VISION ZERO BOULDER
SAFE STREETS REPORT

4th Edition, 2022

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VISIONZERO
Safe Streets Boulder

2018–2020 CRASH DATA SUMMARY

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For an electronic version of this document please visit:
https://bouldercolorado.gov/services/vision-zero

The crash data reported in this document comes from the City of Boulder's Transportation & Mobility Department database, which is derived from the Police Department's Record Management System. The information contained in these databases is updated periodically and may change over time.

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Introduction

The City of Boulder is dedicated to creating and maintaining a safe transportation system through capital improvements, maintenance, traffic control, education, enforcement, and engineering. Boulder has been reporting on Vision Zero since 2009, and while the number of overall crashes has decreased, serious injury and fatal crashes are still occurring. **Between 2009 and 2020, 636 people have been seriously injured or killed**.

These traffic injuries and deaths are at odds with Boulder's core community values to ensure travel safety for people using all modes, as defined in the *Transportation Master Plan (TMP)*. Safety concerns such as drivers speeding; impaired or distracted road users; and conflicts among vehicles, pedestrians, and bicyclists challenge our national reputation as a walkable, bikeable, and livable city.

Vision Zero is Boulder's bold goal to eliminate all severe crashes involving people using all modes of travel. Boulder defines severe crashes as those that result in a serious injury or fatality.

14,500+ **Between 2018 and 2020, approximately 14,500 people were involved in a crash in Boulder**

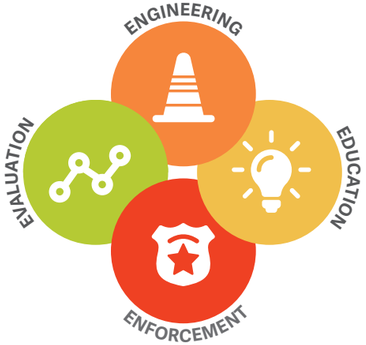
9 people were killed

2 walking *1 on a bike* *6 in a car*

150 people were seriously injured

25 walking *55 on a bike* *70 in a car*

These people aren't just numbers. They are our mothers, fathers, brothers, sisters, children, and friends. They've been seriously injured or killed in the course of the everyday act of moving from place to place. The impact on their families, friends, and communities is immense and permanent.



THE VISION ZERO APPROACH

Vision Zero employs both a location-specific and a systemwide approach that is targeted, responsive, and proactive through a transformative set of actions that prioritizes travel safety for everyone. Vision Zero includes a holistic **4 E's approach** to eliminate severe crashes and reduce other types of crashes. The community should feel educated and empowered about best practices to protect themselves and others when driving, walking, or bicycling. This approach also focuses on our community's perception of travel safety and comfort with the idea that no one should be discouraged from traveling by any mode because of fears about safety.

Vision Zero guiding principles:

- **Use a people-focused, data-driven, action-oriented, and interdisciplinary approach to carrying out the 4 E's.**
- **Proactively employ proven crash countermeasures, with a focus on continuous improvement.**
- **Practice a Safe Systems approach that recognizes:**
  - People make mistakes that can lead to crashes.
  - The human body has limited physical ability to tolerate crash forces.
  - The responsibility for making the mobility system safe is a shared responsibility across all road users and stakeholders and requires personal responsibility.
  - All parts of the system must be strengthened and properly maintained to multiply the impact of interventions and provide a safety net when any one part of the system is deficient.

There are five Vision Zero objectives:

1. **Eliminate crashes resulting in serious injuries and fatalities.**
2. **Reduce other types of crashes.**
3. **Improve travel comfort and security.**
4. **Enhance awareness of and community engagement with Vision Zero.**
5. **Improve data and be transparent.**

Methodology

The same crash analysis methodology that was used for the 2015-2017 analysis (*Vision Zero Safe Streets Report, 3rd Edition 2019*) was used for the 2018-2020 analysis. All crash records were queried to only include police reported crashes from the database. Moreover, special attention was given to all bicycle- and pedestrian-related crashes by reading through the police officer narratives of each crash report and using the Pedestrian and Bicycle Crash Analysis Tool (PBCAT) crash typing software to find specific crash trends. Police officer narratives were also used to fill in gaps within the police reports, where applicable.

The only difference in the crash analysis methodology used for the 2018-2020 analysis is that crashes occurring on private property were removed from the total, which is in line with industry best practices. Local agencies typically follow this approach to focus on analyzing conditions where they have authority to implement proven crash countermeasures within the public right-of-way. Historically in Boulder, private property crashes account for about 16% of total crashes, or an average of 410 crashes per year. Over 90% of private property crashes occurred in parking lots and only 1% of private property crashes resulted in a serious injury.

PLANNING CONTEXT

Vision Zero is a priority of the *Transportation Master Plan (TMP)* and also informs our other city transportation plans and standards—including the *Design and Construction Standards*, *Pedestrian Crossing Treatment Installation Guidelines*, *Traffic Signal Practices*, *Low-Stress Walk and Bike Network Plan*, *Curbside Management Plan* (in progress) and the Speed Limit Setting and Signing Framework grant (planned to begin in mid-2022).

The *Vision Zero Boulder: Safe Streets Report* is the city's comprehensive traffic crash analysis used to understand where and how crashes are occurring, whom they involve, and inform actions to improve safety. The report was first published in *2012* (2009-2011 crash data), with additional versions released in *2016* (2012-2014 crash data) and *2019* (2015-2017 crash data). This 4th edition includes a detailed analysis of crash data for the years 2018-2020. The corresponding *Vision Zero Action Plan* will be updated in 2022 and will detail specific actions to address the trends and issues documented in this Safe Streets Report. In addition, ongoing evaluation and reporting will be done in support of the *Transportation Report on Progress* every two years.

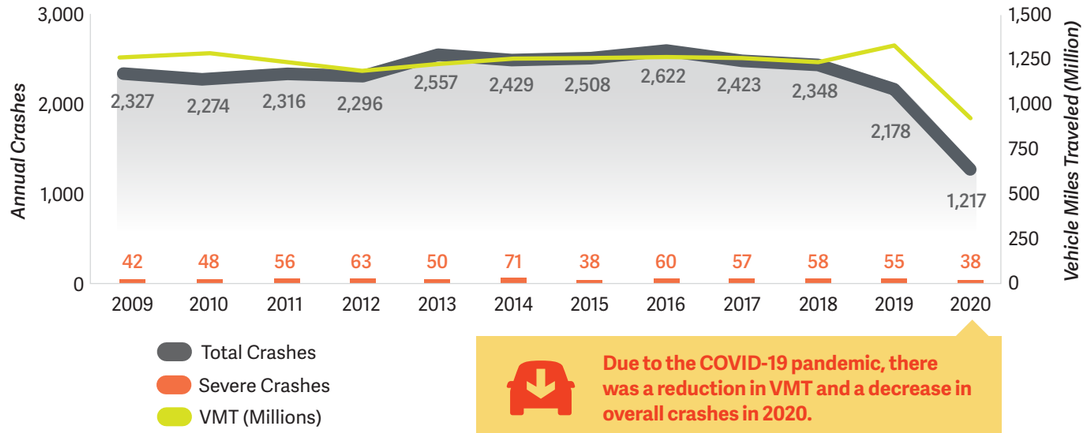
While the primary focus of Vision Zero is to eliminate severe crashes, it also aims to reduce other types of crashes. The city wants to mitigate the inconvenience, frustration, and costs of being involved in a minor injury or property damage only crash.

Snapshot of Key Findings

The *Vision Zero Boulder: Safe Streets Report, 4th edition 2022* includes a review of the crash data for the years 2018 through 2020, as well as a comparison of these data trends with those developed in prior reports (for years 2009 through 2017). This section provides an overview of crashes and associated trends for this crash data and identifies key findings to help us understand where and how crashes are occurring and to whom.

The total crashes per year in Boulder have been trending down since 2016. However, severe crashes per year have remained steady, ranging between 55 to 60 per year except for 2020, which was impacted by the COVID-19 pandemic and had 38 severe crashes. Between 2018 and 2020, there were an average of 1,914 crashes per year, 50 (approximately 3%) of which were severe.

TOTAL CRASHES, SEVERE CRASHES, AND VEHICLE MILES TRAVELED (VMT)



Due to the COVID-19 pandemic, there was a reduction in VMT and a decrease in overall crashes in 2020.

Impacts of COVID-19 in 2020

Starting in March 2020, COVID-19 restrictions, remote working, and virtual school significantly impacted travel. **The number of vehicle miles traveled (VMT), total crashes, and severe crashes all decreased compared to previous years.** VMT decreased by 29%, total crashes by 47%, and severe crashes by 33% in 2020 as compared to the 2017-2019 average.

Some crash types and causal factors experienced trends noticeably different in 2020, as compared to prior years.

There were fewer crashes involving **pedestrians** overall; however, the number of severe crashes increased.

Similar to vehicle travel, **bicycle** commute travel decreased in 2020; however, recreational bicycle travel increased. Total and severe crashes involving bicyclists decreased.

Crashes involving **people ages 65 years and older** decreased; however, severe crashes remained steady.

Severe crashes involving an **impaired driver** decreased significantly; total crashes also decreased.

AREAS OF CONCERN

Between 2018 and 2020, there were **5,743 total crashes and 151 severe crashes (approximately 3% of total crashes)**. The tables below summarize the percent of all severe crashes and the percent of total crashes each category represents. When the percent of severe crashes is higher than the percent of total crashes, there is a disproportionate, or overrepresented, number of severe crashes for that category. For example, while only 6% of all crashes involved bicycles, bicycle crashes were 36% of all severe crashes.

This report identifies overrepresented severe crashes as areas of concern; mitigations focused in these areas can have the most impact.

Modes of Transportation	2018 – 2020 Severe	2018 – 2020 Total
Bicycle	36%	6%
Pedestrian	18% ↓	2%
Motorcycle	9% ↓	1%
Vehicles	37% ↑	91%

Bicycle, pedestrian, and motorcycle crashes have a disproportionate number of severe crashes compared to total crashes.

Age Range	2018 – 2020 Severe	2018 – 2020 Total
Children <15	5%	1%
Youth 15-19	17%	15%
Ages 20-29	43% ↓	48%
Ages 30-64	10% ↓	19%
Older Adults 65+	25% ↑	17%

Crashes involving people ages 15-29 and older adults ages 65 and older have a disproportionate number of severe crashes compared to total crashes.

Other Categories	2018 – 2020 Severe	2018 – 2020 Total
Distracted	7%	12%
Speeding	32% ↑	9%
Impaired	11%	5%
Making Left Turn	34%	16% ↑

Crashes could be coded to multiple categories, so the percentages do not add up to 100%

Crashes involving people speeding, people impaired, and people making left turns have a disproportionate number of severe crashes compared to total crashes.

12% ↑

The percent of severe crashes involving people speeding increased from 20% (2015-2017) to 32% (2018-2020).

5% or more increase ↑ or **5% or more decrease** ↓ in percentage as compared to 2015-2017

Crash Locations

The majority (67%) of severe crashes between 2018 and 2020 occurred on principal arterial (41%) and minor arterial (26%) roadways, despite these street functional classifications accounting for about 17% of total centerline miles within the city. Centerline miles measure the length of a road or highway regardless of how many lanes it has.

67% of severe crashes occurred on an arterial roadway between 2018 and 2020

- **94%** of severe left turn crashes occurred on an arterial roadway
- **77%** of severe pedestrian crashes occurred on an arterial roadway
- **55%** of severe bicycle crashes occurred on an arterial roadway

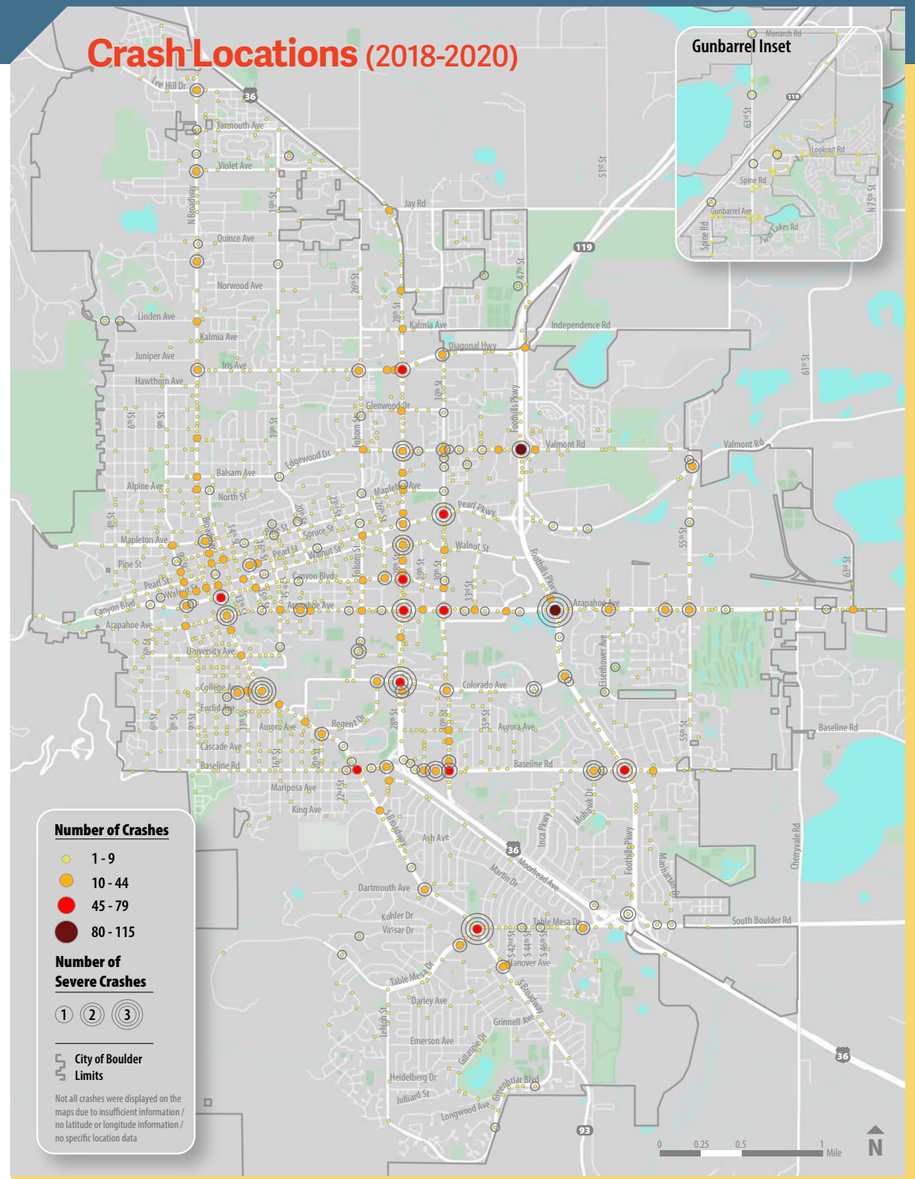
Street Functional Classification	Centerline Miles	Percent of Total Centerline Miles	Severe Crashes	Percent of Total Severe Crashes
Freeway/Expressway	11	3%	10	7%
Principal Arterial	**41**	**9%**	**62**	**41%**
Minor Arterial	**33**	**8%**	**40**	**26%**
Collector	31	7%	14	9%
Local	236	54%	15	10%
Multi-use Path	85	19%	10	7%
Total	**437**	**100%**	**151**	**100%**

The number of deaths from crashes each year has fluctuated since 2015.

Number of Deaths per Year

- 2015 ZERO
- 2016 ●●●●●●
- 2017 ZERO
- 2018 ●●
- 2019 ●●
- 2020 ●●●

Crash Locations (2018-2020)



Between 2018 and 2020, 40% of severe crashes occurred at signalized intersections. The following intersections each had three severe crashes during this time period:

- Foothills Pkwy. & Arapahoe Ave.
- 28th St. & Colorado Ave.
- Broadway & College Ave. & 14th St.
- S Broadway & Table Mesa Dr.

Nationwide, between 2015 and 2019 (2020 excluded due to COVID-19)

- ↑ **7%** increase in total crashes
- ↑ **6%** increase in vehicle miles traveled
- ↑ **3%** increase in population

In Boulder, between 2015 and 2019

- ↓ **13%** **decrease** in total crashes
- ↑ **10%** **increase** in vehicle miles traveled
- ↑ **2.4%** **increase** in population

Source: National Highway Traffic Safety Administration (NHTSA), Federal Highway Administration (FHWA), U.S. Census

ECONOMIC IMPACT OF CRASHES (2018-2020)

Crash Severity	Number of Crashes	Cost Per Crash*	Societal Cost
Property Damage	4,195	$11,600	$48,469,000
Possible Injury Crashes	971	$71,800	$69,747,900
Non-Incapacitating Injury Crashes	426	$127,600	$54,374,200
Incapacitating Injury (Severe) Crashes	143	$349,600	$49,987,500
Fatal (Severe) Crashes	8	$6,611,100	$52,888,500
TOTAL	**5,743**		**$275,467,100**

*Source: Federal Highway Administration, Highway Safety Manual; reported in 2021 dollars

Severe and fatal crashes have a large economic impact on the community. Continuing work on Vision Zero is critical to reduce the overall societal cost.

Progress and Ongoing Projects

To achieve Vision Zero, the 4 E's approach helps ensure the city is addressing travel safety from all angles. As an example, dangerous travel behaviors, such as impaired or distracted bicycling and driving, can be countered through enforcement efforts and safety education outreach, while engineering treatments can help prevent intersection conflicts. In many cases, applying all 4 E's is the most comprehensive way to prevent crashes. The following are key Vision Zero actions which the City of Boulder is already taking or will be doing in the future.

ENGINEERING

- Made progress implementing the **Low-Stress Walk and Bike Network Plan** through Capital Projects, the Pavement Management Program, and GreenStreets Program.
- Based on Traffic Signal Practices recommendations, made substantial progress implementing **pedestrian head-starts** (leading pedestrian intervals or LPIs) and changes to left-turn phasing. Installed additional right-turn-on-red restrictions where appropriate.
- **Lowered the default speed limit** on local streets to 20 mph through the "20 is Plenty" project and installed over 400 unique Vision Zero 20 mph speed limit signs.
- Created a **Vision Zero Innovation Program** where staff experimented with lower-cost and quicker-build safety improvements like paint-and-post curb extensions, hardened centerlines, pedestrian refuge islands, traffic calming features, and artwork.
- Added more **green pavement markings** to highlight conflict areas between bikes and turning vehicles, especially along corridors with higher bike crashes (locations where there were two or more bicycle crashes involving right-turns or left-turns.
- Implemented a **Shared Streets Program** on several key neighborhood streets to promote walking and biking while restricting vehicle access to local traffic only.
- Successfully **secured grant funding for several key capital projects**, including the 30th St. Vertically Separated Bike Lanes, 28th St. & Colorado Ave. Intersection Rebuild, and Safer Signals Improvements/Rebuilds.
- Planned, designed, and constructed projects funded through the **Highway Safety Improvement Program** at Broadway & Rayleigh Rd., Baseline Rd. & 29th St., and Colorado Ave. & Regent Dr.
- Implemented appropriate **pedestrian crossing treatments** at locations where they are needed.
- Successfully delivered many **Neighborhood Speed Management Program** projects, including the planning, design, and construction along 26th St. & 55th St.

Innovative Traffic Calming Treatment (Speed Kidney)

The **Vision Zero Innovation Program** (VZIP) was dedicated to installing innovative, quick-build improvements on city streets in 2020-2021. Due to their significantly lower cost to implement compared to traditional capital projects, VZIP projects are intended to accelerate progress toward creating safer streets to help our community achieve our Vision Zero goals.

Select Locations with Improvements Between 2018 and 2021*

Location	Improvement	Areas of Concern Addressed
15th St. & Canyon Blvd.	Changed northbound and southbound approach lane configuration to improve operations	Pedestrian
29th St. & Baseline Rd.	Aligned 29th St. to be perpendicular to Baseline Rd. to enhance sightlines, added a raised multi-use path crossing 29th St. to slow left-turning vehicles	Bicycle, Pedestrian, Left Turn
30th St. & Arapahoe Ave.	Adjusted left-turn phasing to extend protected-only operation during more periods of the day, changed off-peak left-turn operation from permitted to protected/permitted	Bicycle, Pedestrian, Left Turn
30th St. & Baseline Rd.	Converted left-turn signal phasing from permitted to protected-only	Bicycle, Pedestrian, Left Turn
30th St. & Pearl St.	Adjusted left-turn phasing to extend protected-only operation during more periods of the day, changed off-peak left-turn operation from permitted to protected/permitted, and lengthened pedestrian clearance times	Bicycle, Pedestrian, Left Turn
30th St. & Valmont Rd.	Converted all left-turn operations to Flashing Yellow Arrows, adjusted left-turn phasing from protected/permitted to protected-only during peak travel times	Bicycle, Pedestrian, Left Turn
Baseline Rd. & Mohawk Dr.	Installed hardened centerline, added pedestrian head-starts, increased walk time, added an audible push button and associated extended pedestrian clearance time	Pedestrian
Broadway & Baseline Rd.	Added an eastbound bike lane on the west leg of the intersection	Bicycle
Broadway & Canyon Blvd.	Converted all left-turn operations to Flashing Yellow Arrows	Left Turn
Broadway & North St.	Installed pedestrian head-starts	Pedestrian
Broadway & Rayleigh Rd.	Added signalized southbound right turn lane for vehicles to reduce conflicts with multi-use path users and high speed rear-end crashes	Bicycle, Pedestrian
Canyon Blvd. & Folsom St.	Adjusted left-turn phasing from protected/permitted to protected-only during peak travel times	Bicycle, Pedestrian, Left Turn
Colorado Ave. & Regent Dr.	Installed pedestrian head-starts, reconstructed south side of intersection to provide protection for bicyclists, added a vertically separated bike lane going eastbound between Regent Dr. & 28th St.	Bicycle, Pedestrian
Folsom St. between Iris Ave. & Valmont Rd.	Enhanced the existing bike lanes with buffers, green conflict markings, and reduced the speed limit to 25 mph	Bicycle
Folsom St. between Valmont Rd. & Pine St.	Added a concrete curb to the bike lanes and updated the delineators and green conflict markings	Bicycle
Pine St. between Folsom St. & 28th St.	Added buffered bike lanes and reduced the speed limit to 25 mph	Bicycle
Table Mesa Dr. between Broadway & Vassar Dr.	Added buffered bike lanes, increased buffer and bike lane widths, added green conflict markings, and added a green bike box at Table Mesa Dr. & Broadway	Bicycle

Pedestrian · Bicycle · Speeding · Left Turn

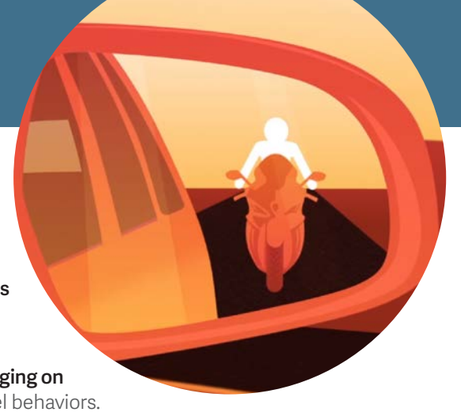
*This table shows a snapshot of key projects and is not a comprehensive list of all improvements that were done to date. These locations are not all high crash locations identified from the Safe Streets Report, 3rd Edition 2019; however, the City has been proactive about identifying locations that need improvements through community feedback, traffic trends, and other safety concerns.

ENGINEERING

Moving Forward: The city will dive more deeply into crash trends identified herein using industry best practices to determine the most impactful reactive and proactive engineering improvements. These proven crash countermeasures will be documented in the ***2022 Vision Zero Action Plan***, and they will be specific, measurable, time-bound, and scalable based on available resources. Transportation staff will continue to evaluate the effectiveness of engineering treatments.

Select Locations with Planned Improvements

Location	Improvement	Areas of Concern Addressed
28th St. & Colorado Ave.	Rebuilding traffic signal, building a protected intersection for pedestrians and bicyclists, installing Business-Access-Transit (BAT) lanes in each direction, and installing landscape buffered multi-use paths along Colorado Ave. between Folsom St. & 28th St.	
30th St. & Colorado Ave.	Constructing underpasses on the south and east leg for pedestrians and bicyclists, building a fully protected intersection for pedestrian and bicycle at-grade crossings, and installing a vertically separated bike lane along 30th St. between Colorado Ave. & Boulder Creek (anticipated construction completion in 2022)	
Baseline Rd. & Canyon Creek Rd.	Replacing the Rectangular Rapid Flash Beacon with a pedestrian traffic signal crossing and adding a raised median pedestrian refuge island	
Baseline Rd. & Mohawk Dr.	Rebuilding signals on the northbound and southbound approaches and adding protected/permitted left-turn phasing	
Broadway & Baseline Rd.	Rebuilding traffic signal and providing protected left-turn phasing	
Broadway & Regent Dr. & 20th St.	Rebuilding traffic signal and providing protected left-turn phasing	
Folsom St. & Pine St.	Rebuilding traffic signal and providing protected left-turn phasing	
Lehigh St. between Table Mesa Dr. & Cragmoor Rd.	Adding buffers to the existing bike lanes. Adding curb extensions and pedestrian crossing treatments	
Various Locations (Eight Intersections)	Enhancing traffic signal displays for Flashing Yellow Arrow and protected left-turn phasing	
Various Locations	Neighborhood Speed Management Program, 20 is Plenty, Vision Zero Innovation Program, and the Community Mobility Planning & Implementation Grant Speed Limit Setting and Signing Framework	



EDUCATION

- Developed and cross-promoted multimedia and **safety education campaigns** to encourage safe travel behaviors, in collaboration with the Vision Zero Community Partnership (VZCP).
- Shared educational **Vision Zero animated videos and targeted safety messaging on social media** to increase community awareness of Vision Zero and safe travel behaviors.
- Coordinated with the **University of Colorado Boulder (CU Boulder) and Google** on Vision Zero community outreach. Three Vision Zero videos (overarching program, distracted, and intoxicated driving) were played at CU football and basketball sporting events; unfortunately, these efforts were suspended due to the pandemic.
- Emphasized crosswalk safety through the **Heads Up campaign** that focused education and enforcement efforts at intersections and crosswalks that have high crash rates. In 2018-2019, piloted the use of **Snapchat advertising** to engage young community members through CU Boulder student events.
- Teamed up annually with **Community Cycles** and CU Boulder to encourage the use of bike lights for nighttime riding by giving out free lights starting in November 2018 through the bike light safety program, **Lighten Up Boulder**. The pandemic impacted this program in 2020 and distribution events were cancelled; however, community members could still receive bike lights through individual requests.
- Encouraged more walking and biking to school through the **Safe Routes to School** program, which included education, engagement activities, and infrastructure review. With funding from a recent two-year Colorado Department of Transportation (CDOT) grant (2017-2019), the city worked with three Boulder elementary schools to:
  - develop maps of recommended walking and biking routes to school
  - conduct in-school bike safety education
  - identify potential infrastructure improvements in a one-mile radius of each school
  - implement Walk and Bike to School Days and a new "Hug n' Go" program at Mesa Elementary School

BOULDER WORK COMMUTE TRIPS & VULNERABLE ROADWAY USERS

WORK COMMUTE TRIPS • WALKING (2015-2019)

Boulder	11.1%
Denver Metro	2.2%
United States	2.7%

WORK COMMUTE TRIPS • BICYCLING (2015-2019)

Boulder	9.9%
Denver Metro	0.8%
United States	0.5%

Source: American Community Survey (ACS) 5-year (2015-2019)

Boulder has a higher percentage of people walking and biking to work when compared to other communities in the Denver Metro and United States.

ENFORCEMENT

Strategies

- **Collaborate on traffic enforcement with local and regional enforcement agencies** to identify locations that would benefit from additional enforcement and, where allowed by state law, photo radar (speed) and photo red-light enforcement. Focus police enforcement on speeding, red-light running, and other unsafe and unlawful activities, such as failing to yield at crosswalks or come to a complete stop at stop signs.
- **Use Boulder Police Department resources** strategically to achieve results, given limitations to where each type of enforcement can be used. Use photo radar in local neighborhoods to issue warnings and citations, which will allow additional officer resources to be used for arterial speed enforcement, flexible red-light running enforcement, and other high-risk traffic control violations. Expand the use of photo red-light enforcement as a highly effective mitigation for the often severe right-angle crashes that can occur when a driver runs a red light.
- The city installed **photo red-light camera technology** at one new intersection in 2019 and two new intersections in 2020.
- **Focus on anti-DUI enforcement** in key locations to address alcohol and drug-impaired drivers, bicyclists, and pedestrians.
- **Track state and federal legislation** related to travel safety goals, such as supporting state legislation to retain the ability of local governments to deploy photo red-light and speed enforcement technology, to prohibit the use of mobile phones while driving, and to protect vulnerable users, such as pedestrians and bicyclists.

State Legislation

- In December 2019, Governor Polis signed into law **Senate Bill 19-175 - Serious Bodily Injury Vulnerable Road User Penalties**. The act makes it a class 1 traffic misdemeanor when careless driving of a motor vehicle is the proximate cause of serious bodily injury to a vulnerable road user.
- In March 2020, Governor Polis signed into law **Senate Bill 20-061 – The Bike Lane Bill**. This act defines a bike lane in Colorado law for the first time and establishes that bicyclists have the right-of-way in all circumstances when using a bike lane. It requires that drivers not drive in, idle in, or otherwise block the bike lane. Drivers or others who block the bike lane may be subject to a fine of $70 and three points off their license if caught blocking the bike lane, like other parking enforcement efforts around the state.

Photo Enforcement Program

Photo Radar Van

Photo radar vans use an automated camera system used to enforce speed limits. When a speeding vehicle is detected, the photo radar system takes a picture of the driver and the license plate. The registered owner of the vehicle then receives a warning or citation in the mail. Photo radar is operated in a marked City of Boulder vehicle by a specially trained police employee.

Two primary vans, one backup at 180 locations

Photo Red-Light Camera

Running red lights is a common cause for crashes at intersections in Boulder. Photo red-light cameras take pictures of any vehicles that run red lights, record the time elapsed since the light turned red and the vehicle entered the intersection, and issue citations. The photo red-light systems are installed at key Boulder intersections that have a high number of collisions.

Eleven cameras at nine locations

BOULDER POLICE DEPARTMENT AND TRANSPORTATION & MOBILITY DEPARTMENT COORDINATION

Regular department communication, monthly meetings	Focus on Vision Zero and NSMP	Participate in Vision Zero Community Partnership	Participate in Heads Up

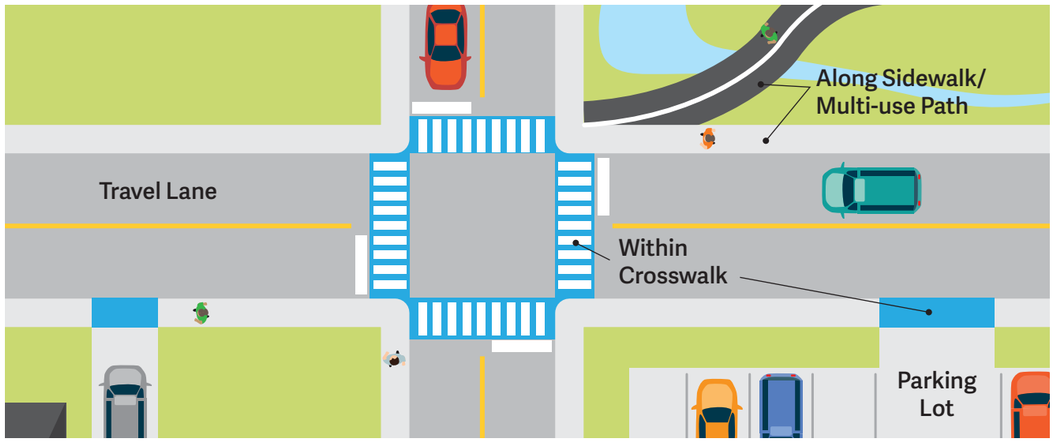
People Walking

People walking are among the most vulnerable users of Boulder's transportation network. **Although pedestrians were involved in only 2% of all crashes from 2018 to 2020 (about 46 per year), they were involved in 18% of all severe crashes (about nine per year) in that timeframe.** Overall, pedestrian crashes between 2018 and 2020 decreased in both total and severe crashes since the last analysis years (2015-2017).

LOCATIONS OF CRASHES INVOLVING PEDESTRIANS (2018-2020)

	Total %	(#)	Severe %	(#)
Within Crosswalk	77%	(106)	70%	(19)
Travel Lane	20%	(28)	30%	(8)
Parking Lot	<1%	(1)	0%	(0)
Along Sidewalk/Multi-use Path	<1%	(1)	0%	(0)
Unknown	2%	(3)	0%	(0)
TOTAL CRASHES		**139**		**27**

77% (about seven per year) of all severe crashes involving a pedestrian **occurred on a roadway classified as an arterial.**

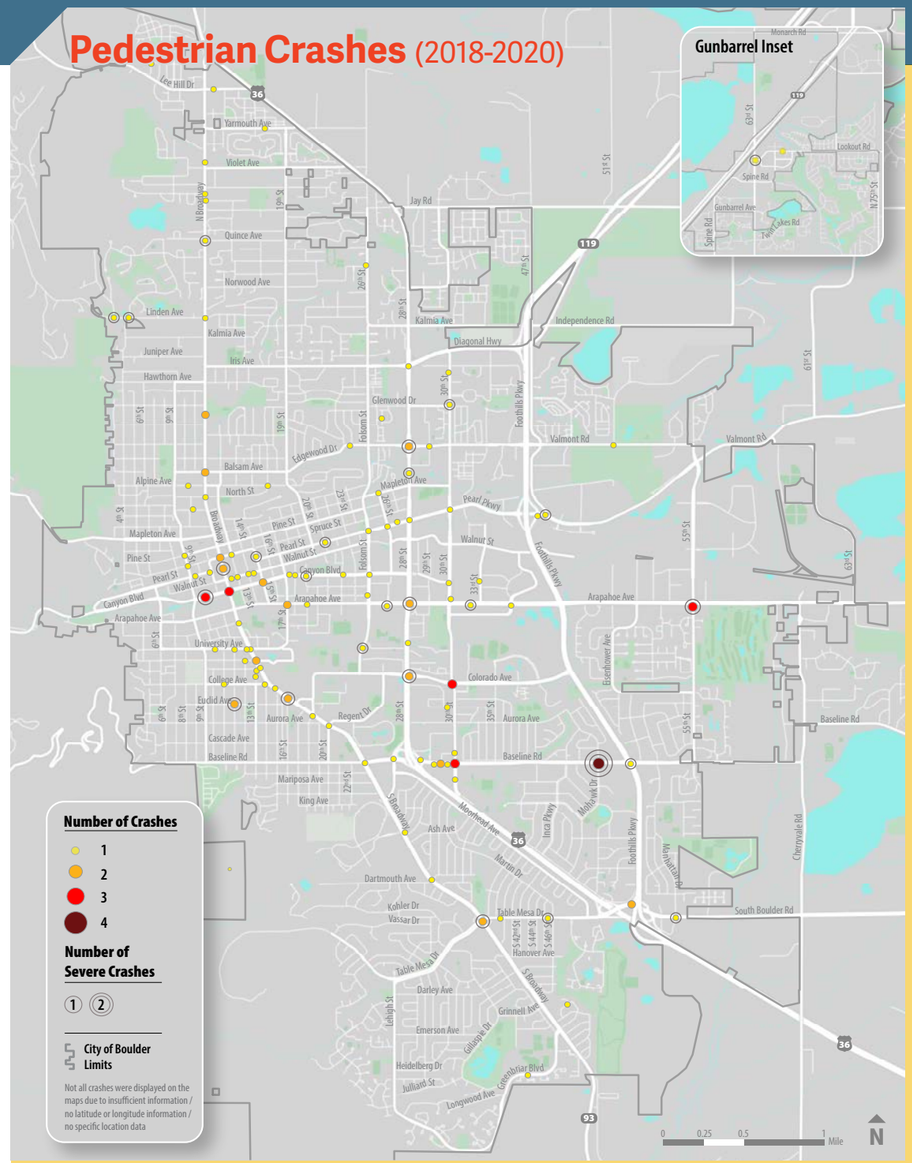


Since 2009, the three most common — and most harmful — types of crashes involving pedestrians are:

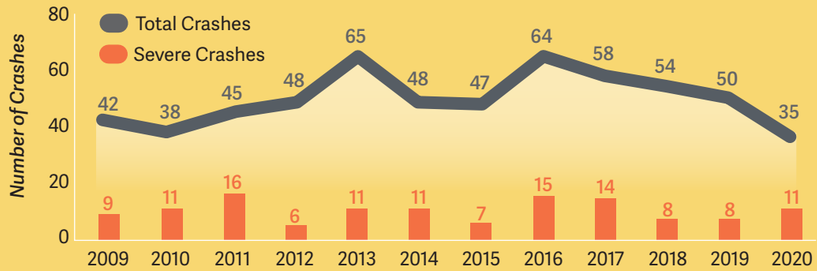
1. **Pedestrians being hit by left-turning vehicles**
   26% of all pedestrian crashes
   19% of all severe pedestrian crashes — about two severe crashes per year
2. **Pedestrians dashing into the street and being hit by a vehicle**
   12% of all pedestrian crashes
   30% of all severe pedestrian crashes — about three severe crashes per year
3. **Pedestrians walking across an intersection and being hit by a motorist who failed to yield**
   8% of all pedestrian crashes
   19% of all severe pedestrian crashes — about two severe crashes per year

These three crash types account for 46% of all pedestrian crashes and 68% of severe pedestrian crashes.

Pedestrian Crashes (2018-2020)



CRASHES INVOLVING A PERSON WALKING



Locations with a high number of pedestrian-related crashes include:

- Baseline Rd. & Mohawk Dr.: four crashes (two severe)
- Arapahoe Ave. & 55th St.: three crashes (one severe)
- Canyon Blvd. & Boulder Main Library: three crashes (one severe)

Areas with a high number of pedestrian-related crashes:

- Central Broadway (from Iris Ave. to Baseline Rd.): 18% of total pedestrian crashes
- Downtown Boulder: 16% of total pedestrian crashes

Key approaches to improve pedestrian safety include:

- Adding pedestrian head-start signal timing at intersections
- Adding "No Right-Turn on Red" restrictions
- Using protected left-turn signal phasing
- Adding signage to increase awareness of pedestrians
- Education around pedestrian safety using social media campaigns

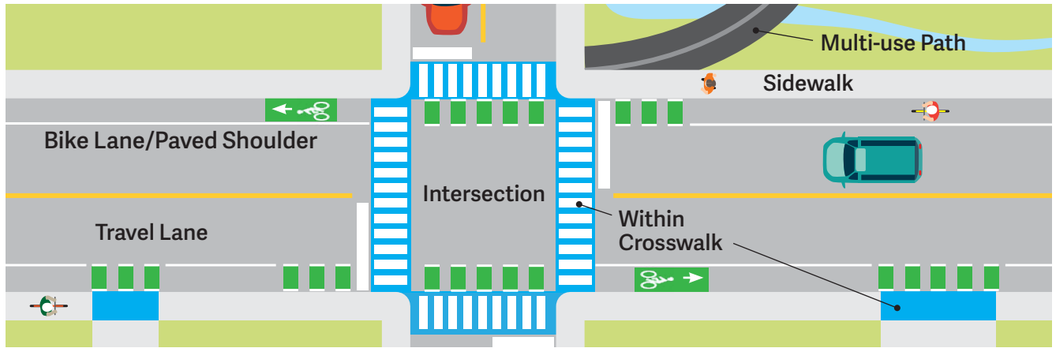
People Bicycling

People bicycling are also among the most vulnerable users of Boulder's transportation network. **Although bicyclists were involved in only 6% of all crashes (about 118 per year) from 2018 to 2020, they were involved in 36% of all severe crashes (about 18 per year)**. The number of people involved in bicycle-related crashes has decreased since 2016. Overall, bicycle crashes between 2018 and 2020 decreased in both total and severe crashes since the last analysis years (2015-2017).

LOCATIONS OF CRASHES INVOLVING BICYCLISTS (2018-2020)

	Total %	(#)	Severe %	(#)
Within Crosswalk	63%	(225)	47%	(26)
Intersection	20%	(70)	16%	(9)
Bike Lane/Paved Shoulder	6%	(23)	14%	(8)
Travel Lane	5%	(17)	5%	(3)
Multi-use Path	4%	(13)	16%	(9)
Other/Unknown	1%	(4)	2%	(1)
Sidewalk	1%	(3)	0%	(0)
TOTAL CRASHES		**355**		**56**

THE MAJORITY of bicycle crashes **ocurred within a crosswalk** or within another part of the intersection. Of crashes on a multi-use path or sidewalk, the **bicyclist was legally riding against traffic** about 69% of the time and about half of those crashes resulted in a serious injury.

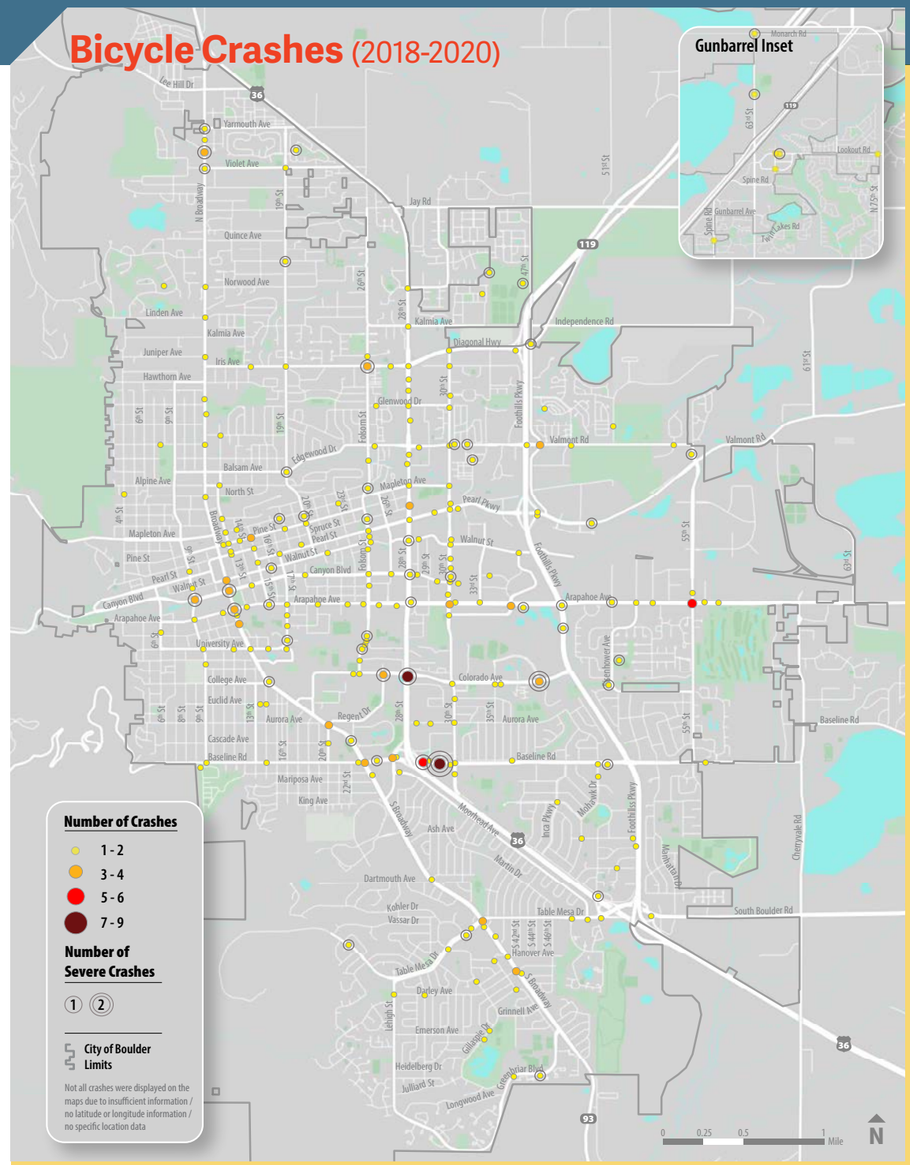


SEVERE BICYCLE CRASHES BY STREET FUNCTIONAL CLASSIFICATION (2018-2020)

	Percent of Total Centerline Miles	Severe Bicycle Crashes	Percent of Total Severe Bicycle Crashes
Freeway/Expressway	3%	2	4%
Principal Arterial	9%	17	30%
Minor Arterial	8%	14	25%
Collector	7%	8	14%
Local	54%	5	9%
Multi-use Path	19%	10	18%

OVER HALF (55%, about ten per year) of severe bicycle crashes **occurred on a roadway classified as an arterial.**

Bicycle Crashes (2018-2020)



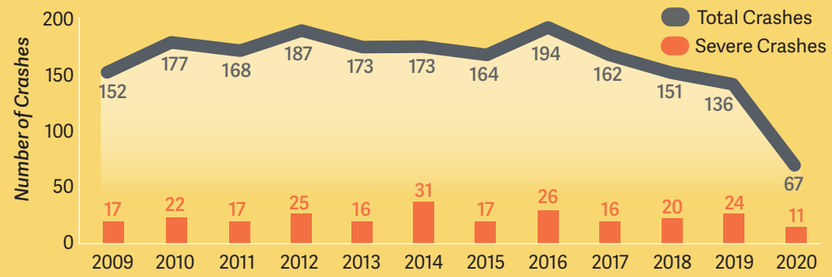
Locations with the highest number of bicycle-related crashes:

- 28th St. & Colorado Ave.: nine crashes (one severe)
- Baseline Rd. & Canyon Creek Rd.: seven crashes (two severe)

Key approaches to improve bicycle safety include:

- Adding green pavement markings and signage to high crash corridors
- Reconstructing intersections to provide protection for bicyclists
- Adding "No Right-Turn on Red" restrictions at intersections
- Using protected left-turn signal phasing
- Organizing programs to educate drivers on bicycle safety

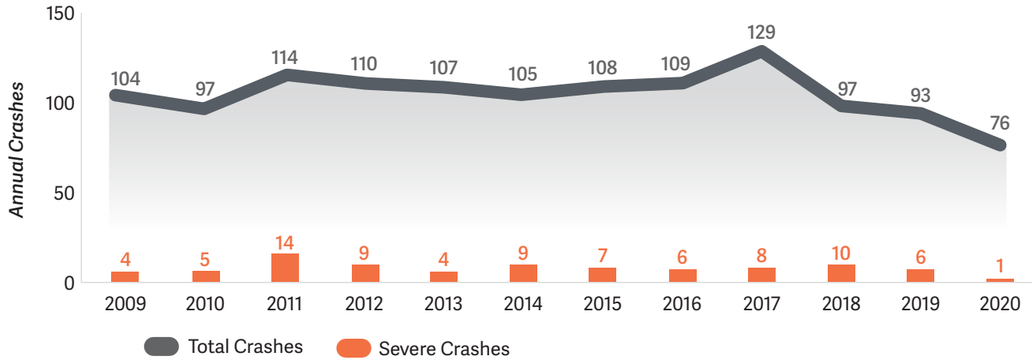
CRASHES INVOLVING A PERSON BICYCLING



People Traveling Under the Influence of Alcohol or Drugs

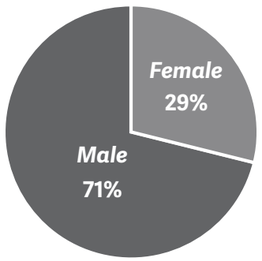
People traveling under the influence continues to be a challenge due to the severity of the crashes. Since 2009, the annual number of crashes involving a person suspected of or charged with a DUI has remained steady, with the exception of 2020. **During the last three years (2018-2020), crashes involving impaired road users were 5% of the total crashes (about 89 crashes per year), however they were involved in 11% of total severe crashes (about six per year).** Generally, total crashes involving impaired road users have decreased since 2017.

CRASHES INVOLVING AN IMPAIRED ROAD USER

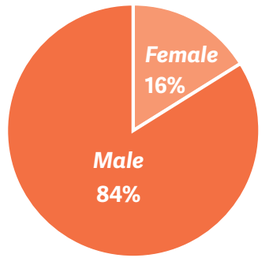


IMPAIRED CRASHES BY IMPAIRED ROAD USER'S GENDER (2018-2020)

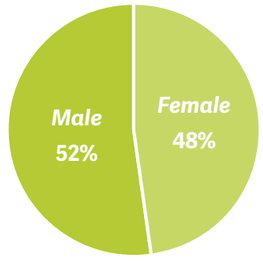
Impaired Crashes



Severe Impaired Crashes



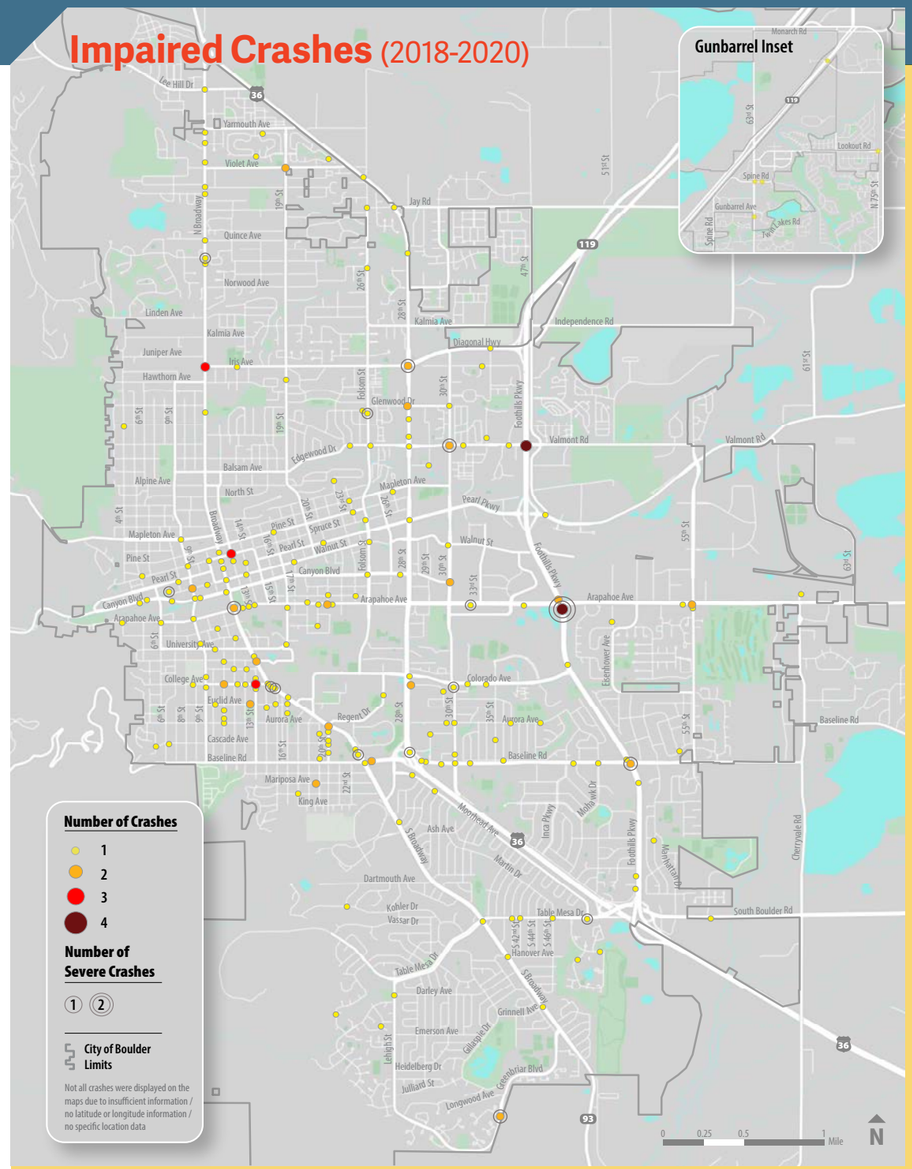
Boulder Population (age 15+ years)



Source: ACS 5-year (2015-2019)

Male road users are significantly more likely to be involved in impaired crashes.

Impaired Crashes (2018-2020)



Locations with the highest number of impaired crashes:

- Foothills Pkwy. & Arapahoe Ave.: six crashes (two severe)
- Foothills Pkwy. & Valmont Rd.: four crashes

The 2018-2020 data showed about 38% fewer impaired crashes in the Downtown area compared to 2015-2017 data.

Key approaches to reduce impaired crashes include:

- Education for all road users
- Enforcement
- Special programs with Uber and Lyft to encourage a safe ride home

Between 2018 and 2020, impaired crashes involved:

- **66%** alcohol only
- **11%** drugs only
- **11%** alcohol and drugs
- **5%** unknown impaired conditions

57% road user under the age of 30

24% road user between ages 30 and 49

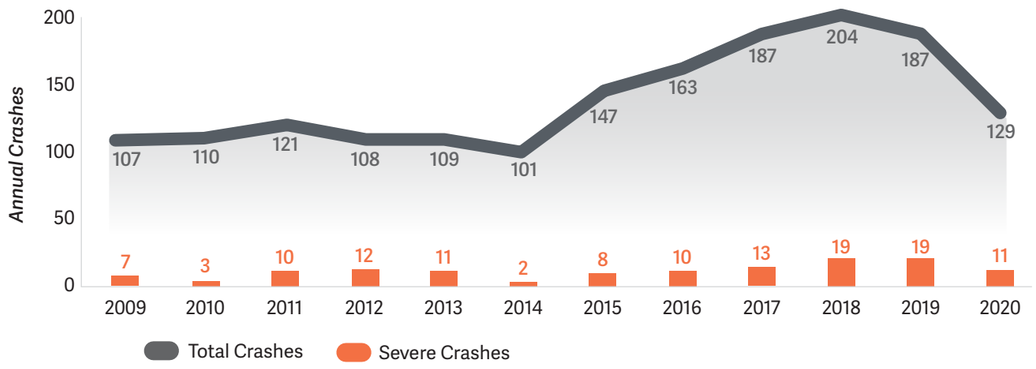
Note that the specific type of drugs involved in each crash was not readily available for this analysis, and more detailed tracking on crash reports of types of drugs involved (such as marijuana) is currently being explored.

People Speeding

The number of speeding crashes increased between 2015 and 2018. 2018 and 2019 had the highest number of severe speeding crashes since 2009. **During the last three years (2018-2020), crashes involving speeding were 9% of the total crashes (about 173 per year) and 32% of total severe crashes (about 16 per year).**

Between 2018 and 2020, one out of every three severe crashes involved speeding.

CRASHES INVOLVING A PERSON SPEEDING (2009-2020)



A crash is identified as a speeding crash if the officer records driver actions as "exceeded safe or posted speed" (and road condition was "dry") or "estimated travel speed was greater than the posted speed limit."

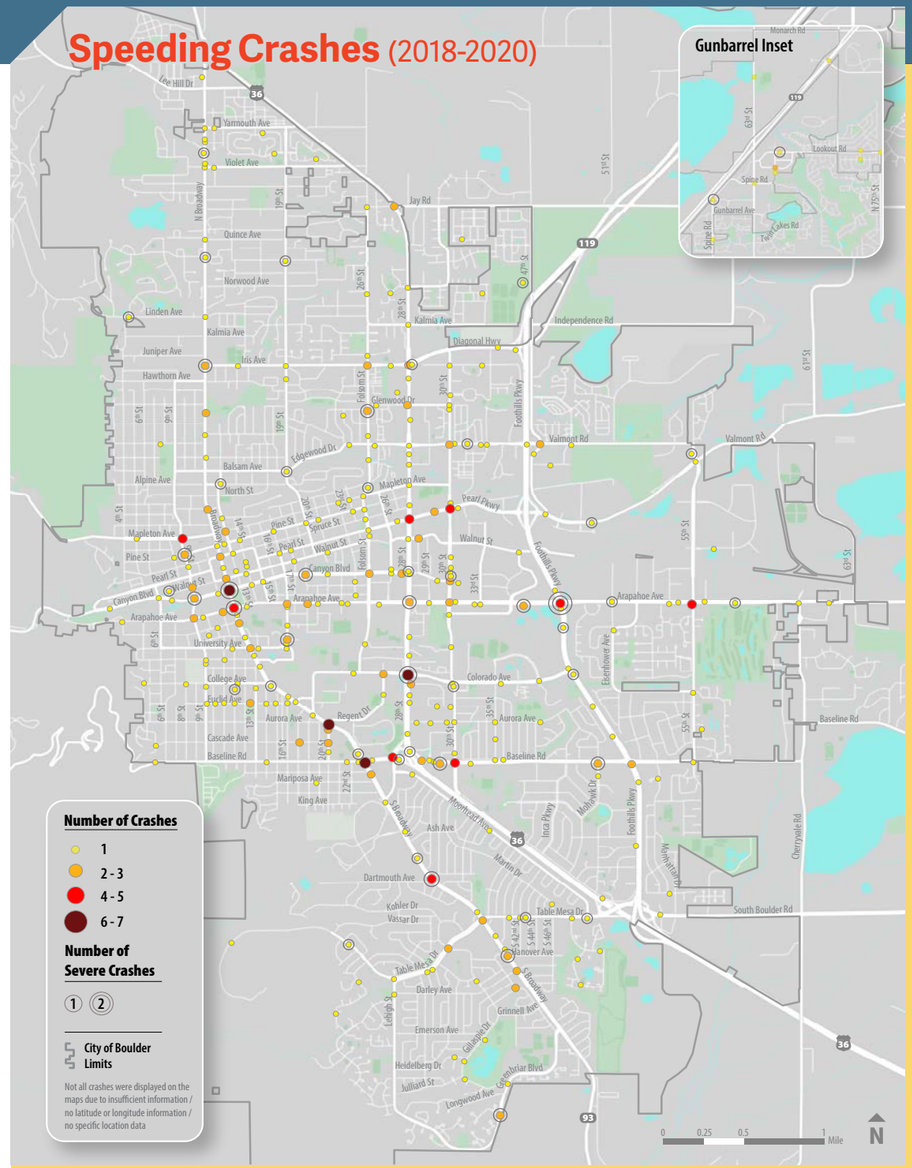
Roughly **one in ten** pedestrians survive a collision with a vehicle traveling at 40 mph, versus **five in ten** at 30 mph, and **nine in ten** at 20 mph.

"20 IS PLENTY" SPEED LIMITS

Speeding was identified as one of the top causes of severe traffic crashes in Boulder in the Safe Streets Report, 3rd Edition 2019 and implementing a 20 mph speed limit for local residential streets was a key action in the city's *2019 Transportation Master Plan* and *Vision Zero Action Plan*. In 2020, the City of Boulder lowered the default speed limit – or the legal speed where no signs are posted – from 25 mph to 20 mph. The speed limit on all residential streets was also lowered to 20 mph. Residential streets make up 70% of all streets in Boulder. The city is currently evaluating the effectiveness of the program with the results of the evaluation planned to be presented in 2022. Boulder's Vision Zero 20 mph sign was designed by Transportation staff to increase visibility by using a larger size and bright colors to highlight the City's commitment to the Vision Zero goal.

More than 400 speed limit and city gateway signs were updated in 2020 as part of this effort.

Speeding Crashes (2018-2020)



Locations with the highest number of speeding-related crashes:

- Broadway & Regent Dr.: seven crashes
- Broadway & Baseline Rd.: six crashes
- Broadway & Canyon Blvd.: six crashes (one severe)
- 28th St. & Colorado Ave.: six crashes (one severe)

Broadway continues to experience the highest number of speeding-related crashes. Other high crash corridors include Arapahoe Ave. and 28th St.

Key approaches to reduce speeding include:

- Installing traffic calming treatments through the Neighborhood Speed Management Program (NSMP) and the Vision Zero Innovation Program (VZIP)
- Lowering speed limits on residential streets
- Reviewing speed limit setting and signing practices
- Piloting Shared Streets
- Deploying photo radar vans, where allowed by state law, to conduct enforcement
- Installing dynamic speed feedback signs at key locations

Ages 20-25

People ages 20 to 25 years old were at fault in 33% of severe speeding crashes between 2018 and 2020.

78%

of speeding travelers involved in severe crashes were males.

People Making Left Turns

During the last three years (2018-2020), crashes involving left turns were 16% of the total crashes (about 306 per year) and 34% of total severe crashes (about 17 per year). This is an increase from 11% of total crashes and 30% of severe crashes during the 2015 and 2017 time period.

51 **severe crashes involving a left-turn movement** (2018-2020)**:**

25 **involved vehicles making a permitted left turn at intersections with a traffic signal**

6 walking | *5 on a bike* | *13 in a car* | *1 on a motorcycle*

24 **occurred at intersections and driveways without a traffic signal**

0 walking | *14 on a bike* | *10 in a car* | *0 on a motorcycle*

2 **occurred when a vehicle ran a red light at a signalized intersection with a protected left turn**

While progress has been made at reducing left-turn crashes at signalized intersections, there has been an increase in left-turn crashes at unsignalized intersections and driveways since 2017.

WHAT ARE THE DIFFERENT TYPES OF LEFT-TURN PHASING?

- **Protected:** you turn left while opposing traffic is stopped
- **Permitted:** you turn left when there is a gap in opposing traffic (vehicles, cyclists, pedestrians)

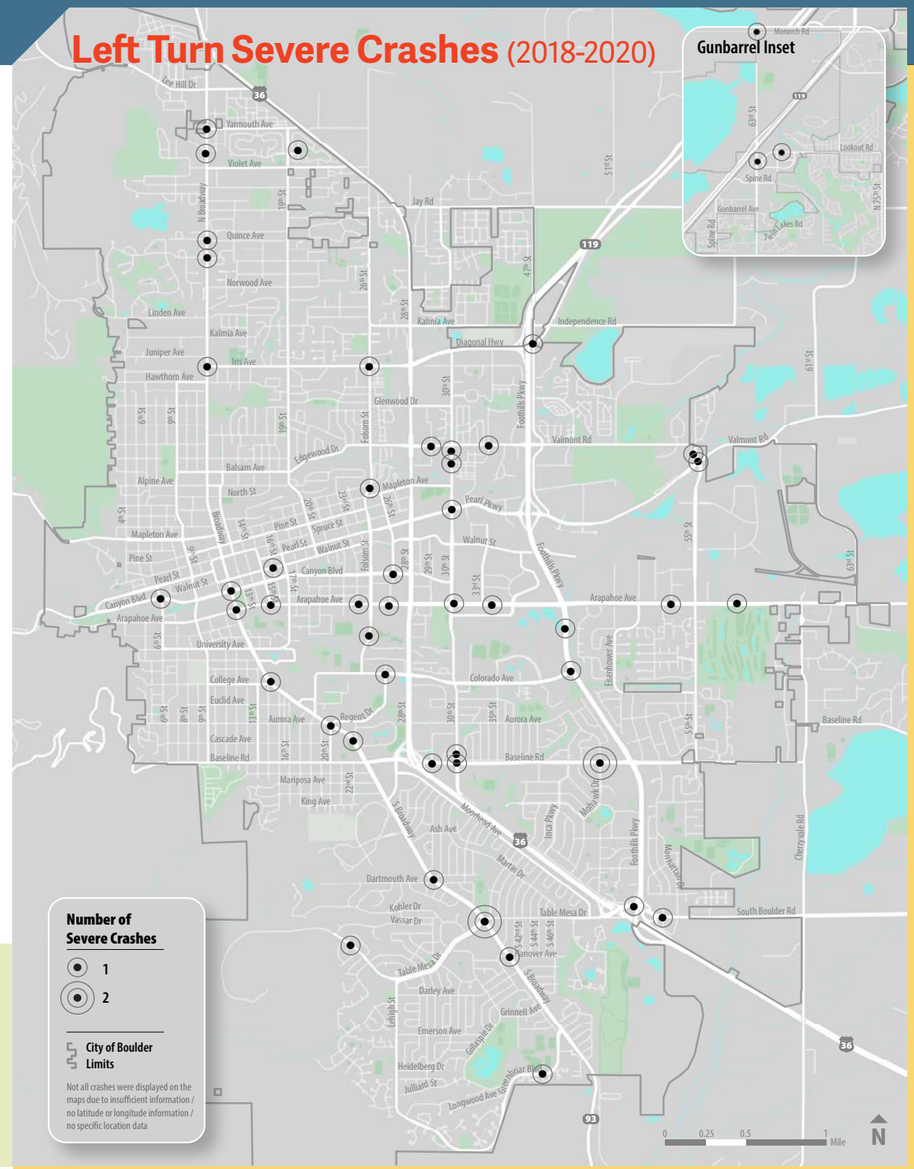
In some cases the City uses a combination of protected and permitted operations at the same signal, and sometimes the signal phasing varies by time of day to accommodate varying levels of usage.

Why Do We Use a Flashing Yellow Arrow (FYA)?

Research has shown that a Flashing Yellow Arrow is safer than a green ball due to its color (yellow = caution!) and due to the flashing movement, which catches the eye and the attention of motorists. The FYA is now the federal standard and is generally preferred over the use of a green ball to indicate permitted left-turn movements.

The city typically uses protected phasing under certain geometric conditions (e.g., limited sight distance) or if there is already a crash trend at a particular intersection. The city also uses protected-only phasing proactively to reduce potential crashes in instances where there are high volumes of bicyclists and/or pedestrians or higher speed vehicles regularly using the intersection.

Left Turn Severe Crashes (2018-2020)



Locations with the highest number of left-turn severe crashes:

- Baseline Rd. & Mohawk Dr.: (two severe)
- S. Broadway & Table Mesa Dr.: (two severe)

Key approaches to reduce left-turn crashes include:

- Using a Flashing Yellow Arrow instead of a green ball
- Adding a protected left-turn phase in addition to permitted left-turn phasing
- Using protected left-turn signal phasing
- Posting signs to reinforce driver left-turn yielding to pedestrians and bicyclists
- Using raised crossings and hardened centerlines to slow turning vehicles

LEFT-TURN PHASING CHANGES HAVE BEEN IMPLEMENTED AT 25 INTERSECTIONS SINCE 2018

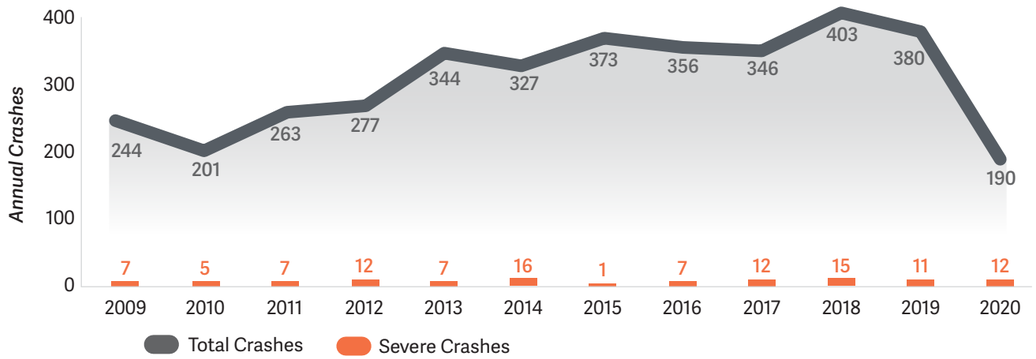
- The intersections are primarily located along arterial corridors, including 28th St., 30th St., Arapahoe Ave., Broadway, Canyon Blvd., Foothills Pkwy., and Pearl Pkwy.
- The locations were determined using both reactive (crash-based) and proactive (areas with higher risk) prioritization criteria.

Preliminary evaluation showed an 87% reduction in crashes

People Ages 65 and Older

Between 2018 to 2020, people ages 65 years and older were involved in 17% of total crashes (about 324 per year) and 25% (about 13 per year) of severe crashes. This is a significant change from the *Safe Streets Report, 3rd Edition 2019*. Severe crashes involving people ages 65 years and older were overrepresented as compared to the total crashes and the number of crashes involving people of that age is also overrepresented when compared to Boulder's population.

CRASHES INVOLVING A PERSON AGE 65 YEARS AND OLDER



Since 2010, crashes involving an older adult have increased by 89%, while the older adult population has increased by 35% between 2010 and 2019.

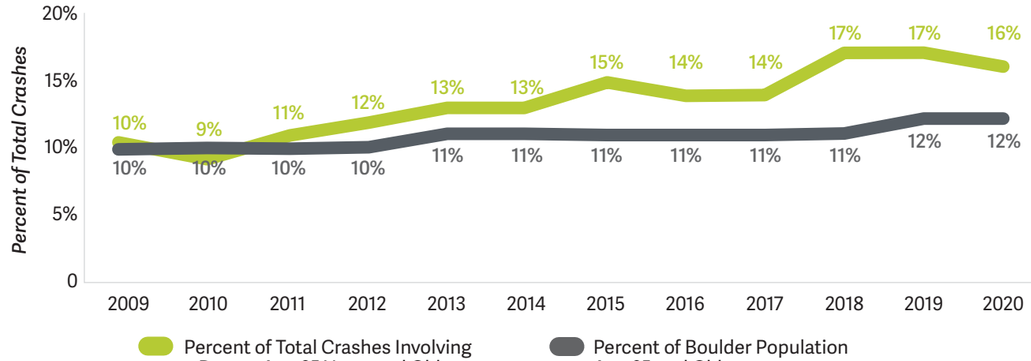
Of the 973 crashes involving people ages 65 and older (between 2018 and 2020):

54% of people ages 65 and older were at-fault (in most cases driving)

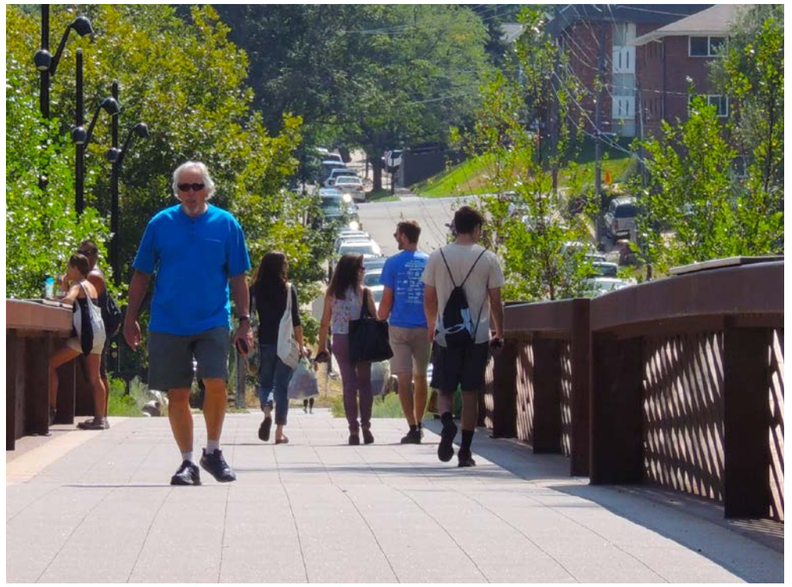
3% of people ages 65 and older were walking or biking

Between 2018 and 2020, people ages 65 and older accounted for 12% of Boulder's population and were involved in 17% of crashes.

CRASHES INVOLVING A PERSON AGE 65 YEARS AND OLDER COMPARED TO BOULDER POPULATION



Source: ACS 5-year (2015-2019)



"Boulder County is experiencing an unprecedented change in its population: the proportion of older adult residents (people age 60 and older) is greater and growing faster than ever before. Between 2020 and 2050, the county's overall population increase is projected to be 33%. Compare that against the older adult population increase of 58% and the 80+ population increase of 244%. We are getting older."

Source: *Aging in Boulder County Past, Present, Future Report*, September 2019

Other Areas of Concern

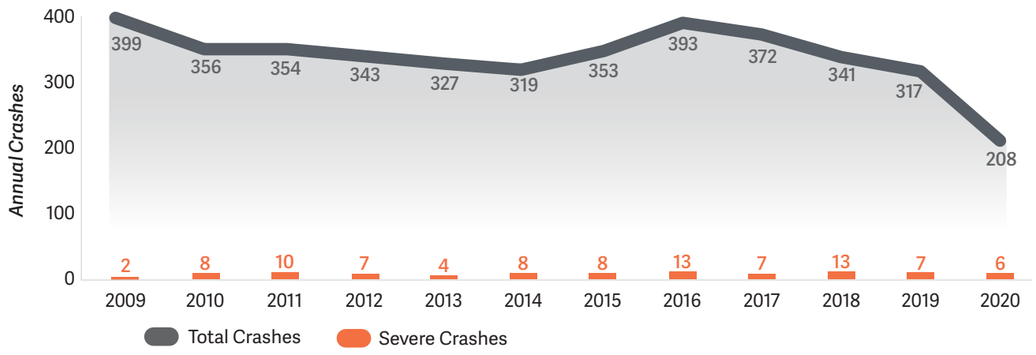
Other areas of concern include crashes involving:

- People ages 15 to 19
- People ages 20 to 29
- Distracted Road Users
- People Riding Motorcycles

People Ages 15 to 19

Between 2018 and 2020, **people ages 15 to 19 years old were involved in 15% of total crashes (about 289 per year) and 17% of severe crashes (about nine per year).** According to the U.S. Census, people ages 15 to 19 account for 12% of the Boulder population.

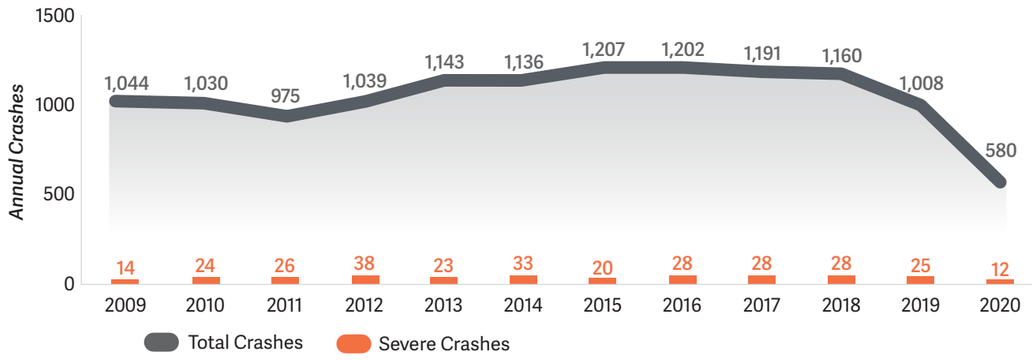
CRASHES INVOLVING A PERSON AGE 15-19



People Ages 20 to 29

Between 2018 and 2020, **people ages 20 to 29 years old were involved in 48% of total crashes (about 916 per year) and 43% of severe crashes (about 22 per year).** According to the 2019 U.S. Census, people ages 20 to 29 account for 31% of the Boulder population. The number of crashes involving people of this age group has decreased since 2017, yet the proportion of severe crashes has remained the same. This decrease was most notable in when many students in this age group were not attending school on campus during 2020 due to the COVID-19 pandemic.

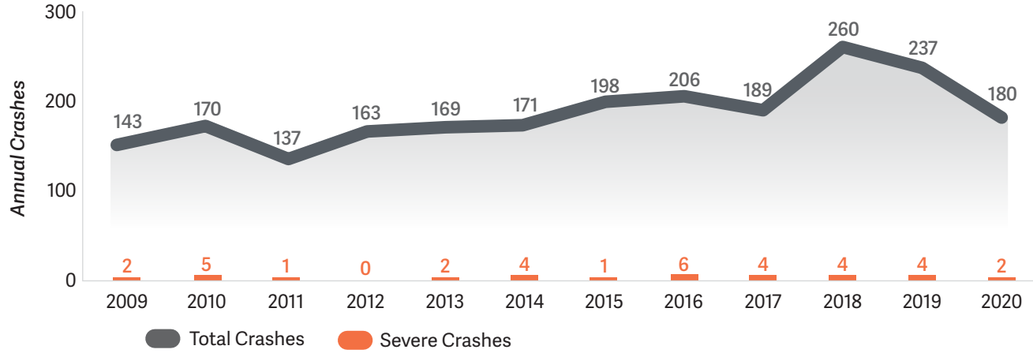
CRASHES INVOLVING A PERSON AGE 20-29



Distracted Road Users

Between 2018 and 2020, **distracted road users were involved in 12% of total crashes (about 226 per year) and 7% of severe crashes (about three per year)**. The number of total distracted crashes increased as compared to 2015 to 2017.

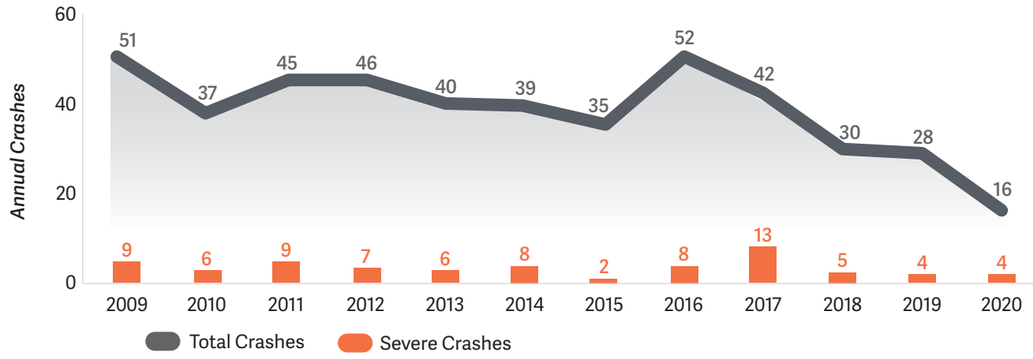
CRASHES INVOLVING A DISTRACTED ROAD USER



People Riding Motorcycles

Although motorcyclists were involved in only 1% of all crashes (about 25 per year) from 2018 to 2020, they were involved in 9% of all severe crashes (about four per year). Overall, motorcycle crashes between 2018 and 2020 decreased in both total and severe crashes since the last analysis years (2015-2017).

CRASHES INVOLVING A PERSON RIDING A MOTORCYCLE



Other Vision Zero Objectives

In addition to eliminating crashes resulting in serious injuries and fatalities and reducing other types of crashes, there are three other Vision Zero objectives.

Improve Travel Comfort and Security

Although Boulder already has a well-developed network of facilities for people walking and bicycling relative to many U.S. cities, it is important to recognize that even one small "high-stress" location can change a person's choice of routes or could deter them from choosing to walk or bicycle at all, especially if children are involved.

Feeling secure plays a role in how people choose to travel. The city's ***Low-Stress Walk and Bike Network Plan*** identifies stressful walking and bicycling conditions and provides recommendations for specific types of facilities, programs, and routes that would help to improve people's comfort levels when getting around Boulder. For instance, this could be adding sidewalks and bicycle lanes to fill in gaps in the existing network or adding lighting to multi-use paths to increase safety.

Enhance Awareness of and Community Engagement with Vision Zero

Prioritizing and growing a robust Vision Zero program requires ongoing monitoring and continuous refinement to city processes, strategic partnerships, community engagement, and resource investment.

It means enhancing social media engagement and strengthening relationships with local and regional community organizations and other municipalities and agencies so that we are integrated and strategic in sharing our best practices and messaging around Vision Zero. Committing to Vision Zero means dedicating resources to improve travel safety and ensuring the program continues to grow in terms of community understanding and adoption.

Improve Data and Be Transparent

The city collects and analyzes data to understand the transportation system and support a data-driven approach to addressing crash trends. By providing clear, straightforward data in a timely manner, community members will understand how and where crashes occur and how to prevent them from happening. City staff is currently transitioning the Transportation & Mobility Department's crash database to include the state's new crash report form (DR3447), which expands the ability to analyze crash data and develop proven crash countermeasures. Good data also allows us to accurately convey information and trends to the public and helps us brief community leaders about the progress we've made and the challenges that still need to be tackled.

Next Steps

The information contained in the ***Safe Streets Report, 4th Edition 2022*** sets the foundation for important and continued safety work. It will guide and inform an update to the ***Vision Zero Action Plan***, which will provide a revised and refocused to-do list of actions within the four E's of engineering, education, enforcement, and evaluation that can be completed in the next few years to work towards achieving the Vision Zero goals. The action plan update will include more in-depth crash analyses to identify the tools best suited to mitigate current crash trends at intersections and along segments. These countermeasures will be prioritized through a racial equity framework. Performance metrics will be revised to enhance our ability to measure progress.

One of the goals of the updated *Vision Zero Action Plan* is to provide a more specific, actionable framework that will seamlessly integrate into other interdepartmental work. The revised action plan will also aim to:

- **Develop and apply an equity index** to assess crash trends within the city relative to social and economic factors, health factors, land use patterns, etc.
- **Quantify, categorize, and prioritize improvements** expected to be most impactful at achieving Vision Zero objectives, particularly in the areas of reducing both severe and total crashes, which have been previously identified as top priorities.
- **Estimate the costs** and be transparent about the budget needs associated with both the implementation and ongoing long-term maintenance of planned or previously installed Vision Zero projects.
- **Refine performance metrics** to more consistently and transparently track and report on progress.

The updated action plan will be completed throughout 2022.

VISIONZERO

Safe Streets Boulder

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