Regional crash and behavior profiles and countermeasures

Given the variety of land use contexts, roadway networks, travel characteristics and the varying types of crashes in the Denver region, the region was divided into four Area Types: Urban, Suburban/Compact communities, Rural and Limited-Access Highways. The regional crash profile analyses were divided into these four area types because travel purposes, mode shares and roadway designs vary greatly by area type. Potential countermeasures identified for each crash profile also consider the regional area type.

Regional Vision Zero objectives

Taking Action on Regional Vision Zero builds on the supporting objectives identified in Metro Vision and establishes a series of Regional Vision Zero objectives and action initiatives for addressing roadway safety and achieving the goal of zero fatalities by 2040 and zero serious injuries by 2045. To implement the plan, the following actions must be focused on:



1 **Improve Collaboration between Allied Agencies**



2 **Increase Awareness and Adoption of Vision Zero**



3 **Design and Retrofit Roadways to Prioritize People's Safety**



4 **Improve Data Collection and Reporting**



5 **Increase Funding and Resources**



6 **Increase Support for Legislation, Policies and Practices that Focus on Safety at All Levels**

Regional Vision Zero Implementation Plan

To achieve these goals, the Implementation Plan identifies a series of immediate, short and medium- to long-term actions to move the region towards safer roads for everyone. These focused actions are informed by a review of existing policies and practices, input from community engagement and collaboration with the Regional Vision Zero Work Group. Progress is already being made on several of the recommended actions.

Accomplishments

Objective 3

Developed a Complete Street Toolkit for the DRCOG region, addressing safety-related aspects of street design, incorporating Vision Zero principles, crash profiles and countermeasures and further guidance for establishing safe design components.

Performed a prioritization analysis of the Complete Streets network of the region to identify the top corridors for investing funds and resources to improve mobility and accessibility for all users.

Objective 4

Created a story map data tool on the Regional Data Catalog to enhance the Regional Vision Zero toolkit and provide local governments easy access to quick analysis of area-type crash profiles.

Objective 6

Supported the Senate Bill 23-200 legislation that ultimately passed, which allows local agencies to use safety cameras as an enforcement technique, including red-light running and speeding.

Key immediate actions

1. *Improve Collaboration between Allied Agencies*

1.2 Convene regular local safety meetings of state and local transportation and public health professionals, police and fire departments, and community and advocacy organizations, to collaboratively address dangerous behaviors on the roadways with strategies like culturally appropriate safety programs and educational messages, paired with outreach and investments.

2. *Increase Awareness and Adoption of Vision Zero*

2.1 Identify and promote Vision Zero training opportunities to local governments, including resources from the national Vision Zero Network, Federal Highway Administration and others.

3. *Design and Retrofit Roadways to Prioritize People's Safety*

3.1 Develop a Vision Zero Quick-Build Toolkit for member governments to provide guidance on the design and implementation of quick-to-deliver and adjustable traffic measures to improve safety on the Regional High Injury Network and Critical Corridors.

4. *Improve Data Collection and Reporting*

4.3 Perform a comprehensive crash data analysis to understand high-risk actions, pre-crash activities and demographics to further build out crash profiles.

5. *Increase Funding and Resources*

5.2 Continue evaluating Transportation Improvement Program criteria to further prioritize safety projects on the regional High-Injury Network that address key crash profiles or otherwise reduce fatal and serious injury crashes.

6. *Increase Increase Support for Legislation, Policies and Practices that Focus on Safety at All Levels*

6.2 Support legislation to increase funding and evaluate reallocation of existing funding to safety projects to create a reliable, dedicated funding stream.

What is Vision Zero?

Vision Zero is a transportation safety philosophy based on the principle that loss of life is not an acceptable price to pay for mobility. Among those concerned with traffic safety Vision Zero has become a useful framework to eliminate traffic deaths and severe injuries in the transportation system with a proactive, preventive approach. Vision Zero recognizes that humans make mistakes and therefore the transportation system should be designed to minimize the consequences of human error. The Vision Zero approach is fundamentally different from the traditional traffic safety approach in American communities in six key ways. Taking Action on Regional Vision Zero establishes a target of zero fatalities and serious injuries on the Denver region's transportation system.

Source: Vision Zero Network

National fatality statistics



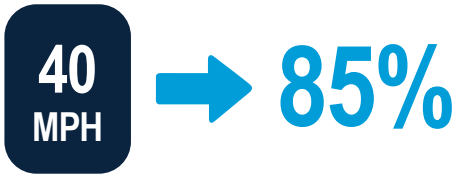
According to the National Highway Traffic Safety Administration, at least one driver was speeding in over **one in four fatal crashes** in the United States in 2017.

Source: Traffic Safety Facts 2017 Data, National Highway Traffic Safety Administration, May 2019



Helmets were estimated to be 37-percent effective in preventing fatal injuries to motorcycle riders and 41 percent for motorcycle passengers. In other words, for every 100 motorcycle riders killed in crashes while not wearing helmets, 37 of them could have been saved had all 100 worn helmets.

Source: Traffic Safety Facts 2017 Data, National Highway Traffic Safety Administration, May 2019



Even vehicle-vehicle crashes that happen at moderate speeds have a significant risk of fatality: **at 40 mph the risk of a fatality in a side-impact crash is up to 85 percent.**

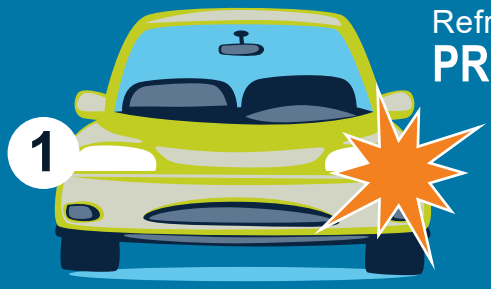
Source: Relationship between Speed and Risk of Fatal Injury: Pedestrians and Car Occupants, D.C. Richards, Transport Research Laboratory, Department for Transport: London, September 2010



According to the Centers for Disease Control and Prevention, National Center for Injury Prevention and Control, **more than half of teens (ages 13-19) and adults (ages 20-44)** who died in car crashes in the United States in 2016 were not wearing a seat belt at the time of the crash.

Source: Seat Belts: Get the Facts, Centers for Disease Control and Prevention, June 2018

Safe Systems Principles

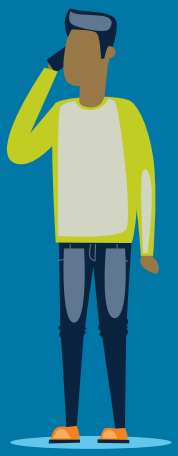


Reframes traffic deaths as **PREVENTABLE.**



Integrates **HUMAN ERROR** into the approach.





Focuses on **PREVENTING FATAL AND SEVERE CRASHES** rather than eliminating all crashes.



Aims to **ESTABLISH SAFE SYSTEMS** prioritizing human life first and foremost when designing a road network.



Applies **DATA-DRIVEN** decision making.



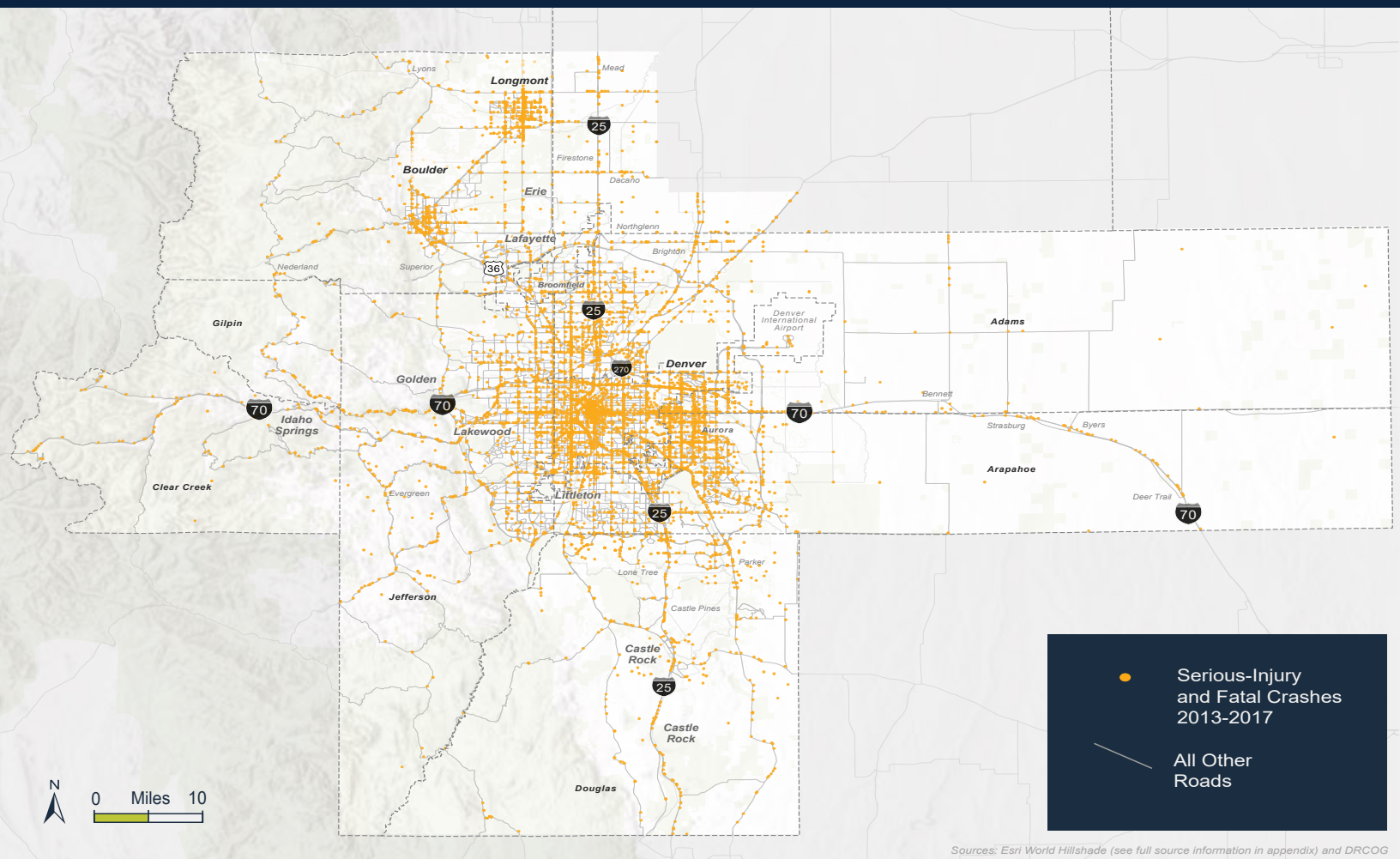
Establishes road safety as a **SOCIAL EQUITY ISSUE.**

Why the Denver region needs Vision Zero

The Denver Regional Council of Governments includes more than 50 local governments, each of which has an equal voice. The towns, cities and counties of the region work together to ensure the Denver region remains a great place to live, work and play.

Traffic-related deaths and severe injuries are a critical and preventable public health epidemic and social equity issue in the metropolitan Denver area. DRCOG, its member governments and its partner agencies are responsible for reducing crashes through safe systems.

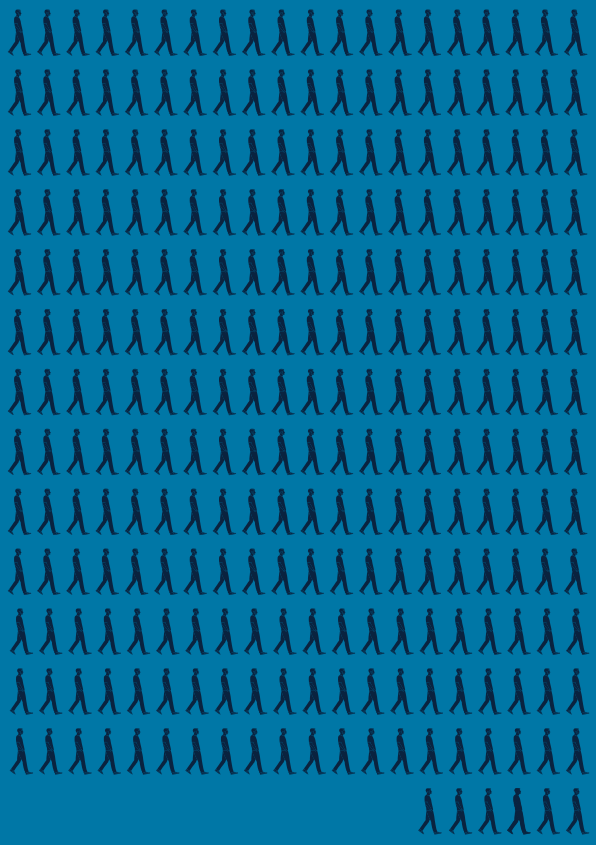
Regional Vision Zero is action-based, well aligned with other traffic safety efforts, and inclusive of and intentional with the people who use the transportation system in the Denver region.



Sources: Esri World Hillshade (see full source information in appendix) and DRCOG

Crash history: a need for a call to action

DRCOG organizes crash data and provides eocoded crash information through its Regional Data Catalog. Crash data representing years 2013 through 2017 was used for the analysis in this plan.



In 2017, 266 people were killed in crashes on the Denver region's streets and highways.



In the Denver region there were nearly 8,700 crashes between 2013 and 2017 that resulted in a fatality or severe injury. The human toll of these crashes is significant:

1,149 people died and 8,827 people were seriously injured on Denver region roadways during this five-year period.

Engineering countermeasures could have prevented many of these crashes.

The following figures illustrate fatality trends, reinforcing the need for a coordinated regional effort to reduce fatal and severe injury crashes.

During this plan's development, complete crash data was available through the end of 2017. Early investigation of 2018 and 2019 data revealed similar trends.

Denver region fatality trends

Figure 1 shows the number of fatalities by travel mode between 2000 and 2017. Since bottoming out in 2008, the annual number of fatalities in the Denver region has been on the rise.

Figure 1. Fatalities by travel mode between 2000 and 2017

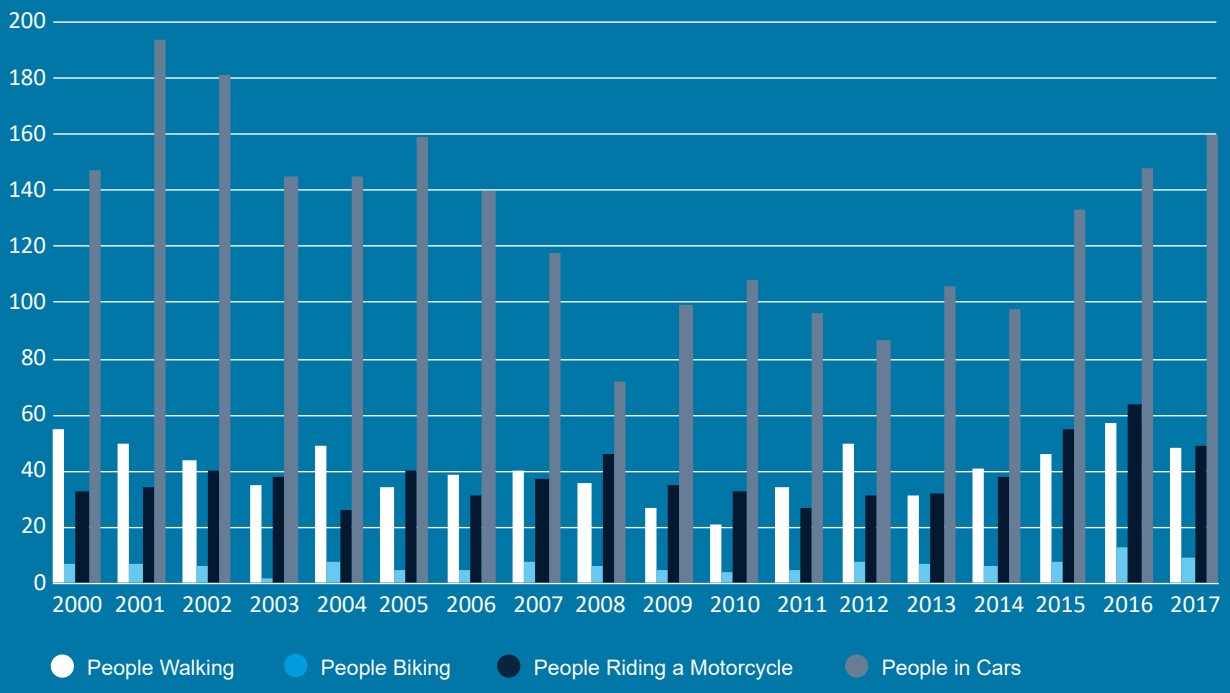


Figure 2 shows the number of fatalities by travel mode per 100,000 residents between 2000 and 2015. In recent years both the number of fatalities and the rate of fatalities for certain travel modes, such as people in cars, have been increasing.

Figure 2. Fatalities by Travel Mode per 100,000 residents between 2000 and 2015

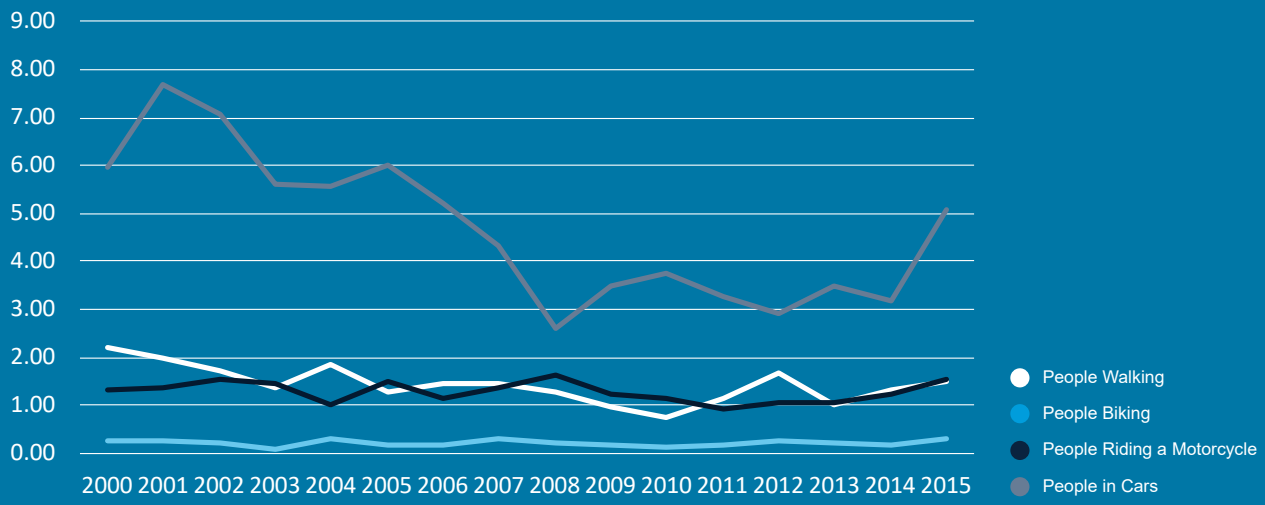


Figure 3 shows the percentage of all crashes, including noninjury and minor injury crashes, by travel mode based on 2013 through 2017 data. People in cars are involved in the vast majority, almost 95 percent, of all crashes.

Figure 3. Percent of All Crashes by Travel Mode Between 2013 and 2017

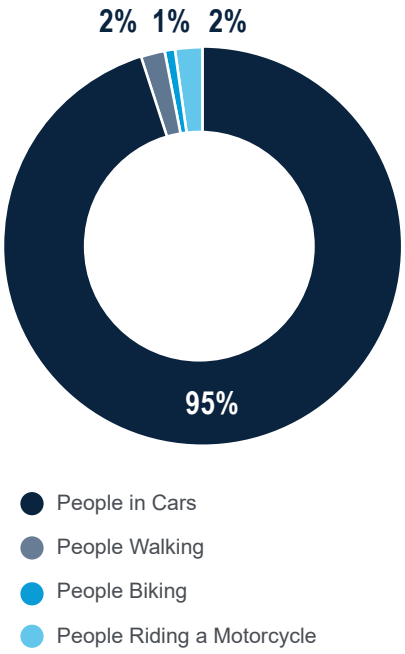
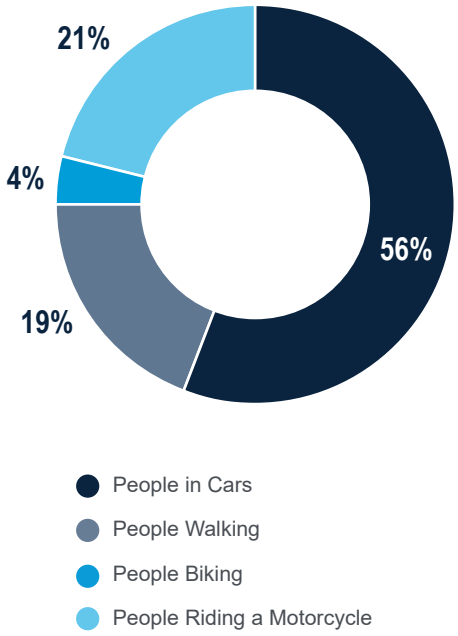


Figure 4 shows the percentage of fatal crashes by travel mode based on 2013 through 2017 data. In comparison to Figure 3, while the overall percentage of crashes involving people walking, biking or riding a motorcycle is small (approximately 5 percent total), the percentage of fatal crashes involving these travel methods is disproportionately high: 21 percent of fatal crashes involve a person riding a motorcycle, 19 percent involve a person walking and 4 percent involve a person biking.

Figure 4. Percent of Fatal Crashes by Travel Mode Between 2013 and 2017



Reducing crashes involving people walking, biking or riding a motorcycle is critical to reducing all fatal and serious-injury crashes and increasing the number of people who walk or bike as their travel mode. A survey conducted for DRCOG's Active Transportation Plan found that 59 percent of respondents are interested in biking but concerned about their safety.

Vision Zero principles: Complete Streets, safe speeds and equity



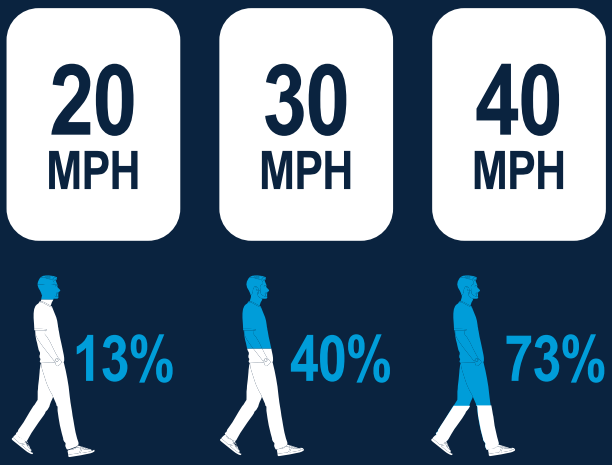
Complete Streets

The percentage of people who travel by walking or biking is relatively small, and most crashes involve people in cars; however, the percentage of fatal crashes involving people walking or biking is disproportionately high. While only 14 percent of trips in the Denver region are made by walking and biking, people walking and biking are involved in 24 percent of the region's fatal crashes.

Source: DRCOG's Focus Travel Model, 2020

The Vision Zero approach is to design Complete Streets that accommodate people using all methods of transportation, prioritizing safe travel for all users over expeditious travel of motor vehicles.

PEDESTRIANS HIT BY A VEHICLE TRAVELING AT



LIKELIHOOD OF FATALITY OR SERIOUS INJURY

Context-appropriate speeds

As crash speed increases, the likelihood of a severe injury or fatality also increases, especially for people walking and biking. For example, research completed by the AAA Foundation for Traffic Safety shows that the likelihood of a fatality or severe injury is 13 percent for a person walking struck by a vehicle traveling at 20 miles per hour, but this likelihoodw increases to 40 percent at 30 miles per hour and 73 percent at 40 miles per hour.

Source: Impact Speed and a Pedestrian's Risk of Severe Injury or Death, AAA Foundation for Traffic Safety, September 2011

The Vision Zero approach is to design and operate roads to achieve context-appropriate vehicle speeds that protect all roadway users.

Equity

Disadvantaged communities are disproportionately affected by traffic safety issues. Often, this results from a combination of streets not designed for all users or streets designed for high vehicle operating speeds traveling through areas otherwise affected by a combination of economic, health and environmental burdens where people are more likely to walk or bike. In the Denver region, 41 percent of the regional High-Injury Network occurs in areas with higher than average numbers of households in poverty and minority populations.

Source: DRCOG

The Vision Zero approach is to prioritize Complete Streets and roadway design and operation projects in disadvantaged communities, and to show empathy in enforcement of behaviors in disadvantaged communities.



Engaging the community for a people-first plan

Achieving the goal of Vision Zero involves everyone. Engaging local communities, stakeholders and the public across the Denver region was critical to the development of the plan and continued engagement is necessary for successful plan implementation.

Throughout plan development, DRCOG invited local communities to provide input through the regional Vision Zero Stakeholder Committee. The committee consisted of staff from local jurisdictions, two representatives for each county within DRCOG and partner agencies. The committee met multiple times throughout plan development and provided insight and feedback, assisted in developing outreach messaging and strategies, and helped develop goals and action initiatives to ensure future plan implementation.

To solicit input from the public to help identify primary traffic concerns in the region, DRCOG released an online survey, publicized in English and Spanish, from the beginning of August 2019 to the end of October 2019. To assist in reaching the large diverse area within DRCOG, paid social media advertising was used to promote the survey. The ads received nearly 475,000 impressions and more than 5,600 people clicked on the ads resulting in over 3,300 survey submissions.

DRCOG also released an online interactive map to accompany the survey, shown in Map 1. The map enabled the public to locate specific traffic safety concerns throughout the Denver metro area. Respondents could also express their agreement with others' posted concerns through the mapping application by liking the comment. In all, respondents identified more than1,000 locations were identified with concerns in the region, as well as 900 additional likes of 436 of the others' comments.

Simultaneous to the survey and map, DRCOG created and released a Regional Vision Zero video to bring awareness to traffic deaths in the Denver region. The video has been well received and has assisted in setting the tone and intent of Regional Vision Zero.



The Regional Vision Zero Stakeholder Committee reviews the draft regional High-Injury Network maps.



Residents identify the locations of safety issues at the Colorado Classic Open Streets Event.

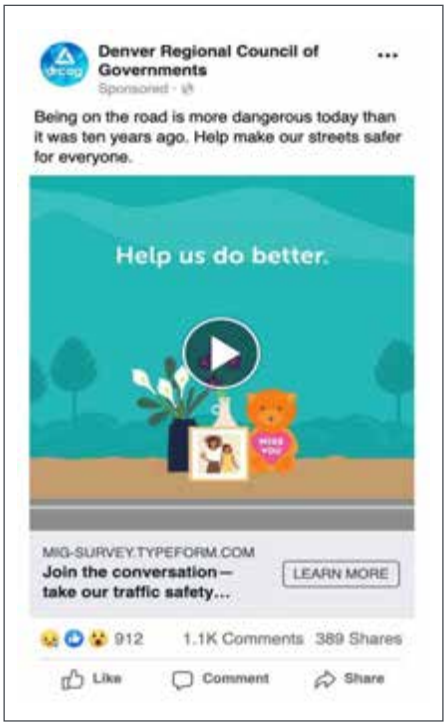


DRCOG conducted local agency meetings throughout the region, including at the Jefferson County offices.

Additional Outreach

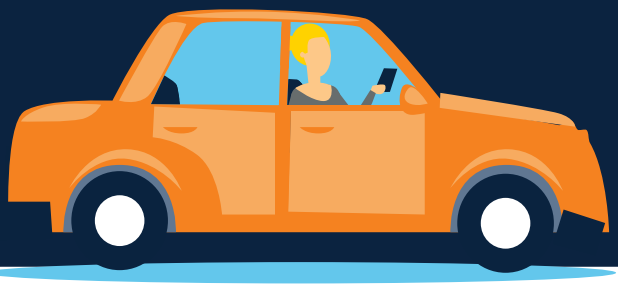
To supplement online outreach, staff attended the Colorado Classic Open Streets Event on August 25, 2017. The booth included an oversized map of the region and, like the interactive online map, allowed attendees to identify traffic concerns in specific locations.

To reach more regional stakeholders, DRCOG staff and the consultant team held four local agency meetings in early November throughout the region to solicit input on the draft regional High-Injury Network, crash profiles, countermeasures, and action initiatives. DRCOG staff invited representatives from advocacy groups and local government staff, including planners, engineers, public works and public school employees and law enforcement personnel, to meetings in Denver, Bennett, Jefferson County and Longmont. The local representatives who attended provided direction to guide further work on the plan.



The roadside memorial video was the top performing social media ad for both English and Spanish language ads.

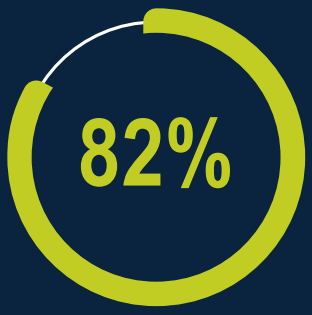
Regional Vision Zero online survey results



Distracted driving was, by far, the top traffic safety concern in the Denver region.

Speeding, red light and stop sign running, and unsafe turning or lane changing were the most significant concerns.

Prioritizing safe travel of people over expeditious travel of motor vehicles is a core Vision Zero strategy:



Of respondents were willing to add one or more minutes to their commute to improve safety.

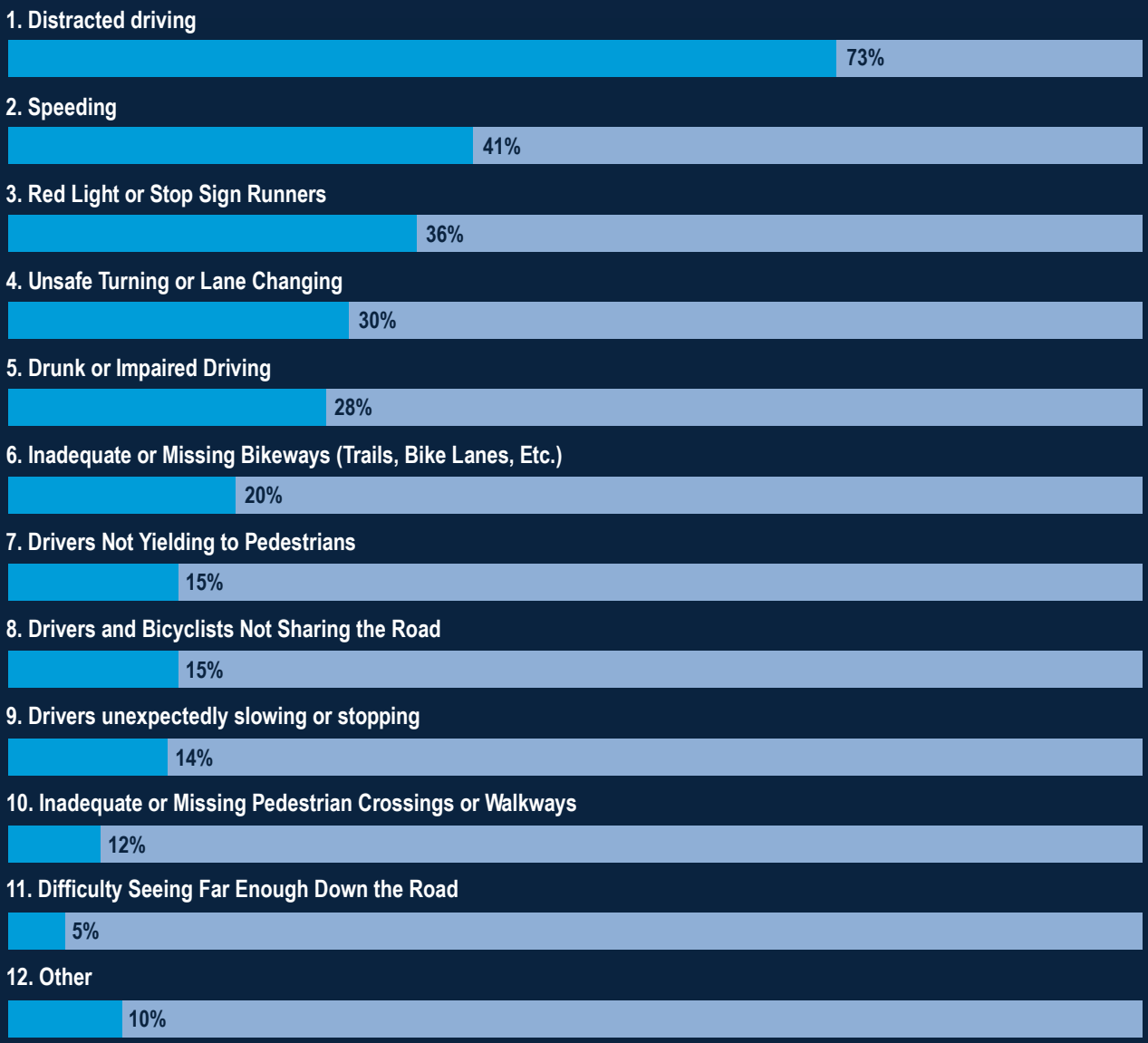


50 percent were willing to add five to 10 minutes to their commute to improve safety.

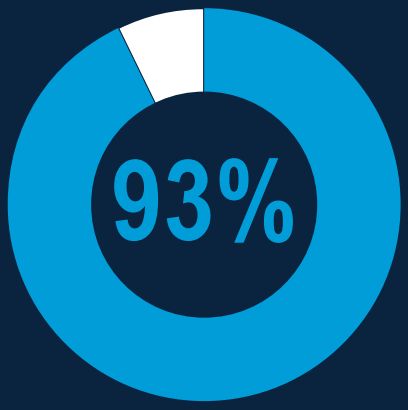


Figure 5.

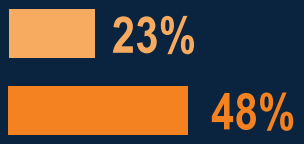
What are your top three traffic safety concerns in the Denver region?



Source: Survey for DRCOG's Regional Vision Zero, administered in fall 2019

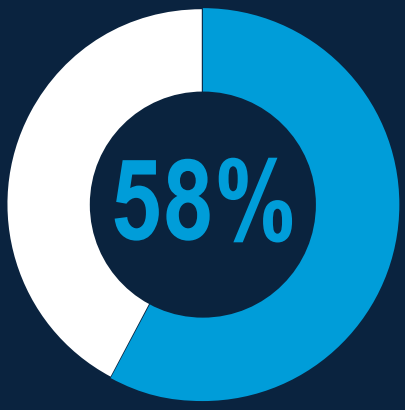


of respondents said traffic safety is either their top concern or is important relative to other issues in the denver region



Only 48 percent of English-language survey respondents and only 23 percent of Spanish- language survey respondents

Would contact the police with a traffic safety concern.



indicated that they know someone who has been hospitalized or killed as a result of a traffic crash.



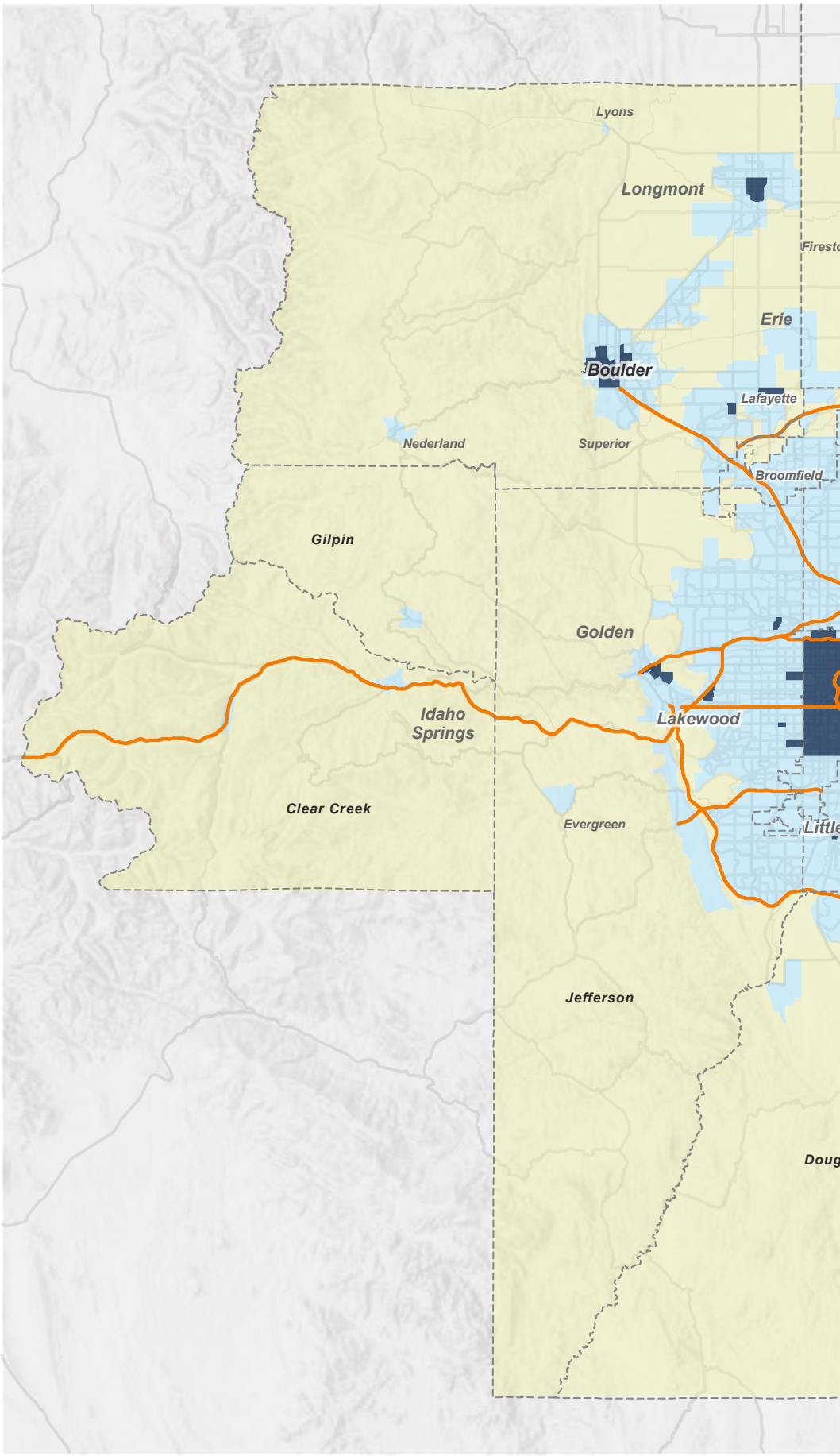
75 percent of English-language survey respondents and 87 percent of Spanish-language survey respondents

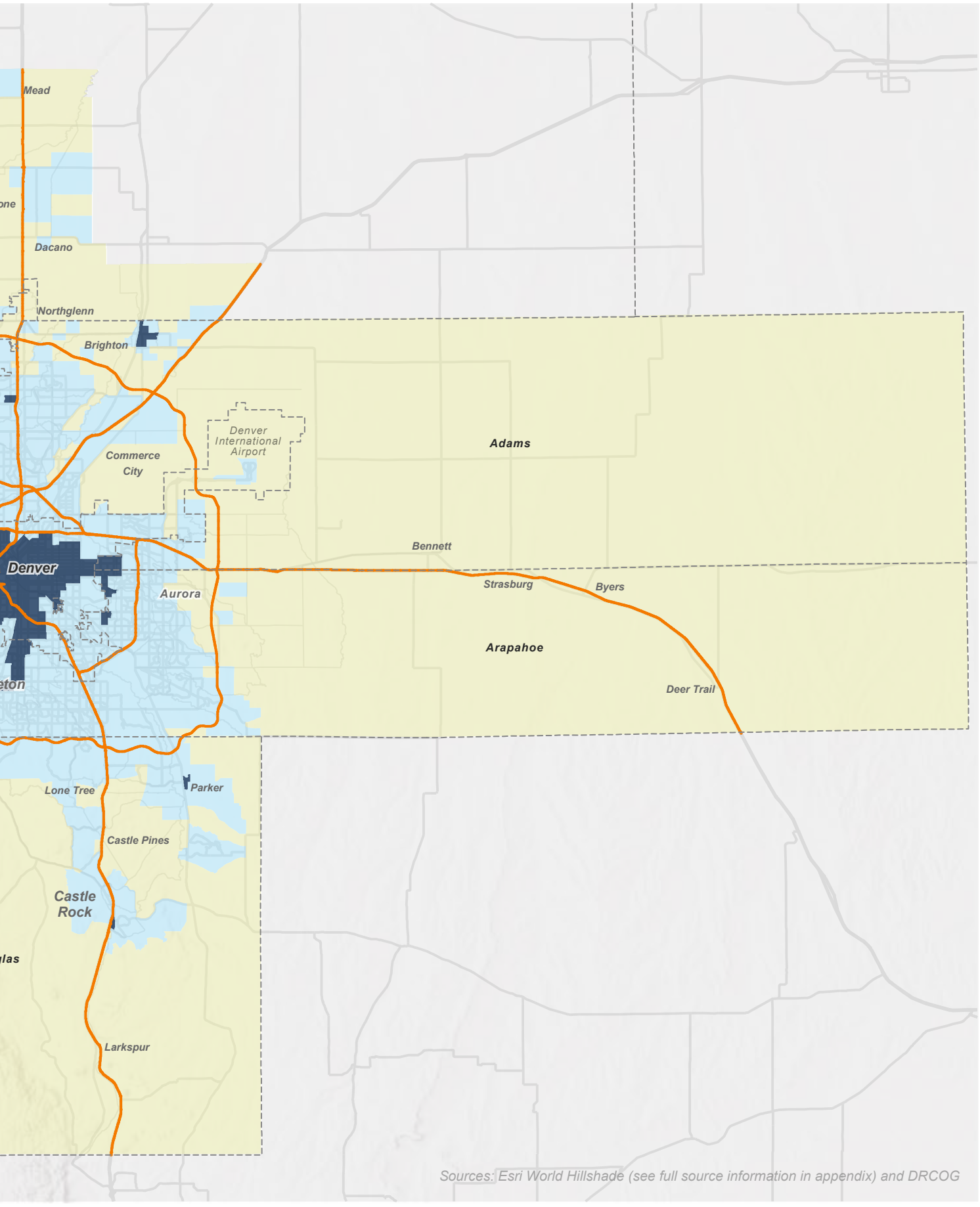
Do not know who to contact, besides the police, with a traffic safety concern.

Map 1. Summary of Regional Vision Zero web map feedback

To gather feedback, an interactive web map was live from August to October 2019. The map gathered more than 1,100 comments, identifying locations where people had traffic safety concerns such as speeding issues, inadequate pedestrian or bicycle facilities and yielding or lane changing. **Map 1** shows how locations identified by the public overlap with the data driven draft regional High-Injury Network included in the regional Vision Zero toolkit.

Moving forward, local communities and the residents of the DRCOG region will continue to be critical to implement the plan, from community-based grants to project-level engagement and education campaigns.




Mead
Dacano
Northglenn
Brighton
Denver International Airport
Commerce City
Adams
Denver
Aurora
Bennett
Strasburg
Byers
Arapahoe
Deer Trail
Lone Tree
Parker
Castle Pines
Castle Rock
Larkspur
Sources: Esri World Hillshade (see full source information in appendix) and DRCOG

Regional Vision Zero toolkit: how to use this plan



DRCOG values local adoption and implementation of Vision Zero. This section describes how local governments can use this plan to join the effort of achieving zero serious injuries or deaths in the Denver region.

How to use this plan

Local governments may use this plan as a toolkit of resources that can be endorsed or customized to encourage Vision Zero adoption and local safety action plan development. Ideally, local governments will use this plan to work strategically to eliminate serious-injury and fatal crashes. The key information for each local government includes:

- **Regional High-Injury Network** – Included in this plan is the Regional High-Injury Network the 9 percent of roads in the region where the majority of serious-injury and fatal crashes occur. The regional High-Injury Network also identifies critical corridors, which were selected by isolating the regional High-Injury Network by county and finding the highest-density corridors for serious-injury and fatal crashes along the regional High-Injury Network for each county. When locally owned and maintained, these roads may become priorities for safety improvements by local governments. Local governments can use the Regional High-Injury Network to identify places to support CDOT in traffic safety improvements through their jurisdictions. In developing a local Vision Zero plan, a local government can develop its own High-Injury Network through the use of more detailed local crash data, modify the regional High-Injury Network presented in this plan, or adopt the regional High-Injury Network within their communities.
- **Crash Profiles, Behavior Profiles and Countermeasures** – Crash profiles by area type provide information to local governments on crash types that are most frequently contributing to serious-injury and fatal crashes in their jurisdictions. The crash profiles and corresponding countermeasure glossary suggest potential countermeasures that local governments and their partners can use to reduce these types of crashes. To apply these crash profiles, a local government can identify the area types relevant in its jurisdiction and target reduction of key crash profiles by implementing recommended countermeasures in high-priority locations (such as on the regional High-Injury Network). Whereas the crash profiles vary by area type, the behavior profiles apply in all area types. Education and encouragement initiatives can promote behavior changes that reduce severe injury and fatal crashes across the region.
- **Local Adoption** – this plan suggests how local adoption of a Vision Zero goal, Vision Zero planning or other strategic safety efforts can contribute to the elimination of crashes in which people are killed or seriously injured across the region.

Regional High-Injury Network

The principles of regional Vision Zero prioritize data use in decision making. DRCOG, along with CDOT and local governments, tracks, analyzes and reports on traffic safety issues within the Denver region. DRCOG organizes crash data and provides geocoded crash information through its Regional Data Catalog. Crash data from 2013 through 2017 was used to analyze the locations of fatal and serious-injury crashes in the region to gain an understanding of the causes of these crashes and identify priority locations for safety improvements in the Denver region.

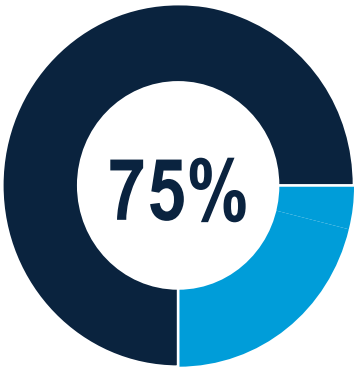
The Regional High-Injury Network identifies the roadways with the highest numbers of fatal and serious-injury crashes (also known as killed and severely injured crashes, or "KSI" crashes). There are more than 15,000 roadway miles in the Denver region, but KSI crashes disproportionately occur on just a small percentage of these roads. DRCOG, CDOT and local governments can use the Regional High-Injury Network to focus safety improvements, education and enforcement at locations where the most serious crashes happen with the greatest frequency.

The Regional High-Injury Network was developed by identifying the road segments with the highest KSI crash density, then the network was connected by adding links based on proximity to high crash density segments and road segment continuity. The High-Injury Network was further refined by filtering for isolated segments with lower KSI crash density. Lastly, the network was throughly reviewed by the Regional Vision Zero Stakeholder Committee and again at local agency meetings held throughout the Denver region. All relevant stakeholder comments were used to edit the regional High-Injury Network to reflect local context and subjective knowledge of areas of particular safety concern. The public comments collected from
the interactive map were also taken into account, locations where multiple users had indicated safety concerns were further analyzed and added to the network as appropriate.

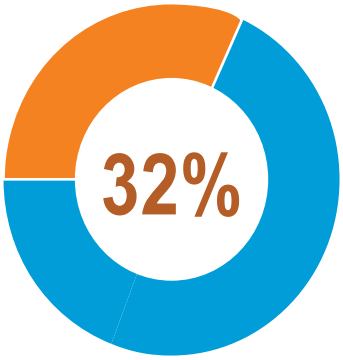
The critical corridors were developed from the regional High-Injury Network. Each of the 10 counties within the DRCOG boundary were analyzed separately to ensure the corridors were dispersed regionally. For each county the critical corridors identify the top 50 percent of KSI crash density corridors along the regional High-Injury Network.

Map 2 (on page 21) shows the draft Regional High-Injury Network developed for Taking Action on Regional Vision Zero.

Statistics

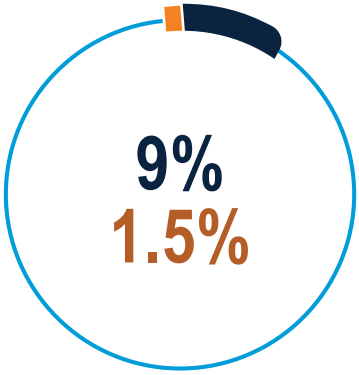


OF FATAL AND SERIOUS-INJURY CRASHES IN THE DENVER REGION ARE INCLUDED ON THE REGIONAL HIGH-INJURY NETWORK

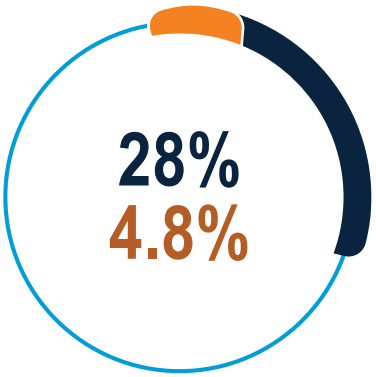


OF FATAL AND SERIOUS-INJURY CRASHES ARE INCLUDED ALONG CRITICAL CORRIDORS

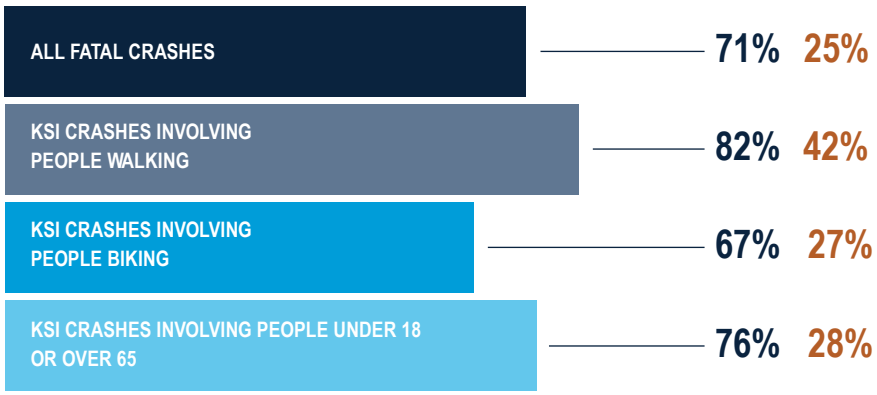
The network includes:



OF ALL ROADS IN THE DENVER REGION



OF HIGHWAYS AND MAJOR ROADS IN THE DENVER REGION

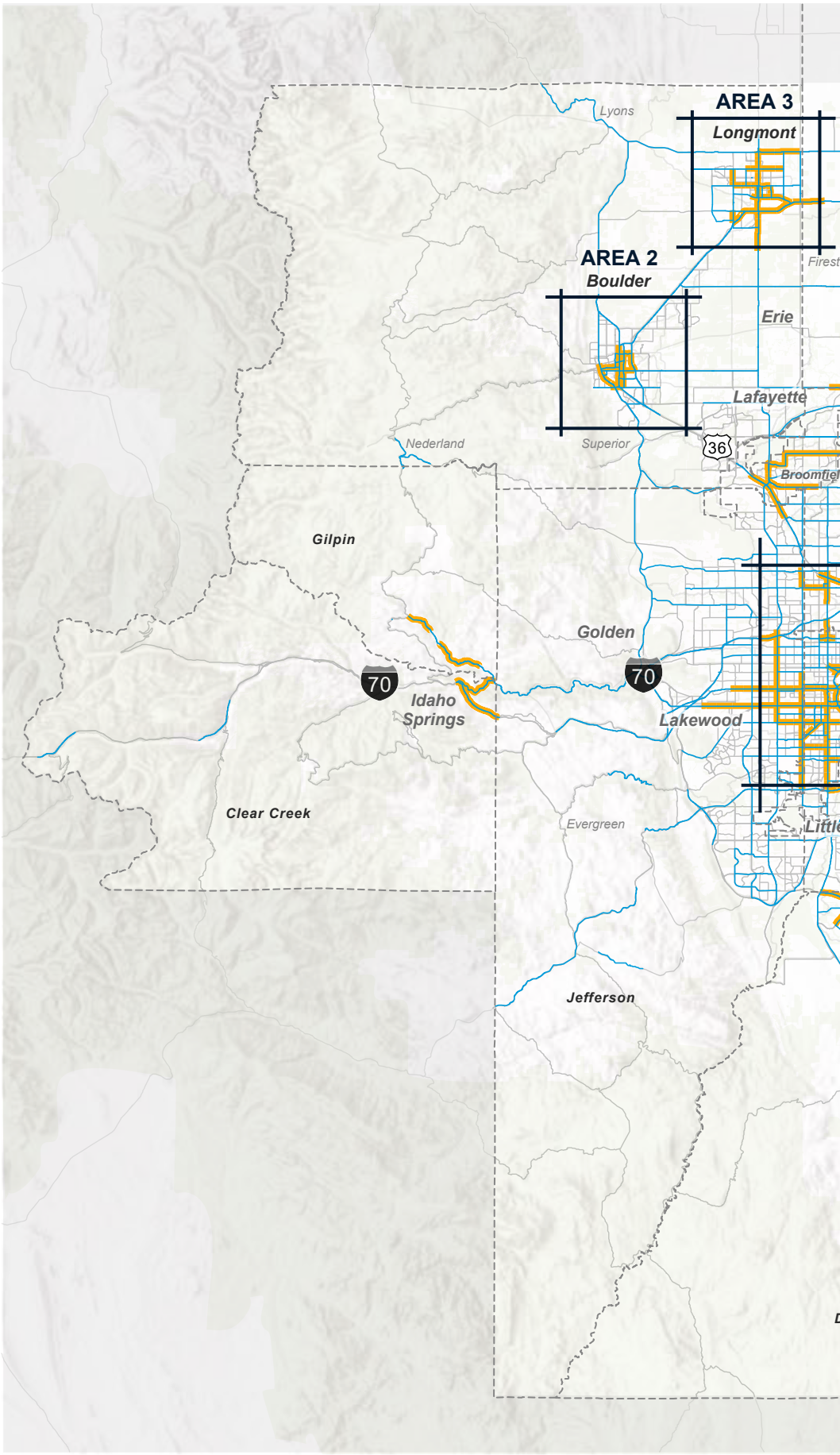


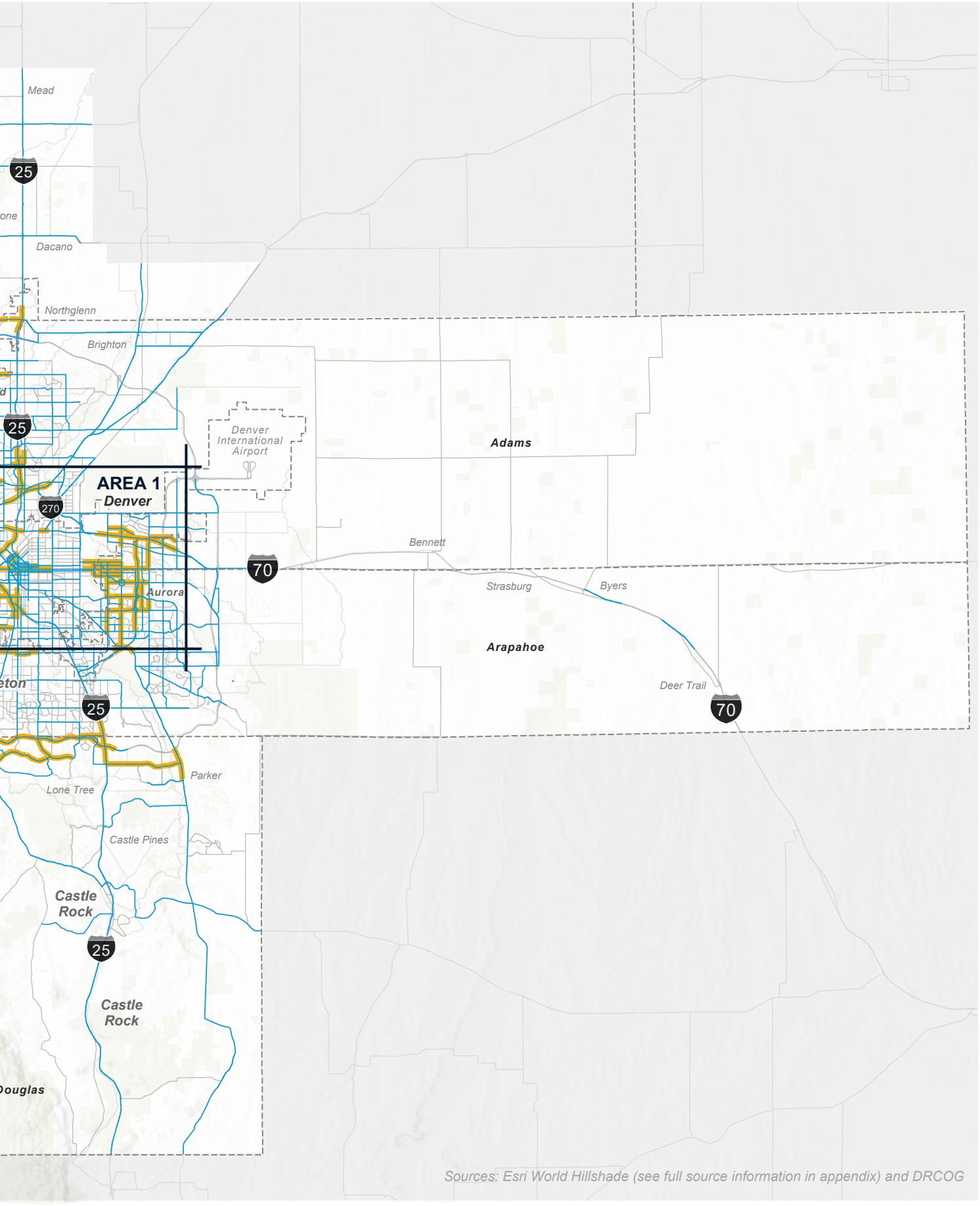
Map 2. Regional high-injury network

The Regional High-Injury Network was developed by identifying segments with the highest density of crashes in which people were killed or seriously injured in the DRCOG region.

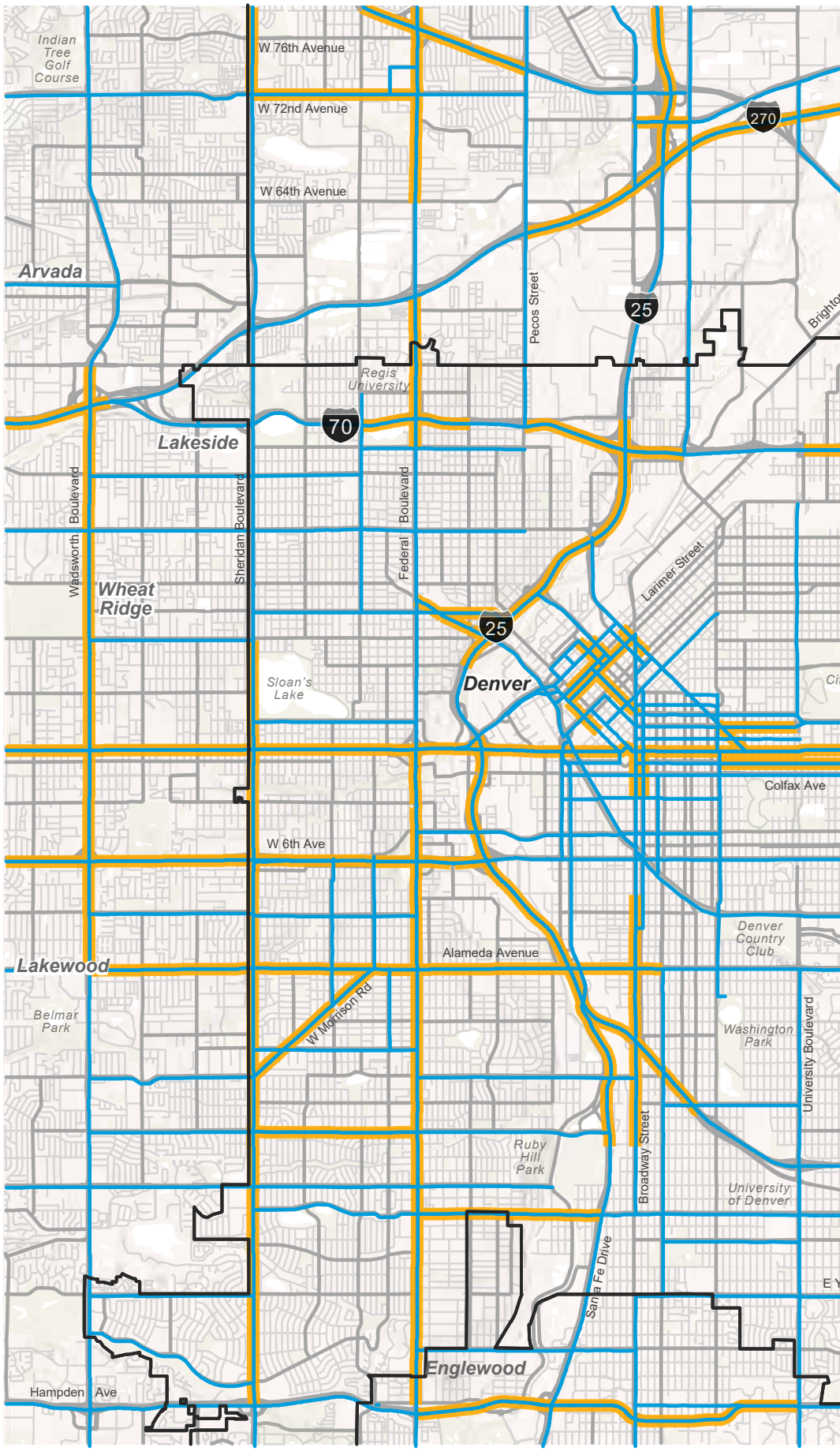
To further hone in on some of the most dangerous areas on the Regional High-Injury Network, DRCOG staff conducted additional analysis for each county to identify critical corridors along the Regional High-Injury Network.

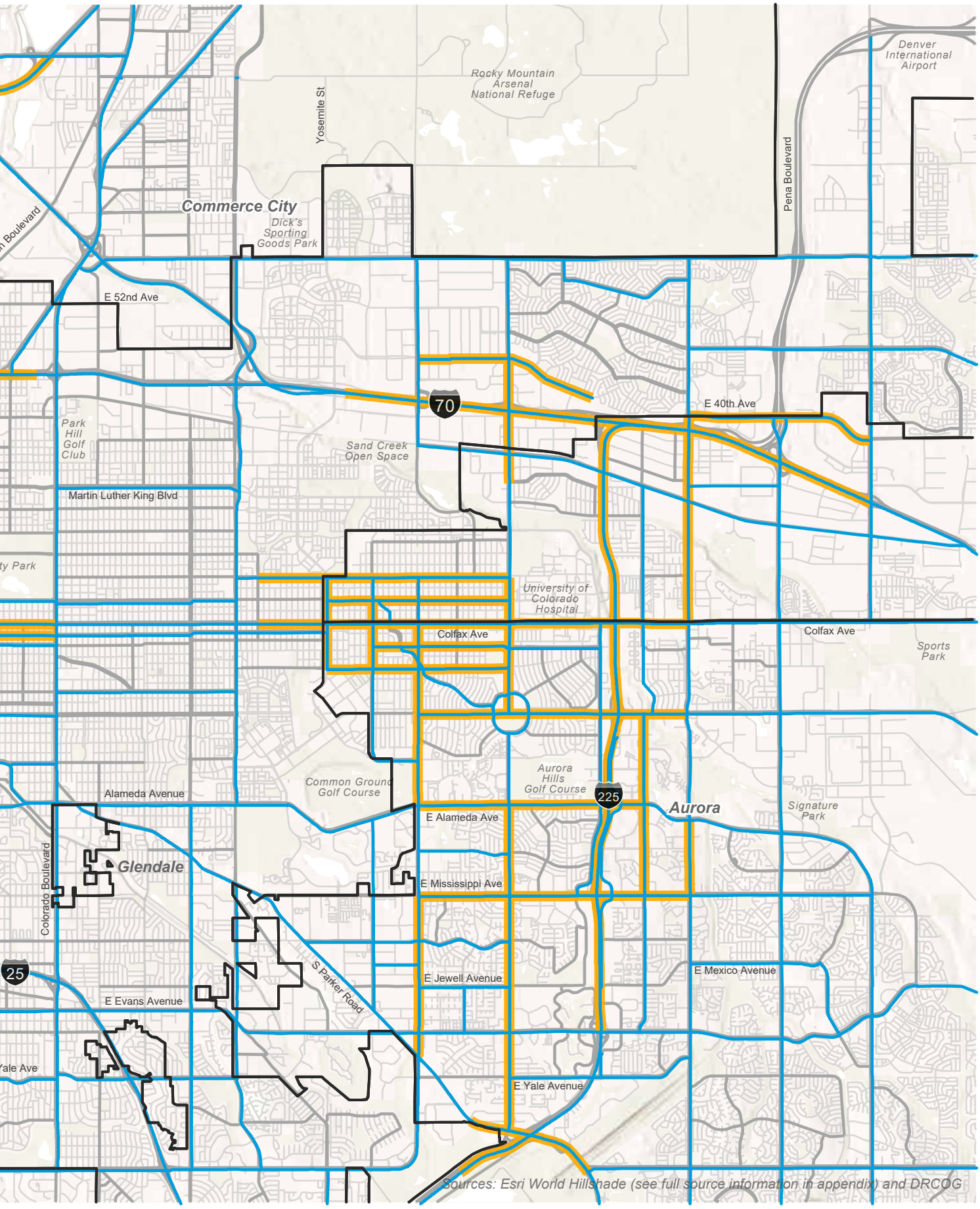
To make it easier for local jurisdictions to view the regional High Injury Network, DRCOG staff has created an interactive map. Please use this tool to zoom into specific areas and get more detail such as local street names. The interactive map also includes additional layers that relate to the regional High Injury Network such as vulnerable populations. Please use this link to view the interactive map: Regional High-Injury Network.




Mead
25
Dacano
Northglenn
Brighton
25
Denver
International
Airport
Adams
AREA 1
Denver
270
Bennett
70
Aurora
Strasburg
Byers
Arapahoe
Deer Trail
70
25
Parker
Lone Tree
Castle Pines
Castle
Rock
25
Castle
Rock
Douglas
Sources: Esri World Hillshade (see full source information in appendix) and DRCOG

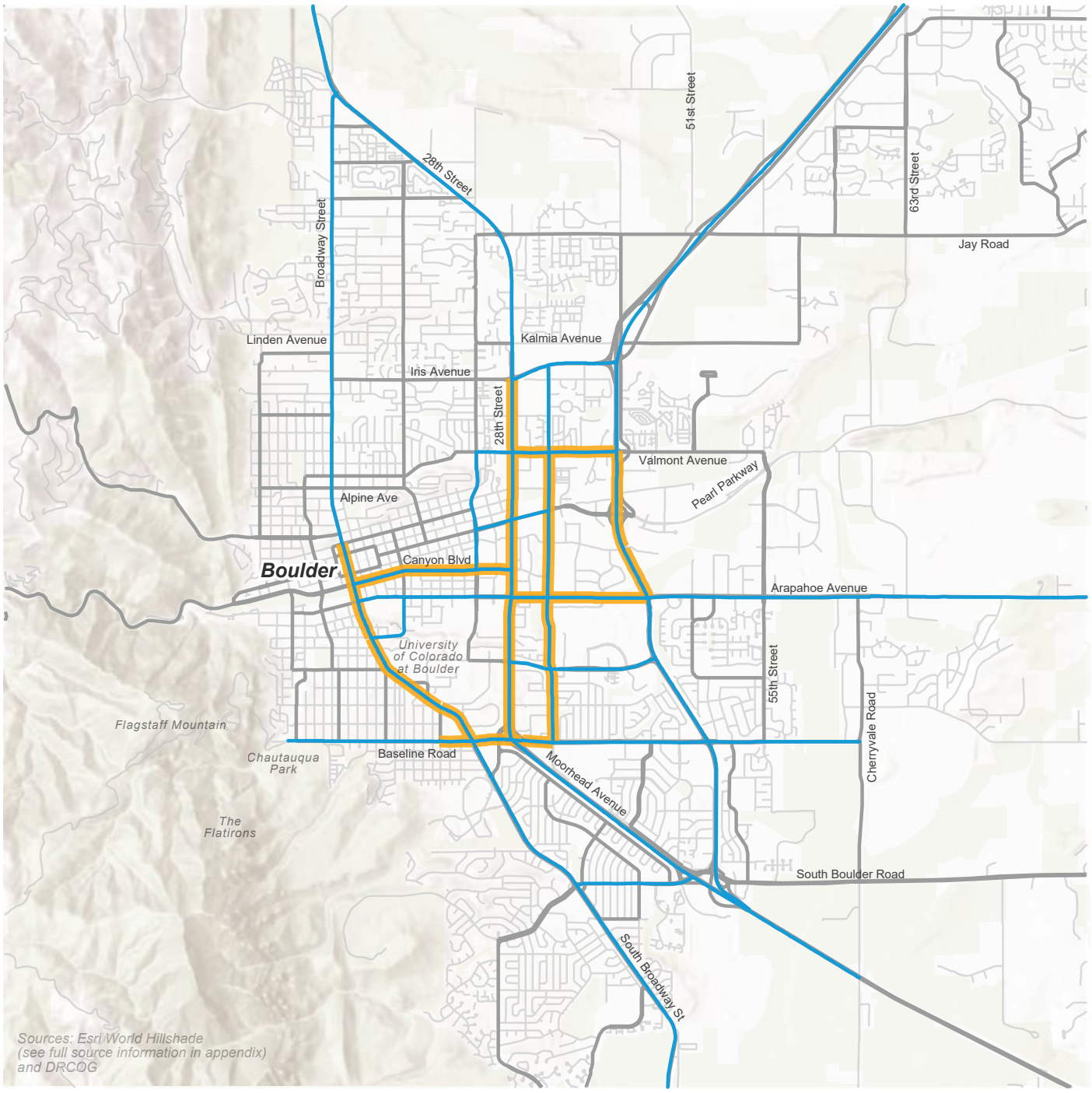
Map 3. Regional High-Injury Network Denver/Aurora





Sources: Esri World Hillshade (see full source information in appendix) and DRCOG

Map 4. Regional High-Injury Network Boulder



High-Injury Network

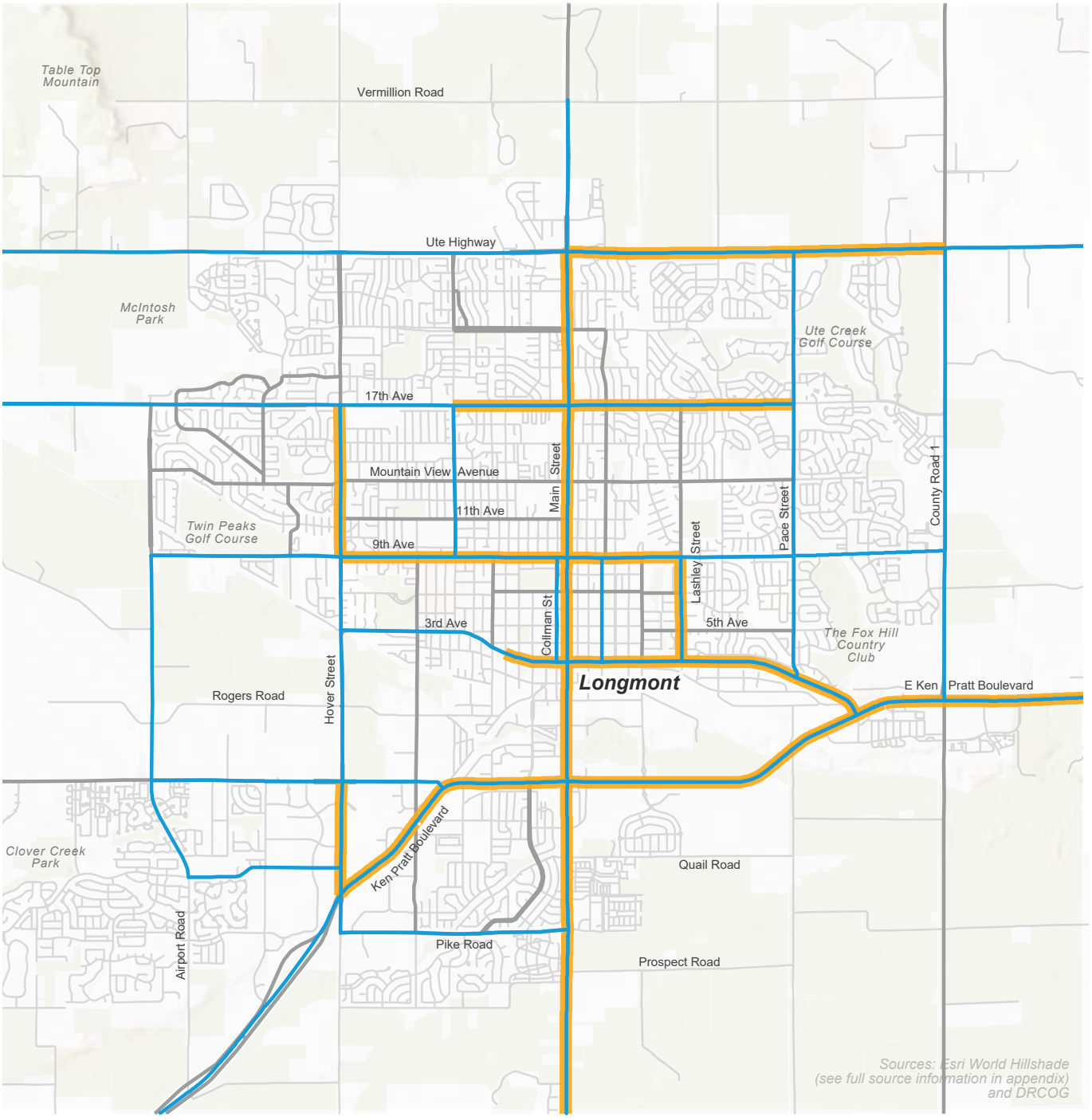
Critical Corridors

All Other Roads

N

0 Miles 0.5

Map 5. Regional High-Injury Network Longmont



Crash profiles, behavior profiles and countermeasures

Crash profiles describe the most frequently occurring crash types that result in fatalities or severe injuries in the Denver region. By analyzing KSI crash data for the Denver region from 2013 to 2017, crash profiles were created according to area type. DRCOG and local governments have the greatest opportunity to reduce fatal and severe injury crashes across the region through application of countermeasures, actions and policies that address the crash profiles.

Crash profiles describe the specific events that occurred in a crash. Behavior profiles describe human behavior that may have led to a crash. Vision Zero seeks to integrate human failure into the approach to roadway design and operation. The infrastructure countermeasures provided for each crash profile can contribute to a safe system that integrates human failing. Though not reliant on communications and campaigns to change human behavior, Vision Zero communities still use theseefforts. The behavior profiles are intended to inform communications and campaigns across the Denver region, not become a substitute to creating safe systems.

The potential countermeasures presented in this section are strategies with a documented crash reduction factor or otherwise recognized as a best practice for addressing certain crash types. Given the broad nature of the crash profiles and crash mechanisms/patterns, the lists of potential countermeasures are intentionally broad. Further engineering analysis should consider additional relevant design guidance in selecting the most appropriate countermeasures.

Area types



Given the diversity of roadways, land use contexts and roadway users, and the varying types of crashes that occur in the Denver region,
the region was divided into four area types. The crash analysis was performed by area type to identify a distinct set of crash profiles and countermeasures for each of the four area types. Map 6 shows the four area types.

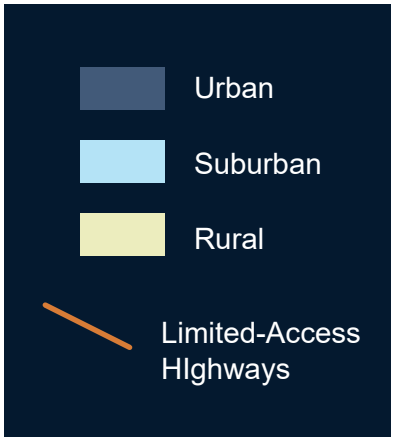
The distinction between area types was defined based on an area's population and employment density, an area's density of low-speed street intersections (less than or equal to 30 mph), and whether the location was within an existing DRCOG Urban Center. A separate area type was assigned to limited access highways which have distinct crash types and countermeasures compared with most other roads. Table 1 shows the defining features of different area types.

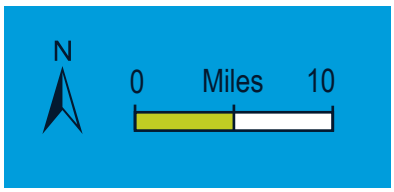
Table 1. Area Type Definitions

Area type	Defining features	Example locations
Urban	• High population or employment density • High density of low-speed (pedestrian-oriented) street intersections • Or, within an existing DRCOG urban center (as of 2019)	Core Denver neighborhoods, Aurora around Colfax Avenue, Englewood around Broadway, core Boulder neighborhoods, other downtown areas
Suburban/compact Communities	• Medium population or employment density	Denver Tech Center, Broomfield, southeast Aurora, Firestone, Idaho Springs
Rural	• Low population or employment density	Clear Creek County (excluding Idaho Springs), eastern Arapahoe County, parts of Boulder County
Limited-access highways	• Interstates or other limited access state highways or other roads	Interstate 25, Interstate 70, U.S. Route 36 (between Denver and Boulder), Peña Boulevard

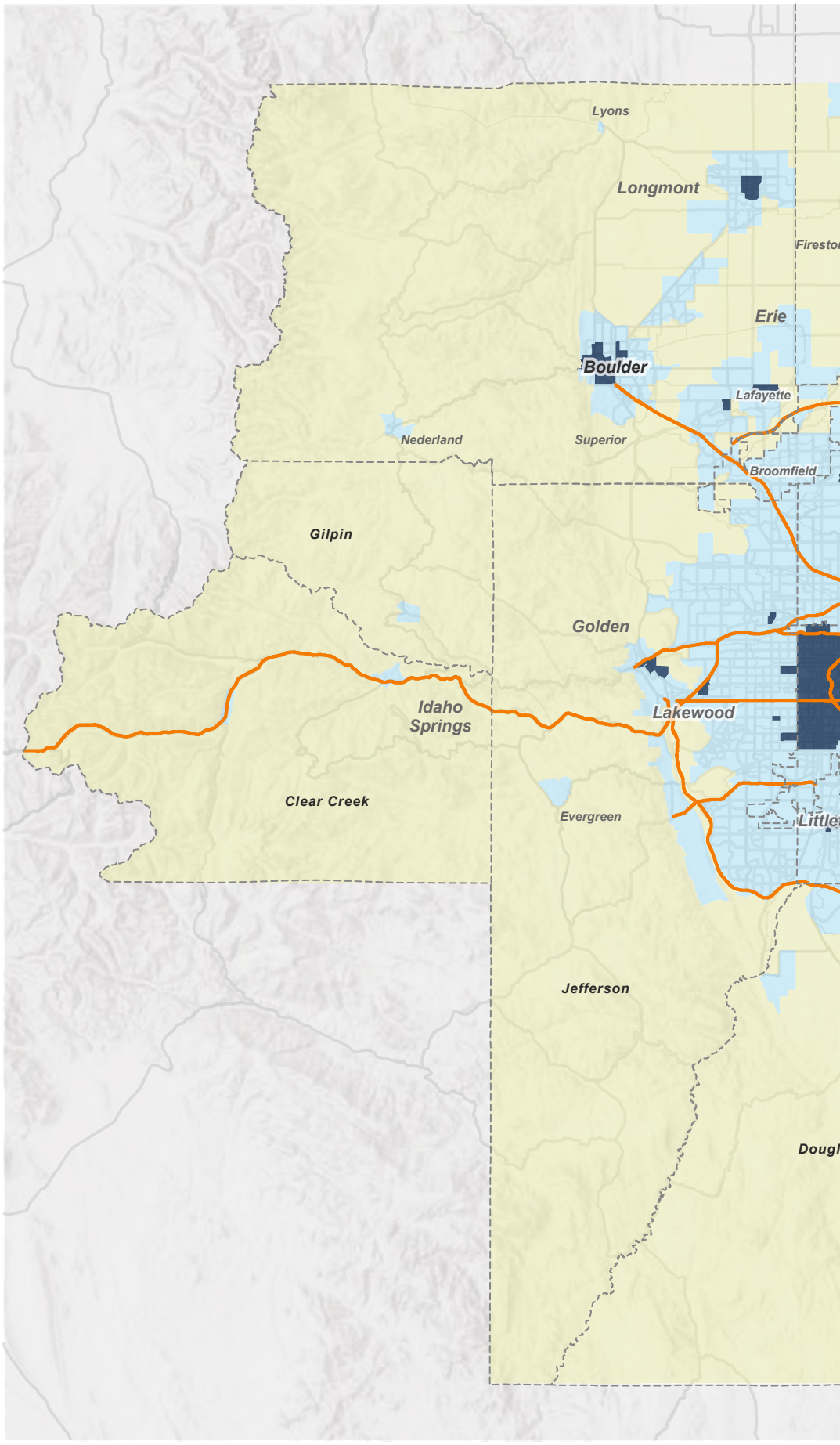
These area types are general for the purposes of regional crash analysis. Multiple area types can exist within a given community.

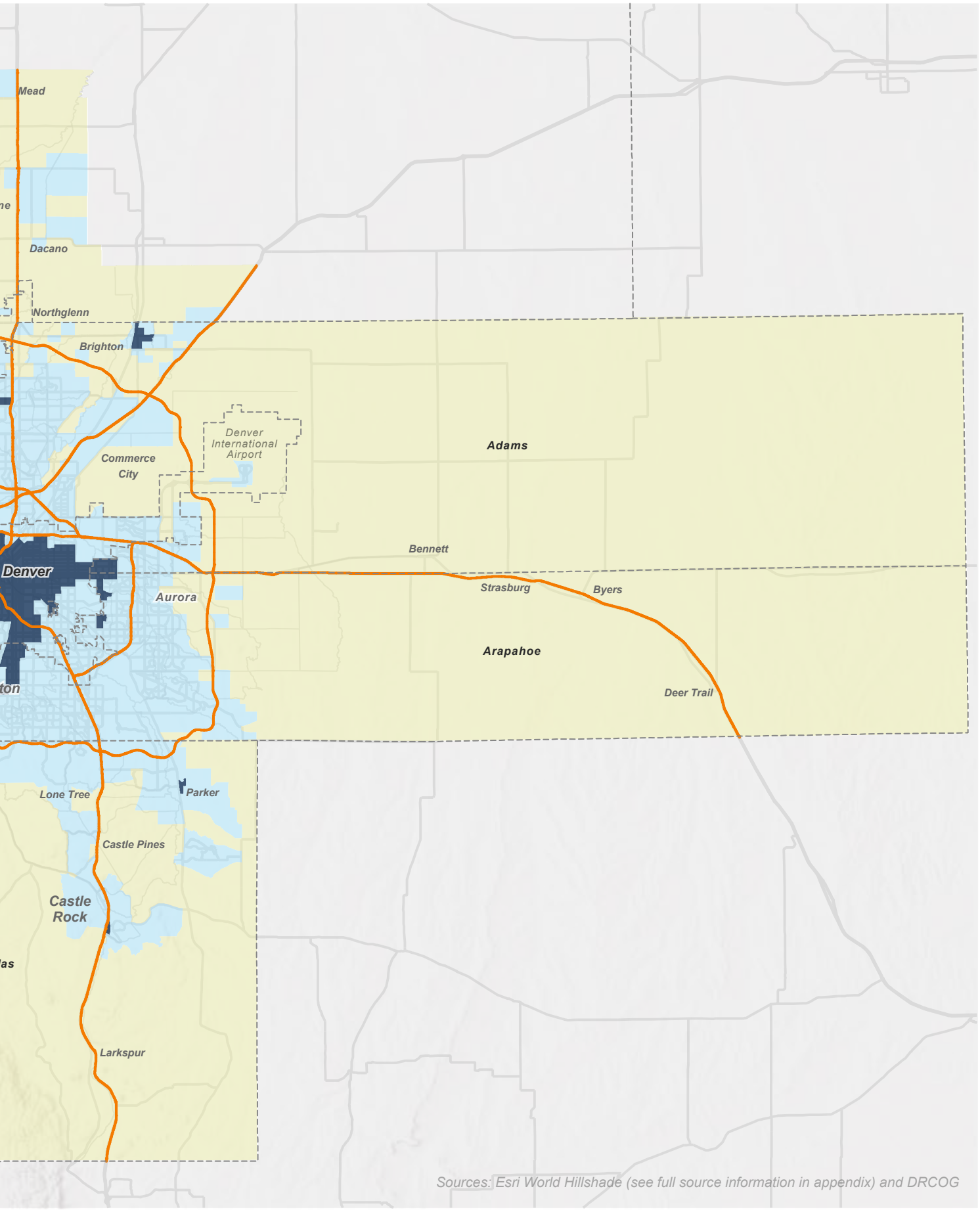
Map 6. Regional area types





These area types are general for the purposes of regional crash analysis. Multiple area types can exist within a given community.




Mead
Dacano
Northglenn
Brighton
Denver International Airport
Commerce City
Adams
Bennett
Denver
Aurora
Strasburg
Byers
Arapahoe
Deer Trail
Lone Tree
Parker
Castle Pines
Castle Rock
Larkspur
Sources: Esri World Hillshade (see full source information in appendix) and DRCOG


COORS
Coors
Coors BREAK
80
YEARS

Area type crash data summary

Figure 6 shows annual fatal crashes by area type between 2013 and 2017. Between 2013 and 2017, fatal crashes increased by 50 percent in the Denver region, from 165 to 248. Fatal crashes have increased the most in the suburban/compact communities area type, by more than 90 percent from 2013 to 2017. Fatal crashes have also increased in the rural area type, while fatality levels have fluctuated in the urban and limited-access highway area types.

Figure 6. Annual Fatalities by Area Type Between 2013 and 2017

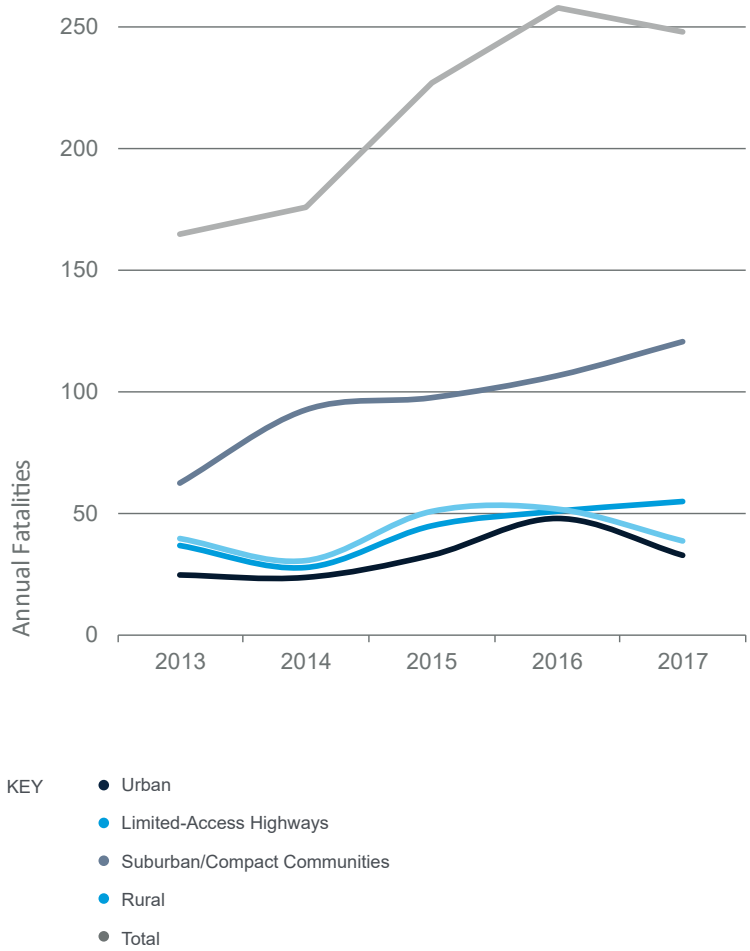


Figure 7 and Figure 8 show that close to half of all KSI and fatal crashes in the Denver region occur in the suburban/compact communities area type. Additionally, while only 10 percent of KSI crashes occur in the rural area type, about 20 percent of fatal crashes occur in this area type. This indicates that the crashes that occur in the rural area type tend to be more severe.

Figure 7. Percent of KSI Crashes by Area Type Between 2013 and 2017

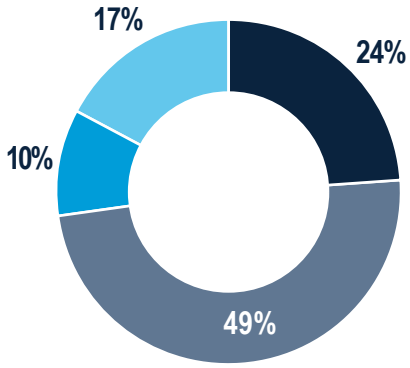
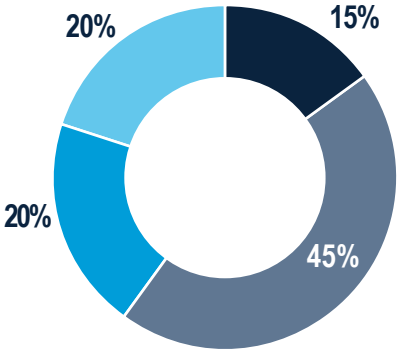


Figure 8. Percent of Fatal Crashes by Area Type Between 2013 and 2017



Key

- Urban
- Suburban/ compact communities
- Rural
- Limited-access highway

Figure 9 and Figure 10 show crashes that involved people walking between 2013 and 2017. Crashes that involved people walking represent a much higher percentage of KSI and fatal crashes in the urban and suburban/ compact communities area types as compared with the rural and limited access highway area types. Nearly half (41 percent) of fatal crashes in the urban area type involve people walking.

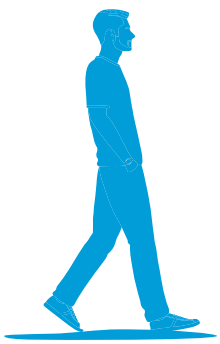


Figure 9. Percent of KSI Crashes that Involved People Walking Between 2013 and 2017

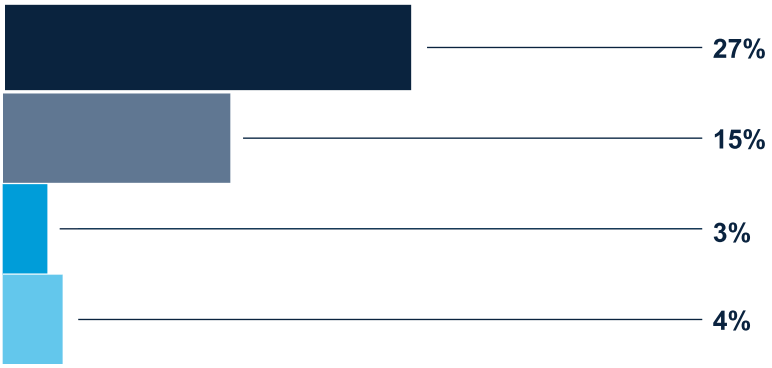


Figure 10. Percent of Fatal Crashes that Involved People Walking Between 2013 and 2017

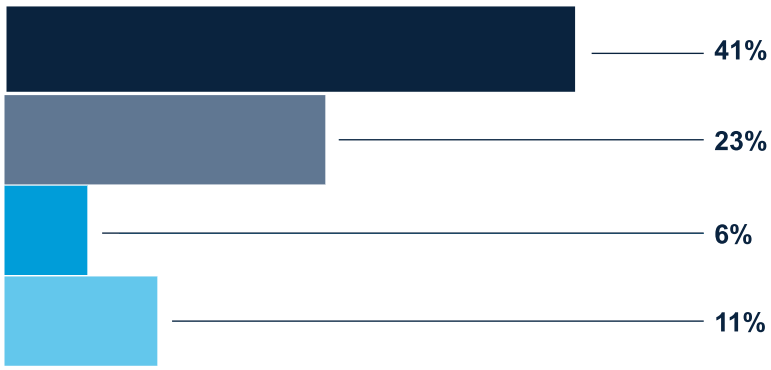








Figure 11 and Figure 12 show crashes that involved people biking between 2013 and 2017. KSI crashes involving people biking were generally not as frequent as crashes involving people walking in the urban and suburban/compact communities area types. However, similar to crashes involving people walking, they represent a higher portion of KSI crashes in the urban and suburban/compact communities area types as compared with the other area types. Crashes that involved people biking represent nearly the same percentage of fatal crashes in the rural area type as they do in the urban and suburban/compact communities area types.

Figure 11. Percent of KSI crashes that involved people biking between 2013 and 2017



Figure 12. Percent of fatal crashes that involved people biking between 2013 and 2017



Key

- Urban
- Suburban/ compact communities
- Rural
- Limited-access highway

Speed reduction strategies

Speeding can be difficult to prove, especially in urban and suburban areas. As a result, crash data often underreports speed-related crashes and many of these crashes are attributed to careless or reckless driving. Additionally, even when speeding is not identified as a driver action because the person driving did not exceed the posted speed limit, posted or operating speeds above what is appropriate for the context increase crash severity.

Speed is identified as a crash profile for rural areas and limited-access highways where speeding is easier to prove. However, speed is a contributing factor to fatal and serious-injury crashes across all area types. Safe travel speed is a core Vision Zero principle given the documented relationship between speed and crash severity. A variety of proven techniques can be applied to reduce travel speed:

- Traffic calming – Vertical devices such as speed humps and speed tables and horizontal devices such as bulbouts, chicanes or mini traffic circles have documented speed-reduction effects. These treatments are typically limited to local and sometimes collector roads.

- Realigning skewed intersections – Broad, wide-radius turns can be made at high speeds. Tighter turns, closer to 90 degrees, with a small radius are made at lower speeds.

- Reducing travel lane widths – Narrower travel lanes encourage lower vehicle speeds. Recent updates to the American Association of State Highway Transportation Official's (American Association of State Highway Transportation Officials) A Policy on Geometric Design of Highways and Streets included allowances for narrow travel lanes in recognition of safety research that showed little or no difference in crash history in a variety of contexts.

- Removing travel lanes – Reducing the number of travel lanes on a street enables the slowest driver to set the operating speed on a street, rather than the fastest driver.

- Roundabouts – By introducing horizontal deflection onto otherwise straight roadways, roundabouts can reduce operating speeds. Additionally, roundabouts have proven safety benefits compared to standard intersections.

Equity strategies

Equity is a foundational Vision Zero concept. Low-income communities and communities of color are disproportionately affected by fatal and serious-injury crashes. In the Denver region, 41 percent of the regional High-Injury Network is in areas with higher-than-average numbers of households in poverty and minority populations.

- The Vision Zero Network published Equity Strategies for Practitioners to assist communities in implementing Vision Zero with a focus on equity. Key strategies from the guide are:

- Commit to the work – Ensure that Vision Zero or traffic safety leadership reflects the diversity of the community, agree that equity issues are a focus of Vision Zero and make a strong and firm commitment from the start.

- Use data to focus efforts – Incorporate demographic, social, public health and economic datasets, as well as qualitative data, into crash analysis and project prioritization.

- Enforcement with empathy – Enforcement must not have an outsized effect on low-income communities and communities of color, nor should they damage police-community relationships. Because safe infrastructure is lacking in many low-income communities and communities of color, these communities are already unfairly burdened by the transportation system. Strategies to integrate equity into enforcement include community policing, officer training, careful application of automated enforcement, transparency in traffic stop data, diversion programs that focus on education rather than punishment and graduated fines.

- Community engagement – Programs and associated staff should build sustaining relationships with the community and partners. Leaders must listen and demonstrate that they value the experiences of people affected by inequitable conditions. Hosting engagement meetings in locations people can attend conveniently and reducing barriers to participation are key elements of Vision Zero-focused community engagement.

Urban Area Crash Profiles

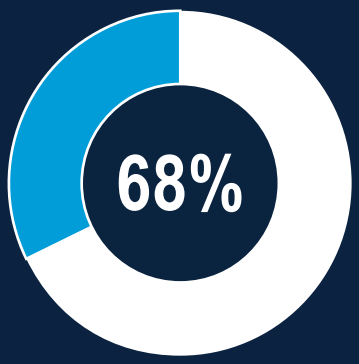
Table 2 shows the four crash profiles for the urban area type. Together these four crash profiles account for 68 percent of all KSI crashes and 66 percent of all fatal crashes in urban areas. Some crashes can be included in multiple crash profiles. For example, a crash could involve a left turn and a person walking.

Crashes involving people walking account for a significant portion of KSI crashes in urban areas, including 43 percent of fatal crashes. Taking measures to reduce the likelihood of crashes involving people walking in urban areas will have a significant effect on reducing overall fatal crashes.

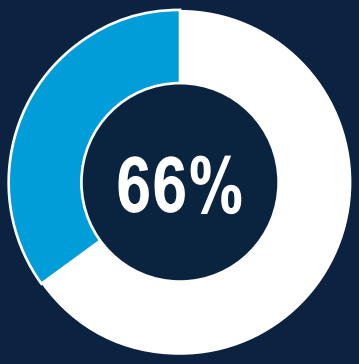
Table 2. Urban area crash profiles

Crash profiles	%KSI in urban areas	% Fatal in urban areas
Failed to Yield Right-of-Way and Left Turn	35%	20%
Pedestrian-Involved	27%	43%
Bicyclist-Involved	12%	6%
Red Light or Stop Sign Running	12%	8%

CRASH PROFILES INCLUDE



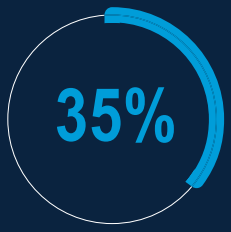
of all KSI crashes in urban areas



of all fatal crashes in urban areas

URBAN 1

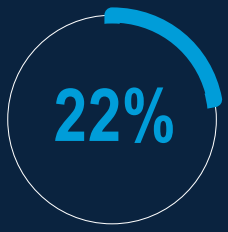
KEY CRASH PROFILE STATISTICS



of all KSI crashes in urban areas



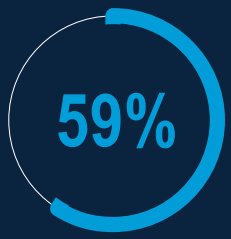
of all fatal crashes in urban areas



involve people walking



involve people biking



of failed to yield right-of-way involve left turns

Failed to yield right-of-way and left turn

What types of crashes does this crash profile include?

This crash profile includes all crashes where the driver action of a vehicle is “Failed to Yield Right-of-Way” or where the movement of a vehicle prior to the crash is “Left Turn.” Failed to yield includes instances of a person driving entering a street, attempting to cross a street or make a turn when another vehicle, person walking or person biking has the right-of-way.

The majority of KSI crashes in urban areas where a person driving failed to yield right-of-way, 59 percent, are left turns. Forty percent involve
a person walking or a person biking, and another 28 percent result in vehicle-vehicle broadside crashes.

Where do these crashes occur?

Most left turn KSI crashes in urban areas occur on arterial streets (86 percent) and at or near signalized intersections (71 percent).

What do local communities say?

Fifteen percent of survey respondents in the Denver region ranked
“drivers not yielding to pedestrians” and 30 percent ranked “unsafe turning/lane changes” in their top three traffic safety concerns.

How to identify these crashes in crash reports or crash data

The driver action of a vehicle is “Failed to Yield Right-of-Way” or the prior movement of a vehicle prior to the crash is “Left Turn.”

Table 3. Potential Countermeasures to Reduce Failed to Yield Right-of-Way and Left Turn Crashes in Urban Areas

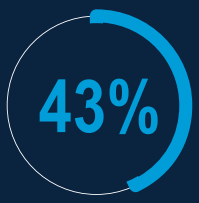
Mechanism/pattern	Potential countermeasures
Left turn at signalized intersection	• Appropriate green time for left turn • Appropriate yellow and all-red interval • Lagging turn phase • Leading pedestrian interval • Positive left turn offset for visibility • Protected turn phase
Left turn and broadside at unsignalized locations	• All-way stop • Consolidate driveways • Improve sight distance • Lighting • Partial closure • Positive left turn offset for visibility • Prohibit left turn • Raised median • Stop lines • Stop signs at near side and far side • Traffic calming • Traffic signal • Two-stage gap acceptance
Pedestrian-involved	• See Pedestrian-involved countermeasures
Bicyclist-involved	• See Bicyclist-involved countermeasures

URBAN 2

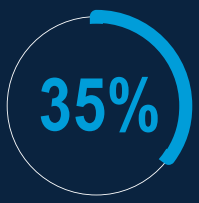
KEY CRASH PROFILE STATISTICS



of all KSI crashes in urban areas



of all fatal crashes in urban areas



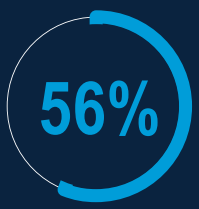
involve a victim of vulnerable age (younger than 18, or older than 65)



occur on arterial streets



occur at signalized intersections



occur at night or twilight

Pedestrian-involved crashes

What types of crashes does this crash profile include?

This crash profile includes all crashes that are classified as "pedestrian" or crashes where a person walking is involved in a harmful event that took place during the crash. While crashes involving people walking only account for 3 percent of total crashes in urban areas, they represent 43 percent of all fatal crashes.

As crash speed increases, the likelihood of a severe injury or fatality also increases, especially for people walking.

Where do these crashes occur?

The vast majority of KSI crashes in urban areas involving people walking occur on arterial streets (84 percent) and are at or near signalized intersections (66 percent).

What do local communities say?

Fifteen percent of survey respondents in the Denver region ranked
"drivers not yielding to pedestrians" and 12 percent ranked "inadequate or missing pedestrian crossings or walkways" as one of their top three traffic safety concerns.

How to identify these crashes in crash reports or crash data

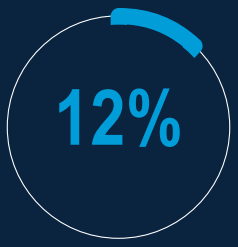
A harmful event is "school age to/from school," "pedestrian on toy motorized vehicle," or "all other pedestrians."

Table 4. Potential Countermeasures to Reduce Pedestrian-Involved Crashes in Urban Areas

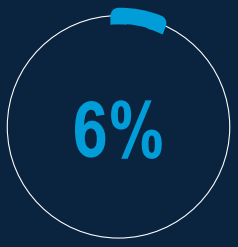
Mechanism/pattern	Potential countermeasures	
Signalized intersection	• Advance stop bar • Bulbout • Countdown pedestrian signal heads • Dual curb ramps • Extend pedestrian crossing time • Far-side bus stops • High-visibility crosswalks • Intersection tightening • Leading pedestrian interval • Lighting • Parking prohibition	• Partial closure • Pedestrian recall signal timing • Pedestrian refuge median • Prohibit left turn • Prohibit right on red • Prohibit turn during pedestrian phase • Protected turn phase • Red-light camera • Roundabout • Shorten signal cycle length • Straighten crosswalks
Nonsignalized intersection	• All-way stop • Bulbout • Co-locate bus stops and pedestrian crossings • Dual curb ramps • Intersection tightening • Lighting • Marked crossing • Narrow travel lanes • Parking prohibition • Partial closure	• Pedestrian hybrid beacon • Pedestrian refuge median • Prohibit left turn • Raised median • Rectangular rapid flashing beacon • Road diet • Sidewalks • Signs • Traffic calming • Traffic signal

URBAN 3

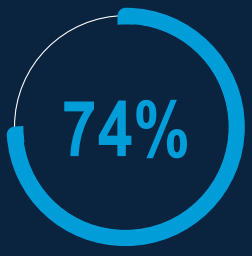
KEY CRASH PROFILE STATISTICS



of all KSI crashes in urban areas



of all fatal crashes in urban areas



occur at intersections

Bicyclist-involved crashes

What types of crashes does this crash profile include?

This crash profile includes all crashes where a harmful event is classified as “bicycle.” While crashes involving people biking only account for 2 percent of total crashes in urban areas, they represent 12 percent of all KSI crashes. When a person biking is involved, the likelihood of the crash resulting in a severe injury or death is much higher than a motor vehicle-only crash.

Where do these crashes occur?

Nearly three quarters of bicyclist-involved KSI crashes occur at or near an intersection.

What do local communities say?

Twenty percent of survey respondents in the Denver region ranked “inadequate or missing bikeways” and 15 percent ranked “drivers and people biking not sharing the road” as one of their top three traffic safety concerns.

How to identify these crashes in crash reports or crash data

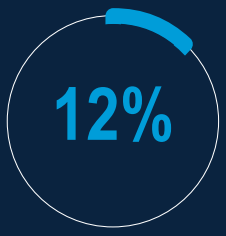
A harmful event is “bicycle.”

Table 5. Potential Countermeasures to Reduce Bicyclist-Involved Crashes in Urban Areas

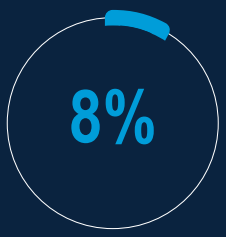
Mechanism/pattern	Potential countermeasures
Intersection	• Automatic recall signal timing • Appropriate sight distance • Bike box • Bike conflict zone markings • Extend bike lane to and potentially through intersection • Extend signal clearance time • Green wave • Partial closure • Prohibit left turn • Prohibit right turn on red • Protected intersection • Protected turn phase • Shorten signal cycle length • Traffic signal • Traffic signal bike detection
Nonintersection	• All-way stop • Consolidate driveways • Improve sight distance • Partial closure • Prohibit left turn • Raised median • Traffic calming • Traffic signal • Two-stage gap acceptance

URBAN 4

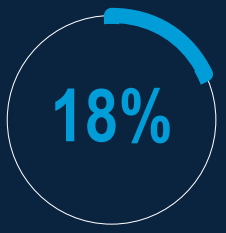
KEY CRASH PROFILE STATISTICS



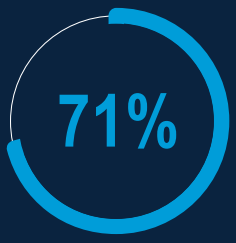
of all KSI crashes in urban areas



of all fatal crashes in urban areas



involve people biking



involve people driving and running a red light

Red-light or stop-sign running

What types of crashes does this crash profile include?

This crash profile includes all crashes where the driver action of a vehicle is "disregarded stop sign" or "failed to stop at signal." Red-light and stop-sign running can result in KSI crashes given at least one vehicle is traveling at relatively high speed and there is a greater likelihood of broadside crashes. The majority of KSI crashes that fall in this crash profile involve a person driving running a red light (71 percent) and result in a broadside crash (66 percent).

What do local communities say?

Thirty-six percent of survey respondents in the Denver region ranked "red-light or stop-sign runners" as one of their top three traffic safety concerns.

How to identify these crashes in crash reports or crash data

The driver action of a vehicle is "disregarded stop sign" or "failed to stop at signal."

Table 6. Potential Countermeasures to Reduce Red-Light and Stop-Sign Running Crashes in Urban Areas

Mechanism/ pattern	Potential countermeasures
Red Light	• Advanced dilemma-zone detection • Appropriate cycle length • Appropriate yellow/all-red signal timing • Red-light camera • Signal coordination • Targeted enforcement • Traffic calming
Stop Sign	• Advance warning sign • All-way stop • Bulbout • Flashing stop sign • Improve sight distance • Lighting • Remove approach lanes • Stop lines • Stop signs at near and far side • Targeted enforcement

Suburban/compact communities areas crash profiles

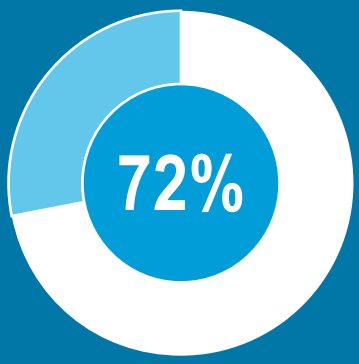
Table 7 shows the three crash profiles for the suburban/compact communities area type. Together these three crash profiles account for 72 percent of all KSI crashes and 61 percent of all fatal crashes in the suburban/compact communities area type. Some crashes can be included in multiple crash profiles.

Failed to yield right-of-way and turning conflicts result in about a third of all fatal crashes in the suburban/compact communities area type. This is followed closely by pedestrian-involved crashes, which represent about a quarter of all crashes in the suburban/compact communities area type.

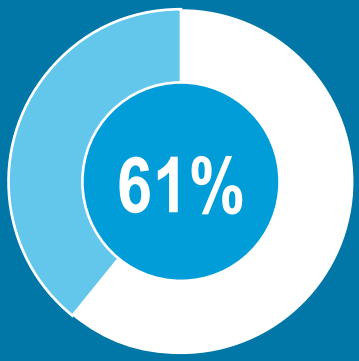
Table 7. Suburban/compact communities crash profiles

Crash profiles	% KSI in suburban/ compact community areas	% Fatal in suburban/ compact community areas
Failed to Yield Right-of-Way and Turning Conflicts	47%	33%
Pedestrian-Involved	16%	25%
Rear End and Stopped or Slowing Vehicles	19%	9%

CRASH PROFILES INCLUDE



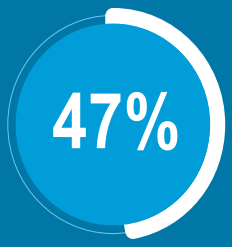
of all KSI crashes in suburban areas



of all fatal crashes in suburban areas

SUBURBAN 1

KEY CRASH PROFILE STATISTICS



of all KSI crashes in suburban/ compact community areas



of all fatal crashes in suburban/ compact community areas



occur at intersections



involve left turns

Failed to yield right-of-way and turning conflicts

What types of crashes does this crash profile include?

This crash profile includes all crashes where the driver "failed to yield right-of-way," the crash form's accident type is "broadside" or a vehicle movement prior to the crash is a left turn or approach turn. This includes instances of a person driving entering a street, attempting to cross a street or make a turn when another vehicle, person walking or person biking has the right-of-way.

Where do these crashes occur?

The majority of these types of crashes, 85 percent, occur at intersections. Of these crashes, 72 percent involve a left turn.

What do local communities say?

Thirty percent of survey respondents in the Denver region ranked "unsafe turning or lane changing" as one of their top three traffic safety concerns.

How to identify these crashes in crash reports or crash data

The driver action is "failed to yield right-of-way," the crash form's accident type is "broadside," or a vehicle movement prior to the crash is a left turn or approach turn.

Table 8. Potential Countermeasures to Reduce Failed to Yield Right-of-Way and Turning Conflict Crashes in Suburban Areas

Mechanism/pattern	Potential countermeasures
Left turn at signalized intersection	• Appropriate green time for left turn • Appropriate yellow/all-red signal timing • Lagging turn phase • Leading pedestrian interval • Positive left-turn offset for visibility • Protected turn phase • Roundabout
Left turn at unsignalized locations	• All-way stop • Consolidate driveways • Improve sight distance • Partial closure • Positive left-turn offset for visibility • Prohibit left turn • Raised median • Roundabout • Stop lines • Stop signs at near side and far side • Traffic calming • Traffic signal • Two-stage gap acceptance
Broadside crashes	• Advance warning signs • All-way stop • Appropriate yellow/all-red signal timing (at signalized locations) • Lighting • Overhead flashing beacon (at unsignalized locations) • Prohibit left turn • Red-light camera • Roundabout • Signal coordination (at signalized locations) • Stop lines • Stop signs at near side and far side • Traffic signal

SUBURBAN 2

KEY CRASH PROFILE STATISTICS



of all KSI crashes in suburban/ compact community areas



of all fatal crashes in suburban/ compact community areas



occur at intersections



involve left turns

Pedestrian-involved crashes

What types of crashes does this crash profile include?

This crash profile includes all crashes that are classified as "pedestrian" or crashes where a pedestrian is involved in a harmful event that took place during the crash. Crashes involving pedestrians account for 25 percent of all fatal crashes in the suburban/compact communities area type.

As crash speed increases, the likelihood of a severe injury or fatality also increases, especially for people walking.

Where do these crashes occur?

The vast majority of pedestrian-involved KSI crashes in the suburban/compact communities area type, 75 percent, occur on arterial streets.

What do local communities say?

Fifteen percent of survey respondents in the Denver region ranked
"drivers not yielding to pedestrians" and 12 percent ranked "inadequate or missing pedestrian crossings or walkways" as one of their top three traffic safety concerns.

How to identify these crashes in crash reports or crash data

A harmful event is "school age to/from school," "pedestrian on toy motorized vehicle," or "all other pedestrians."

Table 9. Potential Countermeasures to Reduce Pedestrian-involved Crashes in Suburban Areas

Mechanism/pattern	Potential countermeasures
Signalized intersection	• Advance stop bar • Countdown pedestrian signal heads • Dual curb ramps • Extend pedestrian crossing time • High-visibility crosswalks • Intersection tightening • Lighting • Leading pedestrian interval • Partial closure • Pedestrian recall signal timing • Pedestrian refuge median • Prohibit left turn • Prohibit right turn on red-light • Prohibit turn during pedestrian phase • Protected turn phase • Red-light camera • Shorten crossing distance • Shorten signal cycle length
Nonsignalized intersection	• Co-locate bus stops and pedestrian crossings • Dual curb ramps • Lighting • Marked crossing • Narrow travel lanes • Partial closure • Pedestrian hybrid beacon • Pedestrian refuge median • Prohibit left turn • Raised median • Rectangular rapid flashing beacon • Road diet • Sidewalks • Signs • Traffic calming • Traffic signal

SUBURBAN 3

KEY CRASH PROFILE STATISTICS



of all KSI crashes in suburban/ compact community areas



of all fatal crashes in suburban/ compact community areas



involve people biking



involve people driving and running a red light

Rear-end crashes and stopped or slowing vehicles

What types of crashes does this crash profile include?

This crash profile includes all crashes where a harmful event is “rear end” or the movement of a vehicle prior to the crash is “slowing” or “stopped in traffic.”

Eighty-four percent of rear-end KSI crashes in the suburban/ compact communities area type involve a stopped or slowing vehicle. In 23 percent of rear-end KSI crashes, distracted driving is a contributing factor, double the rate of all KSI crashes in the suburban/compact communities area type. Additionally, in another 54 percent of crashes careless or reckless driving is a contributing factor.

What do local communities say?

Fourteen percent of survey respondents in the Denver region ranked “other drivers unexpectedly slowing or stopping” as one of their top three traffic safety concerns.

How to identify these crashes in crash reports or crash data

A harmful event is “rear end” or the movement of a vehicle prior to the crash is “slowing” or “stopped in traffic.”

Table 10. Potential Countermeasures to Reduce Rear End Crashes in Suburban Areas

Mechanism/pattern	Potential countermeasures
Arterial streets	• Advanced dilemma-zone detection • Appropriate yellow/all-red signal timing • Auxiliary lanes • Signal coordination • Traffic calming • Traffic incident management • Variable message sign
Distracted driving	• Targeted enforcement • See “Behavior profiles”

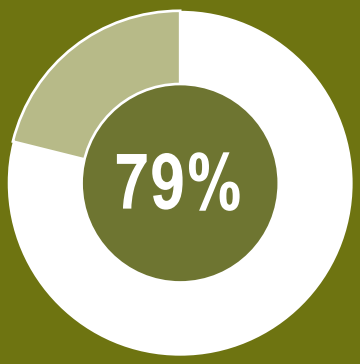
Rural areas crash profiles

Table 11 shows the four crash profiles for the rural area type. Together, these four crash profiles account for 79 percent of all KSI crashes and 85 percent of all fatal crashes in rural areas. Some crashes can be included in multiple crash profiles. Departing from the travel lane, which involves head-on, sideswipe, or crashes with a fixed object, represents more than half of all fatal crashes in rural areas.

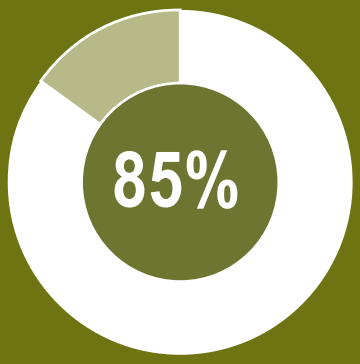
Table 11. Rural area crash profiles

Crash profiles	% KSI in rural areas	% Fatal in rural areas
Departing from the Travel Lane	40%	56%
Failed to Yield Right-of-Way and Turning Conflicts	25%	19%
Speeding	15%	20%
Rear-End and Stopped or Slowing Vehicles	12%	7%

CRASH PROFILES INCLUDE



of all KSI crashes in rural areas



of all fatal crashes in rural areas

RURAL 1

KEY CRASH PROFILE STATISTICS



of all KSI crashes in rural areas



of all fatal crashes in rural areas



result in a crash with a fixed object



result in a head-on crash

Departing from the travel lane

What types of crashes does this crash profile include?

This crash profile includes all crashes where the driver action of a vehicle is "lane violation," the crash form's accident type is a "head-on" crash or a "sideswipe same side" crash, or a harmful event is a crash with a "fixed object," such as a highway barrier, embankment, guardrail, tree, sign or any other fixed object. These include instances when a person driving unintentionally crosses their travel lane or when a person driving is intentionally passing in the opposing lane.

In rural areas, 59 percent of these crashes result in a crash with a fixed object and 23 percent of these crashes result in a head-on crash. A disproportionally high number of fixed-object crashes, 45 percent, occur at night or during twilight hours. Similarly, a disproportionally high number of fixed-object crashes, 33 percent, result from driving under the influence, driving while ability impaired or driving under the influence of drugs.

How to identify these crashes in crash reports or crash data

The driver action of a vehicle is a "lane violation," the crash form's accident type is a "head-on" crash or a "sideswipe same side" crash, or a harmful event is a "fixed object."

Table 12. Potential countermeasures to reduce departure from travel lane crashes in rural areas

Mechanism/pattern	Potential countermeasures
Departure to left	• Advance warning sign (with optional beacon) • High-friction pavement • Median barrier • No-passing zone • Pavement markings • Raised median • Rumble strips • See “Speeding countermeasures”
Departure to right	• Advance warning sign (with optional beacon) • Clear distance • High-friction pavement • Pavement markings • Roadside barriers • Rumble strips • See “Speeding countermeasures”
At night	• Lighting • Variable speed limit
Impaired driving	• Targeted enforcement • See “Behavior profiles”

RURAL 2

KEY CRASH PROFILE STATISTICS



of all KSI crashes in rural areas



of all fatal crashes in rural areas



occur at tersections



involve left turns

Failed to yield right-of-way and turning conflicts

What types of crashes does this crash profile include?

This crash profile includes all crashes where the driver "failed to yield right-of-way," the crash form's accident type is "broadside" or a vehicle movement prior to the crash is a left turn or approach turn. This includes instances of a person driving entering a street, attempting to cross a street or make a turn when another vehicle, person walking or person biking has the right-of-way.

Where do these crashes occur?

The majority of these types of crashes, 83 percent, occur at intersections.

What do local communities say?

Thirty percent of survey respondents in the Denver region ranked
"unsafe turning or lane changing" as one of their top three traffic safety concerns.

How to identify these crashes in crash reports or crash data

The driver action is "failed to yield right-of-way," the crash form's accident type is "broadside" or a vehicle movement prior to the crash is "left turn" or "approach turn."

Table 13. Potential Countermeasures to Reduce Failed to Yield Right-of-way and turning conflict crashes in rural areas

Mechanism/pattern	Potential countermeasures
Left turn at signalized intersection	• Protected turn phase • Roundabout
Left turn at unsignalized locations	• Advance warning sign • All-way stop • Consolidate driveways • Improve sight distance • Positive left-turn offset for visibility • Prohibit left turn • Raised median • Roundabout • Stop lines • Stop signs at near side and far side • Traffic calming • Traffic signal • Two-stage gap acceptance
Broadside crashes	• Advance warning signs • All-way stop • Appropriate yellow/all-red signal timing (at signalized locations) • Lighting • Overhead flashing beacon (at unsignalized locations) • Prohibit left turn • Red-light camera • Roundabout • Signal coordination (at signalized locations) • Stop lines • Stop signs at near side and far side • Traffic signal

RURAL 3

KEY CRASH PROFILE STATISTICS



of all KSI crashes in rural areas



of all fatal crashes in rural areas

Speeding

What types of crashes does this crash profile include?

This crash profile includes all crashes where the driver action of a vehicle is "exceeded safe/posted speed." Speeding is one of the single greatest indicators of the severity of injury when a crash occurs. Nearly 35 percent of KSI speeding crashes in rural areas are also crashes with a fixed object.

What do local communities say?

Forty percent of survey respondents in the Denver region ranked
"speeding" as one of their top three traffic safety concerns.

How to identify these crashes in crash reports or crash data

The driver action of a vehicle is "exceeded safe/posted speed."

Table 14. Potential Countermeasures to Reduce Speeding Crashes in Rural Areas

Mechanism/ pattern	Potential countermeasures
Speeding	• Oversized speed limit sign • Speed cameras • Speed feedback signs • Targeted enforcement • Traffic calming • Variable speed limit

KEY CRASH PROFILE STATISTICS



of all KSI crashes in rural areas



of all fatal crashes in rural areas



occur near or at intersections



involve distracted driving

Rear-end crashes and stopped or slowing vehicles

What types of crashes does this crash profile include?

This crash profile includes all crashes where a harmful event is “rear end” or the movement a vehicle prior to the crash is “slowing” or “stopped in traffic.”

Eighty-four percent of rear-end KSI crashes in rural areas involve a stopped or slowing vehicle. In 29 percent of rear-end KSI crashes in rural areas, distracted driving is a contributing factor, nearly triple the rate for all KSI crashes in rural areas. Additionally, in another 59 percent of crashes in rural areas, careless or reckless driving is a contributing factor.

Where do these crashes occur?

These crashes are evenly split between intersections and non-intersection locations.

What do local communities say?

Fourteen percent of survey respondents in the Denver region ranked “other drivers unexpectedly slowing or stopping” as one of their top three traffic safety concerns.

How to identify these crashes in crash reports or crash data

The driver action is “failed to yield right-of-way,” the crash form’s accident type is “broadside” or a vehicle movement prior to the crash is “left turn” or “approach turn.”

Table 15. Potential countermeasures to reduce rear end crashes in rural areas

Mechanism/pattern	Potential countermeasures
Rear-end crashes	• Advance warning sign • Auxiliary lanes • Incident management protocols • Traffic incident management • Variable message sign • Variable speed limit • See “Speeding countermeasures”
Careless or Reckless Driving (Tailgating)	• Targeted enforcement • See “Behavior profiles”

Limited-access highways crash profiles

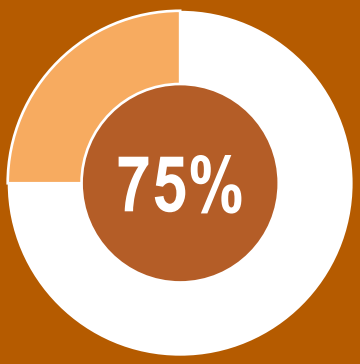
Table 16 shows the three crash profiles for the limited-access highways area type. Together these three crash profiles account for 75 percent of all KSI crashes and 71 percent of all fatal crashes on limited access highways. Some crashes can be included in multiple crash profiles.

Departing from the travel lane, which involves sideswipes or crashes with a fixed object, represents nearly half of all fatal crashes on limited-access highways.

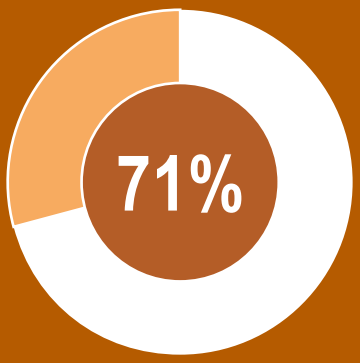
Table 16. Limited-access highway crash profiles

Crash profiles	% KSI on limited-access highways	% Fatal on limited-access highways
Departing from the travel lane	43%	48%
Rear-end and stopped or slowing vehicles	32%	20%
Speeding	8%	10%

CRASH PROFILES INCLUDE



of all KSI crashes on limited-access highways



of all fatal crashes on limited-access highways

LIMITED-ACCESS HIGHWAYS 1

KEY CRASH PROFILE STATISTICS



of all KSI crashes on limited-access highways



of all fatal crashes on limited-access highways



occur at night or twilight



involve driving under the influence, driving while ability impaired, or driving under the influence of drugs



result in a crash with a fixed object

Departure from the travel lane

What types of crashes does this crash profile include?

This crash profile includes all crashes where the driver action of a vehicle is “lane violation,” the crash form’s accident type is “head-on” or “sideswipe same direction” or a harmful event is a crash with a fixed object.

Forty-two percent of lane-violation KSI crashes on limited-access highways result in sideswiping another vehicle traveling in the same direction and another 25 percent result in a crash with a fixed object.

Fixed-object crashes account for 26 percent of all KSI crashes and 28 percent of fatal crashes on limited-access highways. Crashes with concrete highway barriers and guardrails account for just over half of fixed-object KSI crashes on limited-access highways. The other common types of objects (accounting for another 20 percent of fixed-object KSI crashes on limited-access highways) include embankments, cable rails, traffic barrels and bridge structures. A disproportionately high number of fixed-object crashes, 59 percent, occur at night or during twilight hours. Similarly, a disproportionately high number, 35 percent, involve driving under the influence, driving while ability impaired or driving under the influence of drugs.

What do local communities say?

Thirty percent of survey respondents in the Denver region ranked “unsafe turning or lane changing” as one of their top three traffic safety concerns.

How to identify these crashes in crash reports or crash data

The driver action of a vehicle is a “lane violation,” the crash form’s accident type is “head-on” or “sideswipe same direction,” or a harmful event is a “fixed object.”

Table 17. Potential countermeasures to reduce departure from the travel lane crashes on limited-access highways.

Mechanism/pattern	Potential countermeasures
Fixed object	• Advance warning sign • Median or roadside barrier • Pavement markings • Rumble strips • See “Speeding countermeasures”
Sideswipe	• Advance warning sign • Pavement markings • See “Speeding countermeasures”
At night	• Advance warning sign • Lighting • Pavement markings • Variable speed limit
Impaired driving	• Targeted enforcement • See “Behavior profiles”

LIMITED-ACCESS HIGHWAYS 2

KEY CRASH PROFILE STATISTICS



of all KSI crashes on limited-access highways



of all fatal crashes on limited-access highways



involve distracted driving



involve careless or reckless driving

Rear-end crashes and stopped or slowing vehicles

What types of crashes does this crash profile include?

This crash profile includes all crashes where a harmful event is “rear end” or the movement of a vehicle prior to the crash is “slowing” or “stopped in traffic.”

Sixty-eight percent of rear-end KSI crashes on limited-access highways involve a stopped or slowing vehicle. In 24 percent of rear-end KSI crashes on limited-access highways, distracted driving is a contributing factor, more than double the rate for all KSI crashes on limited-access highways. In another 58 percent of crashes careless or reckless driving is a contributing factor.

What do local communities say?

Fourteen percent of survey respondents in the Denver region ranked “other drivers unexpectedly slowing or stopping” as one of their top three traffic safety concerns.

How to identify these crashes in crash reports or crash data

A harmful event is “rear end” or the movement of a vehicle prior to the crash is “slowing” or “stopped in traffic.”

Table 18. Potential countermeasures to reduce rear-end crashes on limited-access highways.

Mechanism/ pattern	Potential countermeasures
Rear end	• Auxiliary lanes • Traffic incident management • Variable message sign • Variable speed limit • See “Speeding countermeasures”
Careless or reckless driving (tailgating)	• Targeted enforcement • See “Behavior profiles”

KEY CRASH PROFILE STATISTICS



of all KSI crashes on limited-access highways



of all fatal crashes on limited-access highways

Speeding

What types of crashes does this crash profile include?

This crash profile includes all crashes where the driver action of a vehicle is “exceeded safe/posted speed.”

Speeding is one of the single greatest indicators of the severity of injury when a crash occurs.

Nearly 39 percent of KSI speeding crashes on limited-access highways are crashes with a fixed object.

Crash report data likely underestimates the number of speeding-related KSI crashes as, in many instances when speeding is suspected but difficult to prove, the driver action is often characterized as careless driving.

What do local communities say?

Forty percent of survey respondents in the Denver region ranked
“speeding” as one of their top three traffic safety concerns.

How to identify these crashes in crash reports or crash data

The driver action of a vehicle is “exceeded safe/posted speed.”

Table 19. Potential countermeasures to reduce speeding on limited-access highways.

Mechanism/pattern	Potential countermeasures
Speeding	• Speed cameras • Speed feedback signs • Targeted enforcement • Variable speed limit

Vision Zero seeks to integrate human failure into the approach to roadway design and operation. The infrastructure countermeasures provided for each crash profile can contribute to a safe system that integrates human failing. Though not reliant on communications and campaigns to change human behavior, the efforts Vision Zero communities still use. The behavior profiles are intended to inform communications and campaigns across the Denver region, not become a substitute to creating safe systems.

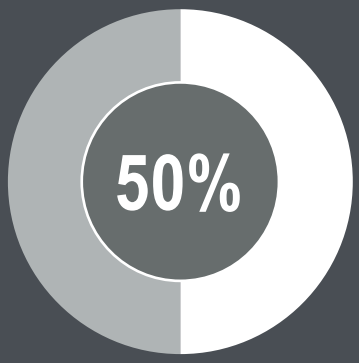
Behavior profiles

Whereas crash profiles describe the specific events that occurred in a crash, behavior profiles describe human behavior that led to a crash happening in the first place.

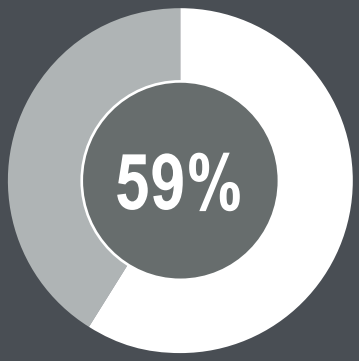
Table 20 shows the four behavior profiles that contribute fairly equally to KSI crashes across all area types regionwide.

Together, these four behavior profiles represent 50 percent of all KSI crashes and 59 percent of all fatal crashes in the Denver region. Frequently, careless or reckless driving occurs alongside other behaviors that contribute to crashes.

BEHAVIOR PROFILES INCLUDE



of all KSI crashes

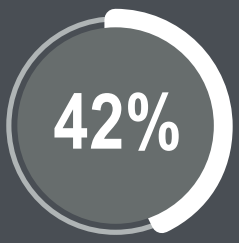


of all fatal crashes

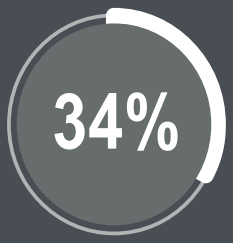
Table 20. Behavior profiles

Crash profiles	Regionwide		Percent fatal by area type			
	% KSI	% Fatal	Urban	Suburban/ compact	Rural	Limited-access highway
Careless or reckless driving	42%	34%	37%	35%	22%	43%
Alcohol and drugs	19%	30%	27%	34%	26%	29%
Aggressive driving	9%	15%	17%	15%	12%	14%
Distracted driving	11%	7%	4%	6%	7%	11%

KEY BEHAVIOR PROFILE STATISTICS



of all KSI crashes



of all fatal crashes



also involve driving under the influence, driving while ability impaired or driving under the influence of drugs

Careless or reckless driving

What types of crashes does this crash profile include?

This behavior profile includes crashes where the driver action of a vehicle is “careless driving” or “reckless driving.”

The majority of these crashes are careless-driving incidents. Part of the reason such a high percentage of KSI crashes regionwide, 42 percent, are associated with careless driving is because it is a catch-all term used when an investigative officer suspects a person driving was acting illegally but cannot prove a specific action. One of the most common difficult-to-prove actions is speeding and many of the careless-driving citations likely involve speeding.

About 28 percent of careless- or reckless-driving crashes also involve driving under the influence, driving while ability impaired or driving under the influence of drugs.

What do local communities say?

Forty percent of survey respondents in the Denver region ranked
“speeding” as one of their top three traffic safety concerns.

How to identify these crashes in crash reports or crash data

The driver action of a vehicle is “careless driving” or “reckless driving.”

KEY BEHAVIOR PROFILE STATISTICS



of all KSI crashes



of all fatal crashes



occur at night or twilight

Alcohol and drugs

What types of crashes does this crash profile include?

This behavior profile includes crashes where the human contributing factor of a vehicle is “driving under the influence, driving while ability impaired and driving under the influence of drugs,” otherwise known as impaired driving.

These crashes disproportionally occur at night, with about three quarters of impaired driving KSI crashes occurring at night or during twilight. Twenty-nine percent of impaired-driving KSI crashes result in a crash with a fixed object.

What do local communities say?

Twenty-eight percent of survey respondents in the Denver region ranked “alcohol or impaired driving” as one of their top three traffic safety concerns.

How to identify these crashes in crash reports or crash data

The human contributing factor of a vehicle is “DUI, DWAI and DUID.”

KEY BEHAVIOR PROFILE STATISTICS



of all KSI crashes



of all fatal crashes



result in a approach turn crash

Aggressive driving

What types of crashes does this crash profile include?

This behavior profile includes crashes where the human contributing factor of a vehicle is “aggressive driving.” These include instances when a person driving intentionally engages in risky behavior and takes chances. Significantly exceeding prevailing travel speeds, tailgating, weaving, rapid lane changes and red-light running are all examples of aggressive driving.

This behavior profile is pervasive across area types and contributes fairly equally to all crash types, with a slight overrepresentation in approach-turn crashes.

What do local communities say?

Survey respondents in the Denver region were not specifically asked about aggressive driving; however, many commented in open-ended responses that aggressive driving and road rage are among their top three traffic safety concerns.

How to identify these crashes in crash reports or crash data

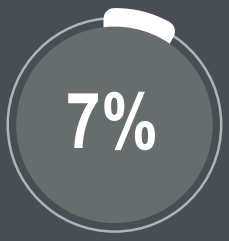
The human contributing factor of a vehicle is “aggressive driving.”

BEHAVIOR PROFILES 4

KEY BEHAVIOR PROFILE STATISTICS



of all KSI crashes



of all fatal crashes



result in a rear end crash

Distracted driving

What types of crashes does this crash profile include?

This behavior profile includes crashes where the human contributing factor of a vehicle is “distracted.” Distractions can include passengers, mobile phones, the radio and other distractions. In about three quarters of distracted KSI crashes “other” is listed as the distraction as it is often difficult to prove what causes a distraction.

The instances of distraction are likely underrepresented as they are only indicated on the police report when there is evidence of distraction. Thirty-two percent of distracted KSI crashes are also rear-end crashes.

What do local communities say?

Seventy-one percent of survey respondents in the Denver region ranked “distracted driving” as one of their top three traffic safety concerns, the highest by far of any concern listed.

How to identify these crashes in crash reports or crash data

The human contributing factor of a vehicle is “distracted.”

Behavior countermeasures

Countermeasures for human behaviors are intended to inform communications and campaigns across the Denver region, not become a substitute to creating safe systems. Countermeasures take the form of enforcement, legislation and culture change campaigns that inform and educate the public.

Legislation

Legislation at multiple levels, including at a town or city, countywide or statewide scale can help address human behaviors that result in crashes that cause death or serious injury. Speed limit setting is one example of legislation being used to reduce behaviors that result in speeding; several United States cities have recently adopted 20 mph residential speed limits through “Twenty is Plenty” campaigns. Legislation can also be used to affect the penalties associated with unsafe behaviors to further discourage them.

Boulder: Evaluation of "20 is Plenty."

Denver: 20 miles per hour local speed limit reduction.

Golden: "20 is Plenty" adoption.

Enforcement

Successful Vision Zero enforcement strategies focus on enforcing the most dangerous behaviors in the most important places, including along the regional High-Injury Network. Using traffic safety cameras to automate enforcement is a strategy available in Colorado and used successfully in Vision Zero communities around the world. Equity and empathy are critical considerations in a Vision Zero-aligned enforcement campaign to ensure that people already burdened by unsafe transportation infrastructure, including low-income populations and people of color, are not further burdened by unreasonable enforcement.

Campaigns

Campaigns can be implemented from the local level through the national level. Effective Vision Zero campaigns use a sophisticated, data-driven approach, ensuring that the right messages reach the right audiences at the right time. Successful campaigns have focused onthe people affected by traffic crashes and individual choices that cause crashes while avoiding victim blaming.





The DRCOG Slow Speeding Kills public outreach campaign was launched to educate motorists about the dangers of "slow speeding" with the goal of reducing injuries and fatalities in Denver area neighborhoods. The campaign aims to educate drivers that most fatal speeding doesn't look the way they picture it, and with increased awareness, behavior change follows.



Proven safety countermeasures

The Federal Highway Administration's Proven Safety Countermeasures is a collection of 28 countermeasures and strategies effective in reducing roadway fatalities and serious injuries. Member governments are strongly encouraged to consider the widespread implementation of proven safety countermeasures to accelerate achieving regional safety goals. The strategies aim to benefit all road users and road types. Each countermeasure addresses at least one safety focus area – speed management, intersections, roadway departures or pedestrians/bicyclists – while others are crosscutting strategies that address multiple safety focus areas. To learn more about a specific countermeasure, click on the countermeasure name in the tables below.

Speed Management

Countermeasure	Description
Appropriate Speed Limits for All Road Users	States and local jurisdictions should set appropriate speed limits to reduce the significant risks drivers impose on others — especially vulnerable road users — and on themselves. Addressing speed is fundamental to the Safe System Approach of making streets safer. A growing body of research shows that speed limit changes alone can lead to measurable declines in speeding related crashes.
Speed Safety Cameras	Agencies can use speed safety cameras as an effective and reliable technology to supplement more traditional methods of enforcement, engineering measures and education to alter the social norms of speeding. Speed safety cameras use speed measurement devices to detect speeding and capture photographic or video evidence of vehicles violating a set speed threshold.
Variable Speed Limits	Speed management strategies, including variable speed limits, are integral to the Safe Speeds element of the Safe System Approach. To accommodate human injury tolerances, variable speed limits improve visibility, providing drivers extra stopping time and reducing impact forces that could lead to fatalities during high-speed crashes.

Pedestrian/Bicyclist

Countermeasure	Description
Bicycle Lanes	Providing bicycle facilities can mitigate or prevent interactions, conflicts and crashes between bicyclists and motor vehicles and create a network of safer roadways for bicycling. To maximize a roadway's suitability for riders of all ages and abilities, bicycle lane design should vary according to roadway characteristics, user needs and land-use context. Road use experts recommend separate bicycle lanes on roadways with higher vehicle volumes and speeds, such as arterial roads.
Crosswalk Visibility Enhancements	Poor lighting conditions, obstructions such as parked cars and horizontal or vertical roadway curvature can reduce visibility at crosswalks, contributing to safety issues. More substantial crossing improvements could prevent increased pedestrian crash potential for multilane roadway crossings with vehicle volumes exceeding 10,000 average annual daily traffic.
Leading Pedestrian Interval	A leading pedestrian interval allows pedestrians to enter the crosswalk at an intersection 3-7 seconds before vehicles are given a green indication. Pedestrians can better establish their presence in the crosswalk before vehicles have priority to turn right or left.
Medians and Pedestrian Refuge Islands in Urban and Suburban Areas	Transportation agencies should consider medians or pedestrian refuge islands in curbed sections of urban and suburban multilane roadways. Particularly in areas with a significant mix of pedestrian and vehicle traffic, traffic volumes over 9,000 vehicles per day and travel speeds of 35 mph or greater.
Pedestrian Hybrid Beacons	The pedestrian hybrid beacon is a traffic control device that helps pedestrians safely cross higher-speed roadways at midblock crossings and uncontrolled intersections. Pedestrian hybrid beacons assist pedestrians in crossing roads that are difficult to navigate, such as when gaps in traffic are insufficient or speed limits exceed 35 miles per hour.
Rectangular Rapid Flashing Beacons	Rectangular rapid flashing beacons flash with an alternating high frequency when activated to enhance the conspicuity of pedestrians at the crossing to drivers. This applies to many types of pedestrian crossings but is particularly effective at multilane crossings with speed limits of less than 40 miles per hour.
Road Diets (Roadway Configuration)	A road diet, or roadway reconfiguration, can improve safety, calm traffic, provide better mobility and access for all road users, and enhance overall quality of life. A road diet typically involves converting an existing four-lane undivided roadway to a three-lane roadway consisting of two through lanes and a center two-way left-turn lane.
Walkways	A walkway is any defined space or pathway for a person traveling by foot or using a wheelchair. These may be pedestrian walkways, shared-use paths, sidewalks or roadway shoulders.

Roadway Departure

Countermeasure	Description
Enhanced Delineation for Horizontal Curves	Enhanced delineation treatments can alert drivers to upcoming curves, the direction and sharpness of the curve and the appropriate operating speed. Potential strategies include pavement markings, retroreflective strips on signposts and delineators.
Longitudinal Rumble Strips and Stripes on Two-Lane Roads	Rumble strips and stripes are designed to address crashes by alerting distracted, drowsy or otherwise inattentive drivers who drift from their lane. Longitudinal rumble strips are milled or raised elements on the pavement intended to alert drivers through vibration and sound that their vehicle has left the travel lane. Rumble stripes are edge line or center line rumble strips where the pavement marking is placed over the rumble strip.
Median Barriers	Median barriers are longitudinal barriers that separate opposing traffic on a divided highway and redirect vehicles striking either side of the barrier. Median barriers significantly reduce the number of cross-median crashes, typical to the relatively high speeds of divided highways.
Roadside Design Improvements at Curves	Roadside design improvements at curves are a strategy encompassing several treatments that target the high-risk roadside environment outside horizontal curves. These treatments can reduce roadway departure fatalities and serious injuries by allowing vehicles to recover safely and reduce crash severity.
SafetyEdge	SafetyEdge^{SM} technology shapes the edge of the pavement at approximately 30 degrees from the pavement cross slope during the paving process. This safety practice eliminates the potential for vertical drop-off at the pavement edge, has minimal effect on project cost and can improve pavement durability by reducing edge raveling of asphalt.
Wider Edge Lines	Wider edge lines enhance the visibility of travel lane boundaries compared to traditional edge lines. Increasing the marking width from the minimum normal line width of 4 inches to the maximum normal line width of 6 inches creates wider edge lines.

Intersections

Countermeasure	Description
Backplates with Retroreflective Borders	Backplates added to a traffic signal head improve the visibility of the illuminated face of the signal by introducing a controlled-contrast background. Through this treatment, older and color vision-deficient drivers experience an improvement in traffic signal visibility.
Corridor Access Management	Access management involves designing, applying and controlling entry and exit points along a roadway. This includes intersections with other roads and driveways that serve adjacent properties. Thoughtful access management along a corridor can simultaneously enhance safety for all modes, facilitate walking and biking, and reduce trip delay and congestion.
Dedicated Left- and Right-Turn Lanes at Intersections	Auxiliary turn lanes — either for left turns or right turns — provide physical separation between turning traffic that is slowing or stopped and adjacent through traffic at approaches to intersections. Installing left-turn and right-turn lanes should be considered for the major road approaches for improving safety at both three- and four-leg intersections with stop control on minor roads, where significant turning volumes exist, or where there is a history of turn-related crashes. When adding turn lanes at an intersection, consider the safety and convenience of pedestrians and bicyclists.
Reduced Left-Turn Conflict Intersections	Reduced left-turn conflict intersections are geometric designs that alter how left-turn movements occur. These intersections simplify decision-making for drivers and minimize the potential for higher severity crash types, such as head-on and angle collisions.
Roundabouts	Roundabouts slow down vehicles and minimize conflict points by allowing circulating traffic the right-of-way. They achieve this through channelized, curved approaches and counterclockwise flow around a central island. Lowering speeds and reducing roundabout conflicts reduces crashes that cause injury or fatality.
Systemic Application of Multiple Low-Cost Countermeasures at Stop-Controlled Intersections	This systemic approach to intersection safety involves deploying a package of multiple low-cost countermeasures, including enhanced signing and pavement markings at many stop-controlled intersections within a jurisdiction. These countermeasures increase driver awareness and recognition of the intersections and potential conflicts.
Yellow Change Intervals	Following a green signal indication, the traffic light at an intersection displays the yellow signal indication for a specific duration of time, known as the yellow change interval. Appropriately timed yellow change intervals can reduce red-light running and improve overall intersection safety.

Crosscutting

Countermeasure	Description
Lighting	Recommended horizontal and vertical illuminance levels determine adequate lighting for all road users to ensure road safety. Adequate lighting can also provide benefits in terms of personal security for pedestrians, wheelchairs and other mobility device users, bicyclists and transit users as they travel along and across roadways.
Local Road Safety Plans	A local road safety plan provides a framework for identifying, analyzing and prioritizing roadway safety improvements on local roads. Local road safety plans customize their process and content to address specific local issues and needs.
Pavement Friction Management	Measuring, monitoring and maintaining pavement friction — especially at locations where vehicles frequently turn, slow and stop — can prevent many roadway departures and intersection- and pedestrian-related crashes. Pavement friction treatments — such as High Friction Surface Treatment — can be better targeted, resulting in more efficient and effective installations using continuous pavement friction data and crash and roadway data.
Road Safety Audit	A multidisciplinary team independent of the project performs road safety audits. Road Safety Audits consider all road users, account for human factors and road user capabilities, are documented in a formal report, and require a standard response from the road owner. Agencies may focus road safety audits on motorized vehicles, pedestrians, bicyclists, motorcyclists or a combination of these roadway users.

Sources for countermeasure descriptions:
American Association of State Highway and Transportation Officials Highway Safety Manual
Caltrans Local Roadway Safety Manual
Federal Highway Administration Office of Safety
Federal Highway Administration Crash Modification Factors Clearinghouse
Federal Highway Administration Bicycle Safety Guide and Countermeasure Selection System
Federal Highway Administration Pedestrian Safety Guide and Countermeasure Selection System
National Association of City Transportation Officials Urban Bikeway Design Guide
Fehr & Peers



Why Local Adoption?

Achieving Vision Zero in the Denver region will take local action and collaboration. Crashes in which people are killed or seriously injured and dangerous behaviors occur throughout the region's urban, suburban and rural areas.

Local adoption of Vision Zero, the creation and implementation of local Vision Zero plans or other strategic safety efforts, demonstrate communities' public commitments to eliminating serious-injury and fatal crashes. These actions help local governments make the right strategic decisions to get to zero deaths and serious-injury crashes.

DRCOG member governments have been taking proactive steps towards road safety in their community by crafting their own comprehensive Vision Zero action plans, including the City and County of Denver and the City of Boulder.

Many member governments have also been awarded funding from the Safe Streets and Roads for All federal program to develop or complete a local safety action plan. Communities are encouraged to collaborate and share best practices with one another to work towards our regional safety goals.






STATE LAW
YIELD
TO PEDESTRIANS
IN CROSSWALK
YOUR
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13
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25

Taking action on

regional vision zero

SAFER STREETS FOR METRO DENVER

Metro Vision establishes shared desired future outcomes among DRCOG's partners. One theme among these outcomes is a connected multimodal region, which includes a supporting objective to improve transportation safety and security. Traffic-related deaths and serious injuries are a critical and preventable public health epidemic and social equity issue in the metropolitan Denver area. DRCOG, its member governments and its partner agencies are responsible for implementing projects and initiatives that will reduce serious-injuries and fatalities.

Regional Vision Zero further explains how DRCOG and local governments can improve transportation safety and security by establishing a series of Regional Vision Zero objectives and action initiatives.



DRCOG's Metro Vision

Metro Vision, the region's plan for continued success, establishes shared desired future outcomes among DRCOG's many partners across the Denver region. Metro Vision defines the region's communities' shared aspirational regional vision in five themes, each including outcomes and objectives that are being implemented through collaboration on strategic initiatives. DRCOG works with partners throughout the region to implement Metro Vision. DRCOG's five overarching themes provide a destination point for regional outcomes:

- **An Efficient and Predictable Development Pattern**
- **A Connected Multimodal Region**
- **A Safe and Resilient Natural and Built Environment**
- **Healthy, Inclusive and Livable Communities**
- **A Vibrant Regional Economy**

For transportation and mobility, the Denver region aspires to have a connected multimodal region that provides everyone with viable travel choices. The overall vision for the region's transportation system is organized around two regional outcomes:

- **The regional transportation system is well connected and serves all modes of travel**
- **The transportation system is safe, reliable and well maintained**

To work toward a future where "the transportation system is safe, reliable and well maintained" will require education, enforcement and engineering approaches to enhance safety to reduce crashes, focusing on serious injuries and fatalities. The main objective is to "operate, manage and maintain a safe and reliable transportation system." The following supporting objectives are defined in Metro Vision:

- **Maintain existing and future transportation facilities in good condition**
- **Improve transportation system performance and reliability**
- **Improve transportation safety and security**

Supporting Metro Vision

Taking Action on Regional Vision Zero builds on these supporting objectives with six additional Regional Vision Zero supporting objectives:

- **Improve collaboration between allied agencies**
- **ncrease awareness and adoption of Vision Zero**
- **Design and retrofit roadways to prioritize safety**
- **Improve data collection and reporting**
- **Increase funding and resources**
- **Increase legislation support that results in safety improvements**

A Call to Action

Taking Action on Regional Vision Zero is a commitment and call to action to reach the vision of zero fatal and serious injuries on roadways across the Denver region. Roadway safety must be integrated into the work of various agencies and individual departments to see results. This section establishes the objectives for implementing Regional Vision Zero, along with a comprehensive set of actions that can be taken to change the roadway safety narrative in the Denver region.

A timeline, action leader and supporting partners are noted for each action. Additionally, the Safe System Approach elements that align with each action are listed. The actions in this plan are not intended to be an exhaustive list; instead, they are strategic and can begin to eliminate fatal and serious injury crashes on the transportation network.

Monitoring progress at a regional level is critical to taking action and providing transparency on what partners are providing support to achieve Vision Zero. There must be accountability for the commitment to eliminating traffic deaths and severe injuries. The region and member agencies should regularly assess actions and consider modifying them over time to ensure successful outcomes.



Objectives

Taking Action on Regional Vision Zero builds on the supporting objectives identified in Metro Vision. It establishes a series of Regional Vision Zero objectives and action initiatives for addressing roadway safety and implementing Vision Zero in the region:



1 **Improve Collaboration between Allied Agencies**



2 **Increase Awareness and Adoption of Vision Zero**



3 **Design and Retrofit Roadways to Prioritize People's Safety**



4 **Improve Data Collection and Reporting**



5 **Increase Funding and Resources**



6 **Increase Legislative Support**

Actions

Effective implementation comes from coordinating various agencies and partners to take action focused on safety. Each objective is supported by actions assigned to lead agencies and timeframes. The plan builds a comprehensive Safe System approach to efforts by breaking down overarching objectives into specific actions that will implement Vision Zero and save lives together.

Implementation Plan Components

A. **Action items** - A specific effort that an identified action leader and support partners can advance.

B. **Timeframe** - Action items are assigned a general timeframe to help action leaders prioritize their efforts. Although the timeframes note several years, these timeframes align with the level of effort for completing these actions. Timeframes include:

   a. Ongoing: Currently underway

   b. Immediate: 0-2 years

   c. Short: 3-5 years

   d. Medium-Long: 6-10 years

C. **Action leader and supporting partners** - Each action item is led by an action leader and supported by various agency partners.

D. **Expected impact** – Based on feedback from the Regional Vision Zero Working Group.

   a. Low: Minimal influence, with minor improvements in specific aspects of transportation safety.

   b. Low-Medium: Some positive impact, contributing moderately to enhancing traffic safety in the region.

   c. Medium: Substantial contribution, significantly improving overall transportation and traffic safety in the region.

   d. Medium-High: Significant positive impact, leading to noteworthy advancements in reducing crashes and improving safety on the region's roadways.

   e. High: Exceptional impact, making a transformative difference in achieving the ultimate goal of Vision Zero by significantly reducing or eliminating traffic-related injuries and fatalities.



1

Increase collaboration among allied agencies.

The region will pursue collaboration among local governments and allied agencies through convening working groups, providing training, and sharing traffic safety data and strategies. Allied agencies may include state and regional transportation agencies, police departments and state patrol, advocacy organizations and organizations from public health, social services, economic development, education, homelessness, religious and spiritual communities, and other community-based groups. The collaboration will allow for more unified Vision Zero messaging, strategies, and implementation involvement across the region.

#	Action	Timeframe	Action Leader	Support Partners	Expected Impact
1.1	Continue monthly meetings of the Regional Vision Zero Working Group. Use the working group as a place to share updates on local safety efforts, provide information on funding opportunities related to safety and collaborate with regional safety stakeholders. Explore the creation of focus groups within the Working Group to address priority issues and assist in advancing the implementation of the plan.	**Ongoing**	DRCOG	Member Governments, Colorado Department of Transportation	Medium
1.2	Convene regular local safety meetings of state and local transportation and public health professionals, police and fire departments and community and advocacy organizations to collaboratively address dangerous behaviors on the roadways with strategies like culturally appropriate safety programs and educational messages, paired with outreach and investments.	**Immediate**	DRCOG	Colorado Department of Transportation, Colorado Department of Public Health and Environment, Federal Highway Administration, National Highway Traffic Safety Administration, Member Governments, Local Police and Fire Departments	Medium-High
1.3	Collaborate with the Advanced Mobility Partnership to support transportation technology efforts that support Regional Vision Zero through data collection, planning, programming and decision-making.	**Immediate**	DRCOG	Advanced Mobility Partnership stakeholders	Medium-High

#	Action	Timeframe	Action Leader	Support Partners	Expected Impact
1.4	Work with local agencies to develop regional collaboration opportunities, such as peer exchanges for local staff to provide assistance or guidance on safety-related projects or programs. Potential topics include Rapid Response teams, quick-build projects, federal grant opportunities and more.	**Immediate**	DRCOG	Member Governments	Medium
1.5	Facilitate training sessions among police departments to provide support on addressing key crash profiles and behaviors and submitting comprehensive crash reports.	**Short**	Statewide Traffic Records Advisory Committee, Member Governments, Local Police, Colorado State Patrol	DRCOG, Colorado Department of Transportation	Medium-High
1.6	Support the work of ally organizations creating support systems for victims of crashes such as counseling, memorializing and storytelling.	**Short**	Local Advocacy Organizations	DRCOG, Member Governments	Low-Medium



2

Increase awareness and adoption of Vision Zero.

The region will increase awareness of Vision Zero among local communities, local governments and related transportation agencies and support adoption of Vision Zero or similar local safety plans or strategies by local governments. This will include educational campaigns targeted at driver behavior, promoting Vision Zero principles, data sharing and street design tactics.

#	Action	Timeframe	Action Leader	Support Partners	Expected Impact
2.1	Identify and promote Safe System Approach and Vision Zero training or education opportunities to local governments, community organizations and media outlets.	**Immediate**	DRCOG	Colorado Department of Transportation, Federal Highway Administration, National Highway Traffic Safety Administration	Medium
2.2	Update the Regional Vision Zero webpage to include traffic safety resources and information, including details on the Safe Systems Approach and updates on DRCOG's progress towards Vision Zero in the region.	**Immediate**	DRCOG		Low-Medium
2.3	Coordinate with the Colorado Department of Transportation and local partners to promote emerging technology and programs that provide people easy ways to find a safe ride home when they go out.	**Immediate**	Colorado Department of Transportation, Member Governments	DRCOG, National Highway Traffic Safety Administration	Low
2.4	Develop targeted efforts to engage middle and high school students in traffic safety through the Safe Routes to School program, focusing on empowering youth leadership to promote safe transportation in their school communities, prioritizing marginalized communities.	**Short**	DRCOG, The Colorado Department of Transportation	Member Governments	Medium-High

#	Action	Timeframe	Action Leader	Support Partners	Expected Impact
2.5	Create and implement a Regional Vision Zero partnership program modeled on the Way to Go program to promote and prioritize safety in the DRCOG region.	**Short**	DRCOG	The Colorado Department of Transportation, Federal Highway Administration, National Highway Traffic Safety Administration	Medium
2.6	Create a technical assistance program for member governments in the development of a local Vision Zero Action Plan or similar local safety action plan or assist in formally adopting support for DRCOG's Taking Action on Regional Vision Zero Plan.	**Short**	DRCOG	Member Governments	Medium
2.7	Work with school districts to provide them with tools to host educational seminars or workshops on Vision Zero principles and targeted engagement about traffic safety for kindergarten through 12th-grade students.	**Short**	DRCOG, The Colorado Department of Transportation	Member Governments	Medium



Design and retrofit roadways to prioritize safety.

The region will design and fund the construction of roadways that prioritize safety for all roadway users. This includes updating street design guidelines to prioritize safety, developing toolkits incorporating a Safe System approach, applying traffic safety countermeasures to corridors and intersections as part of street reconstruction projects and strategically prioritizing quick-build safety projects. Projects should be prioritized along the regional (or local) High-Injury Networks or locations that will reduce the risk of fatal and serious injury crashes. Redesigning and rebuilding streets and roadways to prioritize safety can significantly reduce the number of fatal and severe injury crashes across the region.

#	Action	Timeframe	Action Leader	Support Partners	Expected Impact
	Develop a Complete Street Toolkit for the DRCOG region addressing safety-related aspects of street design, incorporating Vision Zero principles, crash profiles and countermeasures and including further guidance for establishing safe design components.	**Completed**	DRCOG	Member Governments	Not applicable
3.1	Develop a Vision Zero Quick-Build Toolkit for member governments to guide the design and implementation of quick-to-deliver and adjustable traffic measures to improve safety on the Regional High-Injury Network and Critical Corridors.	**Immediate**	DRCOG	Member Governments, The Colorado Department of Transportation	Medium-High
3.2	Work with Regional Transportation Operations staff and member governments to utilize the authority provided through Senate Bill 23-200 to identify “automated vehicle identification corridors” along the Regional High-Injury Network and Critical Corridors and install speed cameras to encourage driving at safer, legal speeds addressing traffic safety concerns without disproportionately affecting specific demographic groups.	**Immediate**	Member Governments, DRCOG	The Colorado Department of Transportation	Medium-High

#	Action	Timeframe	Action Leader	Support Partners	Expected Impact
3.3	Partner with the Regional Transportation District and member governments to apply strategies and policies identified in the toolkit from the Regional Transportation District's First and Last Mile Strategic Plan. Prioritize implementing these countermeasures along planned bus rapid transit corridors.	**Immediate**	Regional Transportation District	Member Governments, DRCOG	Medium
3.4	Work with member governments to help update street design guidelines, standards and municipal codes in accordance with DRCOG's Reginal Complete Streets Toolkit.	**Short**	Member Governments	DRCOG, The Colorado Department of Transportation	Medium-High
3.5	Support installing more lighting and maintaining the regional transportation system, prioritizing human-centered approaches to improve safety and public health.	**Medium-Long**	Member Governments	The Colorado Department of Transportation, DRCOG	Medium



Improve data collection and reporting.

The region will improve the collection, analysis and reporting of crash data to local communities, local governments and relevant agencies. This will include more frequent updates to the regional crash database and improved data collection techniques. More robust, accurate and transparent data will provide the region with the tools to identify strategies, programs and projects and prioritize investments that most efficiently and effectively reduce the number of fatal and serious injury crashes.

#	Action	Timeframe	Action Leader	Support Partners	Expected Impact
	Create a story data platform on the Regional Data Catalog to enhance the Regional Vision Zero toolkit and provide local governments with easy access to quick analysis of area-type crash profiles.	**Completed**	DRCOG	Member Governments	Not applicable
4.1	Continue DRCOG staff participation in the Colorado Statewide Traffic Records Advisory Committee meetings to help improve the quality of crash data and form completeness. Explore becoming a voting member of the Statewide Traffic Records Advisory Committee.	**Ongoing**	Statewide Traffic Records Advisory Committee	DRCOG	High
4.2	Continue to lead inventory of the region's needs and issues surrounding crash data, working with the Department of Revenue, the Statewide Traffic Records Advisory Committee and the Colorado Department of Transportation to identify solutions to address data collection, processing and analysis and explore the creation of a regional crash data consortium.	**Ongoing**	DRCOG	Member Governments, Colorado Department of Transportation, Colorado State Patrol, Local Police	High

#	Action	Timeframe	Action Leader	Support Partners	Expected Impact
4.3	To build out crash profiles further, perform a comprehensive crash data analysis to understand high-risk actions, pre-crash activities, and demographics.	**Immediate (Perform every 3-5 years)**	DRCOG		High
4.4	Facilitate training sessions for local jurisdictions on downloading and using the regional crash data for detailed analysis of crash locations in their boundaries.	**Immediate**	DRCOG	Member Governments, Colorado Department of Transportation	Medium-High
4.5	Perform a systemic safety analysis to identify the Regional High-Injury Network and Intersections.	**Short (Perform every 5 years)**	DRCOG		High



5

Increase funding and resources.

The region will take measures to increase funding and allocation of resources for programs and projects that improve traffic safety. Strategies may include prioritizing safety projects in the Transportation Improvement Program (particularly those along the regional High-Injury Network or addressing a crash profile), dedicating Capital Improvement Project funds to traffic safety projects, or providing grant-writing support. Increased funding will be critical to the region's ability to promptly implement many of the vital traffic safety improvement projects.

#	Action	Timeframe	Action Leader	Support Partners	Expected Impact
5.1	Research and share information on grant funding opportunities in the monthly Regional Vision Zero Work Group agenda as potential funding resources for DRCOG and regional stakeholders, including the Colorado Department of Transportation, the Regional Transportation District and local governments.	**Ongoing**	DRCOG		Medium
5.2	Continue evaluating Transportation Improvement Program criteria to further prioritize safety projects on the regional High-Injury Network that address key crash profiles or otherwise reduce fatal and serious injury crashes.	**Immediate**	DRCOG		High
5.3	Explore opportunities to support regional stakeholders with streamlined data requests or potential letters of support for safety funding opportunities.	**Immediate**	DRCOG	Member Governments	Medium
5.4	Partner with the local governments with existing funding sources dedicated to safety improvements to assist other local governments in exploring dedicated Capital Improvement Project funding sources for safety projects that target the regional (or local) High-Injury Network or specific crash profiles, depending on area type.	**Immediate**	Member Governments	DRCOG	Low

#	Action	Timeframe	Action Leader	Support Partners	Expected Impact
5.5	Explore the creation of a Regional Vision Zero Transportation Improvement Program set-aside program or a similar integrated pool of safety funding to implement improvements along DRCOG's High-Injury Network, with a focus on projects that address the regional crash profiles.	**Short**	DRCOG	Colorado Department of Transportation	Medium
5.6	Explore the adoption of an evaluation program for quick-build safety projects in the region to help determine the viability and effectiveness of future permanent projects.	**Short**	DRCOG	Member Governments	Medium



6

Increase support for legislation, policies and practices that focus on safety at all levels.

The region will pursue and support legislation that results in traffic safety improvements. Legislation may address speed limit setting, helmets for motorcycle drivers and passengers, seatbelt laws, safety cameras and other methods of reducing crashes as safety research evolves. DRCOG, its local governments and allied agencies can help elected officials better understand the scope of crashes causing death and serious injuries in the region and pursue and support legislation to reduce them. Changes to legislation will provide governments with a greater set of tools and resources and reduce barriers to making improvements that reduce fatal and serious injury crashes.

#	Action	Timeframe	Action Leader	Support Partners	Expected Impact
	Support legislation to maintain the ability to use safety cameras as an enforcement technique, including red-light running and speeding.	**Completed**	DRCOG		Not applicable
6.1	Re-evaluate legislative priorities as new safety research arises.	**Ongoing**	DRCOG		Medium-High
6.2	Support legislation to increase funding and evaluate the reallocation of existing funding to safety projects to create a reliable, dedicated funding stream.	**Immediate**	DRCOG		High
6.3	Support legislation that enables approaches for local agencies to set appropriate speed limits on state-owned roadways to reduce vehicle operating speeds and crash severity.	**Immediate**	DRCOG		Low-Medium
6.4	Coordinate with member governments and regional stakeholders to explore a Safety Policy Playbook to help local agencies navigate and prioritize new safety legislation and policies.	**Short**	DRCOG	Member Governments	Medium-High
6.5	Support legislation that seeks to improve safety on a systemic level. Examples include increased driver education around vulnerable road users, a statewide primary seatbelt law and a statewide universal motorcycle helmet law.	**Medium-Long**	DRCOG, Colorado Department of Transportation		Medium-High

Additional active efforts

Local governments can look to their peers across the nation and partner agencies in the region for inspiration or guidance in implementing Vision Zero



Colorado Department of Transportation

The Colorado Department of Transportation launched Moving Colorado Towards Zero Deaths in 2015, which sets a bold and visionary goal of zero deaths for every individual, family and community using Colorado's transportation network.

The 2020-2023 Colorado Strategic Transportation Safety Plan establishes a collaborative and shared vision and mission for transportation safety in Colorado. It relies on the premise that every agency and jurisdiction have a role in enhancing transportation safety for any transportation mode in Colorado through policy, planning, funding, design and construction, operations, and maintenance. DRCOG has developed Regional Vision Zero to complement and support the Colorado Department of Transportation's commitment to achieving zero fatal and severe injury crashes on roadways throughout Colorado.

Advancing Transportation Safety Program

The Advancing Transportation Safety Program is a statewide collaborative effort led by a team of state and local agencies, advocacy groups, academic institutions and private entities. The program was developed as part of the implementation efforts for the 2020-2023 Strategic Transportation Safety Plan, required by the Highway Safety Improvement Program. DRCOG is a committed partner in the Advancing Transportation Safety Program's work to make a long-term investment in and commitment to transportation safety across Colorado, to cultivate a stronger transportation safety culture and ultimately achieve the vision of zero fatalities and serious injuries for all users on Colorado roadways.

Local advocacy

Advocacy organizations in the Denver region are actively involved in Vision Zero. The Denver Streets Partnership, which operates within the City and County of Denver, has established its Vision Zero core principles and has identified priority implementation actions related to street design, street operations, enforcement and funding. Elsewhere, although not specifically called out within advocacy agendas, organizations such as Bicycle Colorado and Community Cycles in Boulder are actively engaged in local governments' safety efforts including planning, design, implementation and culture change.

How local governments can stay engaged

DRCOG has made a Vision Zero commitment and is dedicated to the action initiatives detailed in this plan. Local governments can use DRCOG as a resource and participate in the future of Vision Zero in the region by:

- **Participate in the Regional Vision Zero Working Group –** Local governments can have key representatives join the working group.
- **Participate in Training Opportunities** – Local governments can facilitate their staff and residents to participate in training opportunities communicated by DRCOG.
- **Collect data** – The continuous improvement and availability of crash data and traffic safety information is a priority for DRCOG. Local governments should consult with DRCOG for data questions and assistance understanding and applying the data within the regional High-Injury Network.
- **Apply for Grants** – Local governments can track updates on available funding and grants for safety projects and apply for funding for safety projects or programs.
- **Join the Vision Zero Network** – Local governments can join the Vision Zero Network, become a Vision Zero community and stay involved with evolving research and training on Vision Zero through this national group.


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Data used for analysis

The data source for this plan is the Denver Regional Council of Governments-Colorado Department of Transportation traffic crash database. This database is a collaborative effort among multiple local government and law enforcement agencies. When crashes involving vehicles occur, officers fill out a crash form and send it the Department of Revenue, which processes the records and enters them into the state's DRIVES database. CDOT receives crash data from DRIVES and processes the data. CDOT staff add an additional crash type field, correct common errors, update location information and normalize the data. CDOT sends the Denver regional crash data to DRCOG to geocode. Once geocoded, CDOT verifies the final product. The database does not include records for crashes not reported to, or by, law enforcement agencies.

This plan focuses on killing and serious-injury (KSI) crashes. To identify this level of crash, crashes that were identified as injury level of "persons with evident, incapacitating injury" and "persons killed" were compiled for years 2013 through 2017.

Given data limitations, it is not possible to determine which individual or person type (for example, the driver, passenger, pedestrian or bicyclist) was injured in a specific crash. For data tabulations, it was assumed that the most vulnerable person was the most likely to suffer the most severe injury. Detailed injury data was not available for this plan. There are also gaps in the data, as most of the crashes do not have all detailed fields available. For example, the age of the person associated with a crash may be available for one crash but not for another. All numbers in this report were derived from available data. Readers are encouraged to consider data constraints while reading Taking Action on Regional Vision Zero.

Map disclaimer

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Esri. "World Hillshade" [basemap]. Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap, and the GIS user community. Scale Varies. February, 2020. https://esri.maps.arcgis.com/home/item.html?id=f47a5a35be8c41f7890c1763f65a6d9f.

regional vision zero
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