



MID-OHIO REGIONAL
MORPC
PLANNING COMMISSION

Active Transportation Plan 2020-2050

Technical Memo

Walking and Bicycling Safety

INTRODUCTION

The 2020 – 2050 Active Transportation Plan (ATP) advances the regional priorities of the Metropolitan Transportation Plan and helps communities within the Metropolitan Planning Organization area plan for and implement projects that include pedestrian, bicycle, and transit accommodations – or complete streets – on the region's road network. Complete streets ensure all users, regardless of mode of travel, have a safer and more comfortable way to reach their destination.

With extensive data analysis and contribution from Central Ohio communities, residents, and stakeholders, the ATP explores the current environment for walking and bicycling in the Metropolitan Planning Organization area and provides resources to guide the region toward a complete, connected low-stress active transportation network.

This technical memo provides an overview of the safety trends for people walking and bicycling in Central Ohio. The data used for the analyses included in this memo include all crashes reported as involving people walking or bicycling within the Metropolitan Planning Organization (MPO) boundary from 2015 to 2019. This data was provided by the Ohio Department of Transportation (ODOT).

CRASHES INVOLVING PEOPLE WALKING AND BIKING

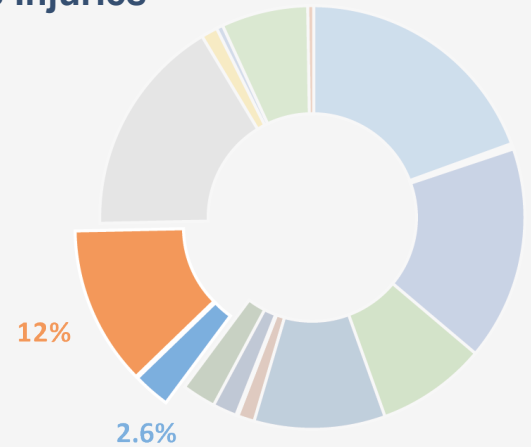
During the time period from 2015-2019, more than 200,000 crashes occurred within the MPO. Crashes involving people walking and bicycling specifically accounted for relatively few of those crashes – approximately 2 percent. However, **those people who were struck while walking and bicycling accounted for nearly 15% of all serious injuries and more than 20 percent of all fatalities** during this time period.



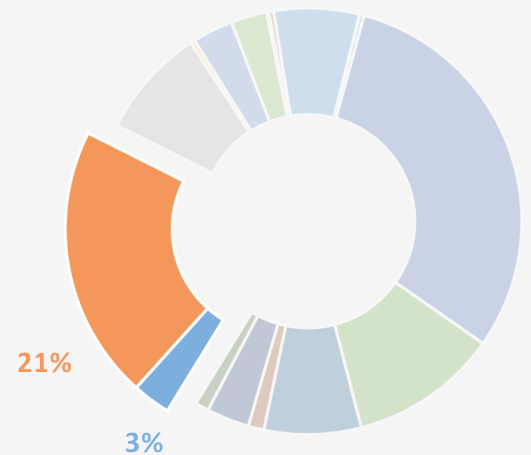
This data indicates that people walking are more significantly impacted than any other user on our roadways, with an overall rate of fatal and serious injury during this time period of 21%.

A serious injury is defined as an incapacitating or life-altering injury resulting from a crash

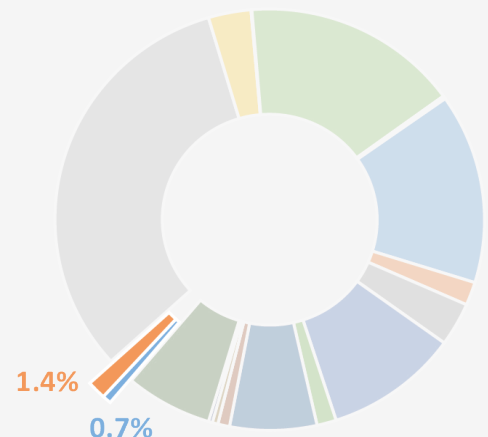
Serious Injuries



Fatalities



Crashes



CRASH TRENDS OVER TIME

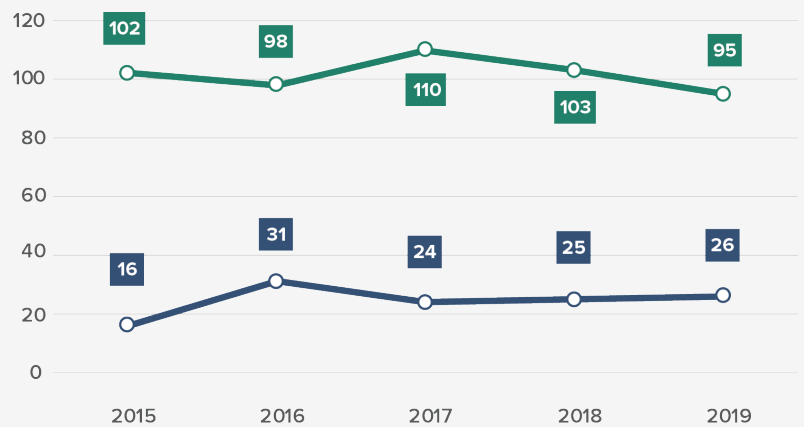
The trend from year to year during this time period indicates that the region is not meeting its goal related to safety for people walking and bicycling. The number of fatalities and serious injuries varies slightly from year to year but have either remained steady or increased over time.



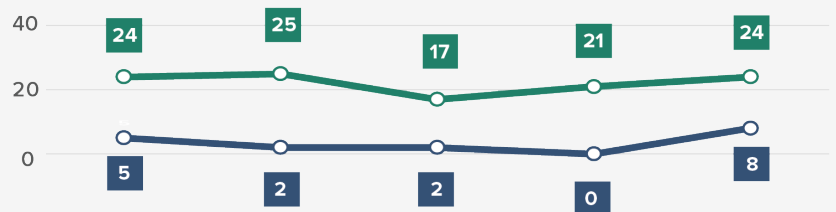
Between 2015-2019:

- There were **2,912 total crashes** involving people walking, and **1,376 total crashes** involving people bicycling.
- There were **508 people seriously injured** while walking, and **111 people seriously injured** while bicycling.
- There were **122 people killed** while walking, and **17 people killed** while bicycling.

Crashes involving People Walking

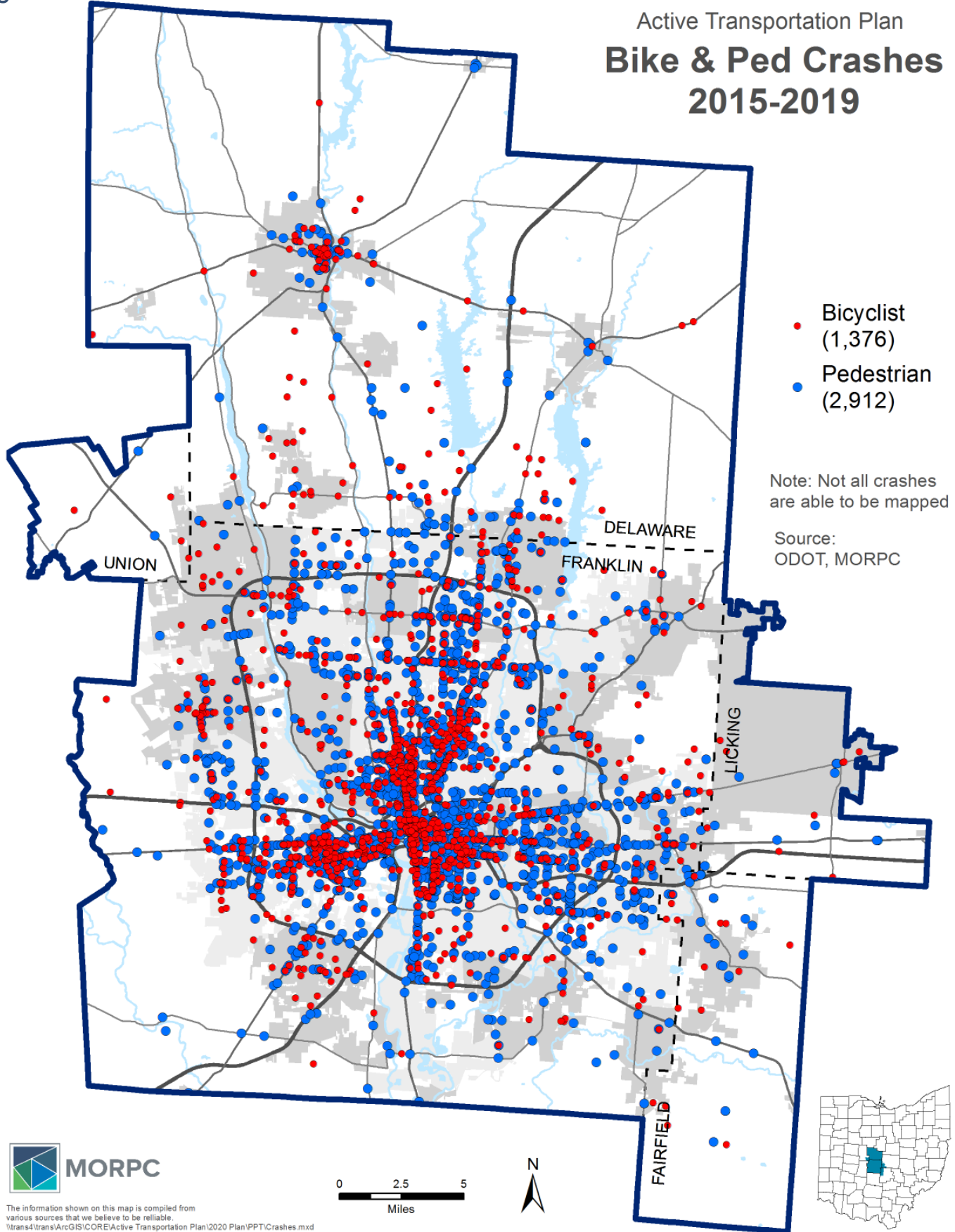


Crashes involving People Bicycling



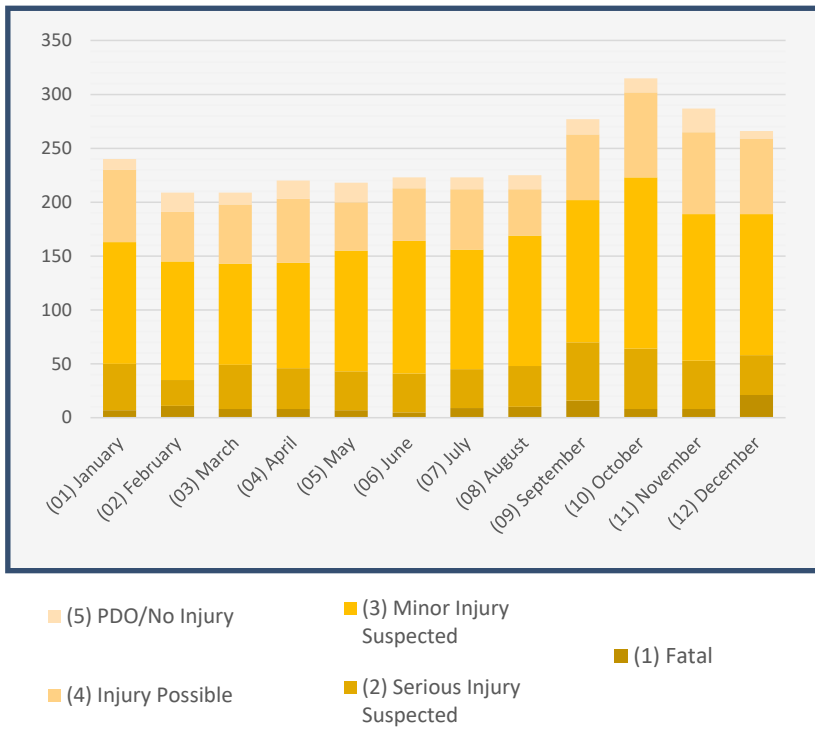
The map in Figure A on the following page illustrates how these crashes occur throughout the MPO, but many are concentrated in locations with higher density and more walking and bicycling activity.

Figure A.



CRASHES BY MONTH OF YEAR

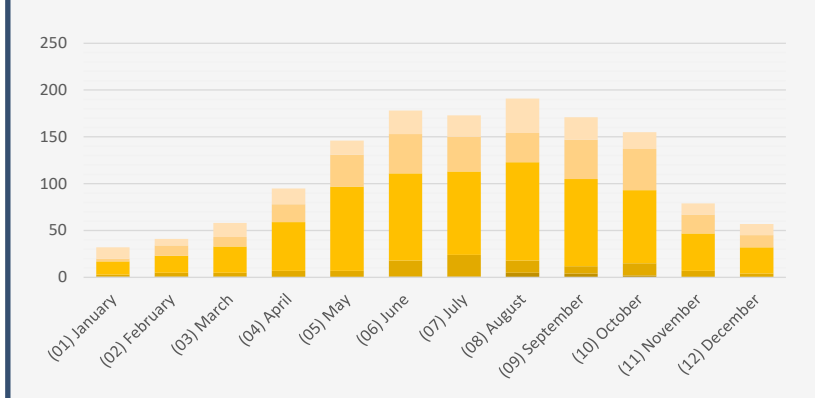
Crashes involving People Walking



Crashes involving people walking were more common during the fall and winter months of September, October, November, December, and January.

The highest number of fatal crashes occurred in December (21 total over the 5-year time period) and the highest number of serious injury crashes occurred in October (56 total).

Crashes involving People Bicycling



Crashes involving people bicycling were more common during the summer and Fall months of May, June, July, August, September and into October.

The highest number of fatal crashes occurred in August (5 total) and the highest number of serious injury crashes occurred in July (23 total).

CRASHES BY TIME OF DAY

Crashes involving People Walking

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Total
JAN	8	7	3	1		1	14	16	12	4	8	10	7	7	15	16	8	13	32	19	16	10	10	3	240
FEB	7	5	6	1	2	1	9	5	10	8	5	6	8	6	11	9	13	16	20	19	15	12	7	8	209
MAR	8	1	5	2	1	1	4	16	9	9	6	5	6	7	12	12	16	8	9	20	25	16	7	4	209
APR	7	6	5	2	2	1	12	5	12	6	11	6	9	8	9	14	18	20	11	15	11	16	5	9	220
MAY	3	5	3	3	2	1	2	7	8	3	6	8	13	16	14	15	19	19	13	14	6	17	14	7	218
JUN	3	5	7	3	2	2		5	14	3	4	9	8	12	12	12	19	23	24	12	5	15	16	8	223
JUL	7	2	6	1	1	4	1	5	9	4	8	12	10	16	8	12	22	14	14	10	12	12	16	17	223
AUG	9	5	5	3	4	1	5	4	15	4	7	6	14	8	12	12	21	20	20	5	6	21	8	10	225
SEP	8	5	3	1	1	4	10	5	16	19	15	8	12	9	21	20	19	21	13	16	25	10	15	11	277
OCT	5	4	3	4	2	1	20	19	12	15	15	5	8	10	14	16	24	21	18	35	27	20	9	8	315
NOV	5	5	6			4	12	11	13	7	5	10	7	7	14	14	27	35	31	20	22	14	10	8	287
DEC	6	6	10	3	2	2	11	14	10	9	5	8	13	14	10	13	14	33	37	15	4	12	4	11	266
Total	76	56	62	24	19	23	100	112	140	81	95	93	115	120	152	165	220	243	242	200	174	175	121	104	2912

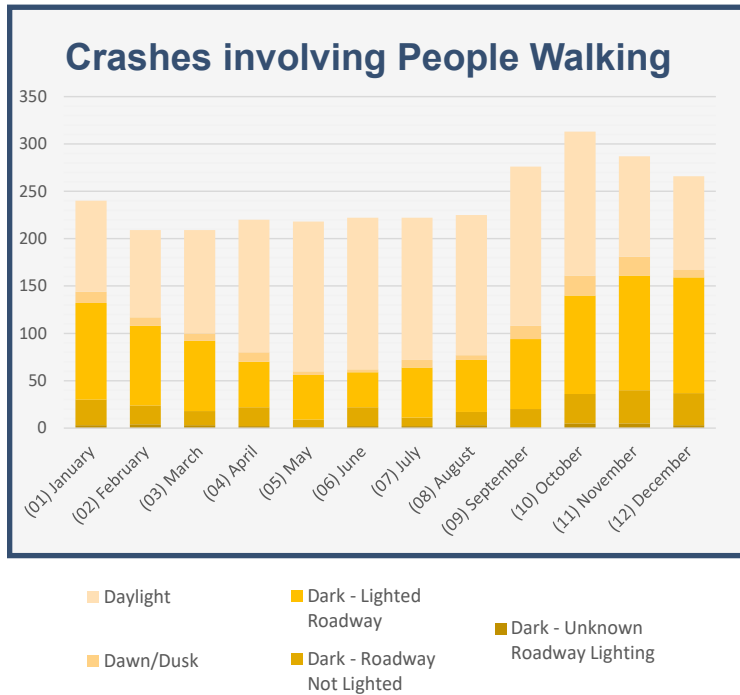
Crashes involving people walking were most common during the afternoon commute period, but remained high during the time of year and hours of the day that are darkest

Crashes involving People Bicycling

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Total
JAN		1				2	1	3	1	3	3				1	1		4	1	2	4	3	1	1	32
FEB	2						2	2	1	2	1	2	3	3	1	6	6	4	3	2				1	41
MAR						1	3	2		2	1		2	3	4	5	7	5	9	4	4	2	1	3	58
APR	3		2	1			2	1	1	3	1	6	6	8	6	6	17	10	6	6	4	4	2		95
MAY	2		2	1			1	1	6	3	6	6	8	4	9	9	12	15	18	15	14	7	5	2	146
JUN	4		6		1	1	4	5	2	3	4	4	6	11	22	10	13	21	15	13	21	6	4	2	178
JUL	3	1	3		1	1	1	3	8	5	3	8	10	8	21	18	11	16	7	14	8	12	6	5	173
AUG	4	2	5	2	2	2	2	8	7	6	4	6	10	11	15	18	11	23	11	10	12	12	4	4	191
SEP	1		1	1		1	4	6	5	7	1	6	6	13	12	22	18	15	16	13	11	5	5	2	171
OCT	5	1		1	1		3	7	5	6	4	4	6	7	9	9	16	25	13	17	6	6	1	3	155
NOV	1	2	1					4	2		2	5	5	3	5	4	9	9	14	6	2	2	1	2	79
DEC			1			1	4	3		2	2	4	1	4	4	7	1	11	6	2	2	1		1	57
Total	25	7	21	6	5	9	25	46	38	40	34	46	63	74	111	114	114	162	124	106	89	58	32	27	1376

Crashes involving people bicycling were most common during the afternoon commute period, but were generally highest in the afternoon to evening hours throughout summer into fall.

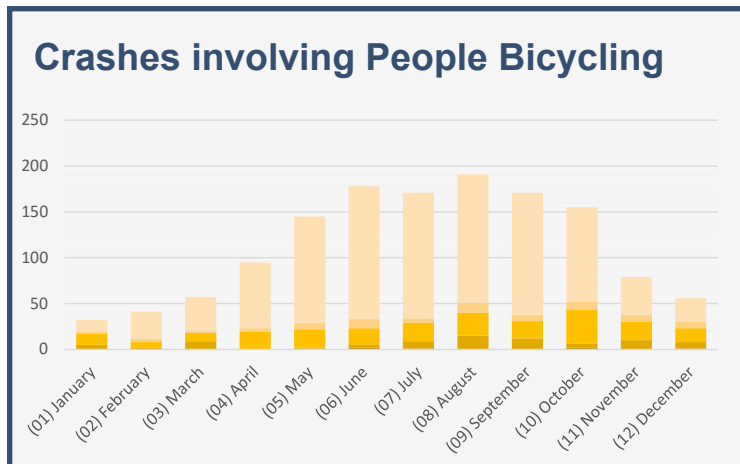
CRASHES BY LIGHTING CONDITIONS



Crashes involving people walking

were slightly more common during daylight hours (approximately **54%** of all crashes), but as we noted earlier, there were many more after dark during the winter months.

- Approximately **32%** of crashes occurred after dark on roadways that were noted as having some form of lighting.
- Fatal and serious crashes, however, were slightly more common after dark, with crashes during daylight hours only representing about **40%**.



Crashes involving people bicycling

were most common during daylight hours (approximately **72%** of all crashes).

- Approximately **16%** of crashes occurred after dark on roadways that were noted as having some form of lighting.
- A similar pattern was present in fatal and serious crashes, with around **60%** of crashes occurring during daylight hours.

ROADWAY CHARACTERISTICS

The design of our roadways can have a significant impact on the severity of the crashes that occur. This can include characteristics such as the number of travel lanes, the overall width of the road, as well as the speed limit the road is designed to accommodate.

The roadway network in the MPO primarily consists of arterial, collector, and local roadways, as well as the limited access freeway network. Excluding freeways from the analysis, local roadways comprise the largest percentage, (more than 60 percent), of total roadway miles in the MPO. Local roadways are the roadways that make up the street network within our communities and provide access to homes and neighborhoods. These are generally lower speed, lower volume, and narrower streets where there is also an expectation of seeing more people walking and bicycling.

Arterial roadways, on the other hand, comprise less than 20 percent of the total roadway miles in the MPO. These are the larger roadways that connect to major destinations and are generally higher speed with higher traffic volumes. There is also less of an expectation to see people walking and bicycling on these roadways. However, the majority of fatalities and serious injuries involving people walking and bicycling in Central Ohio have occurred on arterial roadways. Those fatalities and serious injuries are distributed across different types of arterials, but primarily occur on 4-lane arterials.

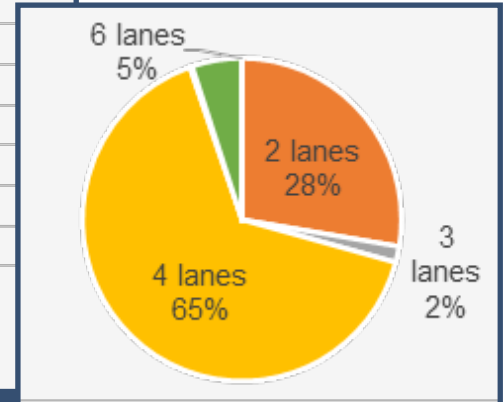
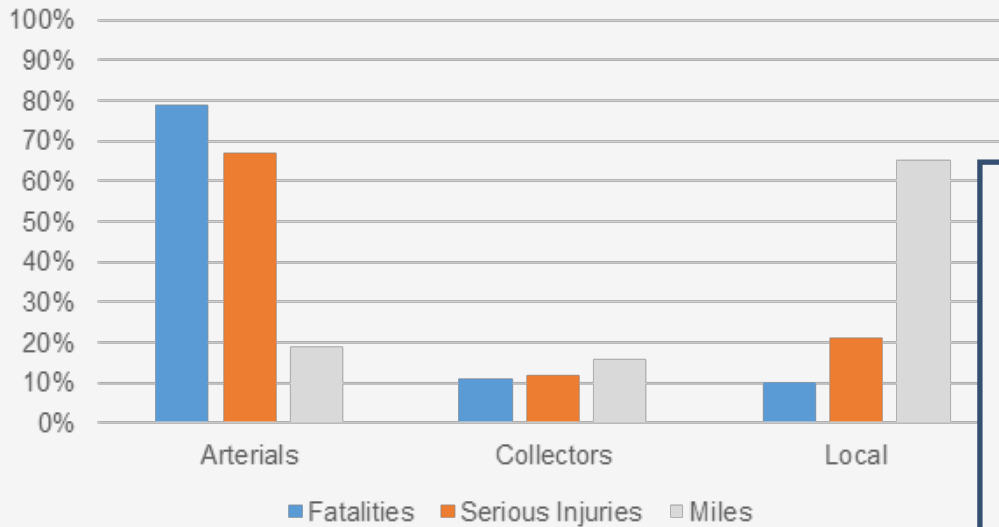


Local roads like this one in New Albany see lower vehicle speeds and volumes, making walking or bicycling on them feel safe for many bicyclists.



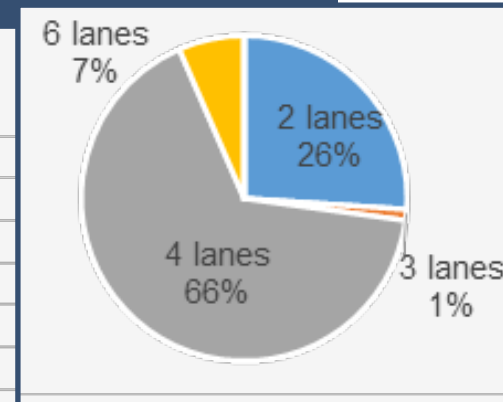
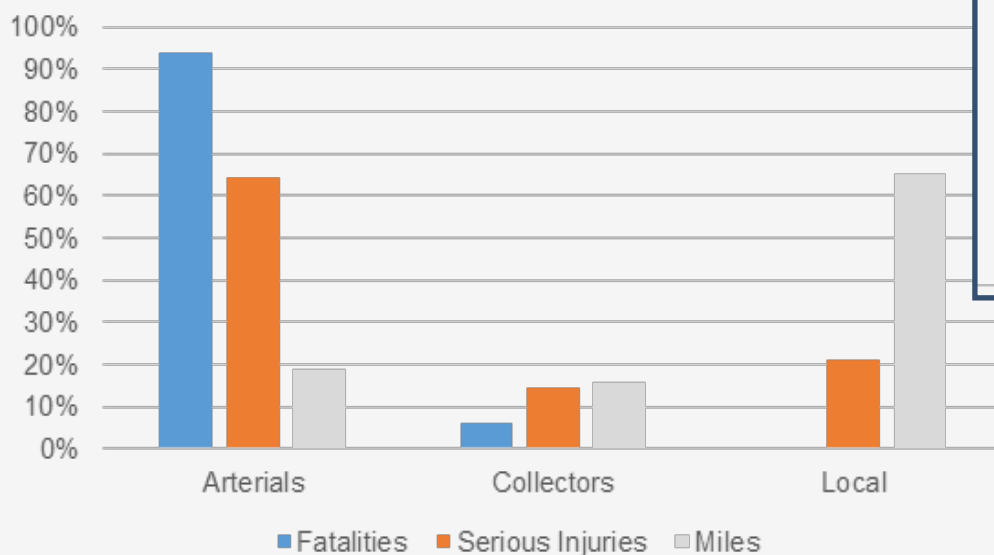
In contrast, arterial roads like this one see high traffic volumes and high vehicle speeds due to their wide, large-setback designs. This deters most bicyclists from riding on them, and endangers those who do.

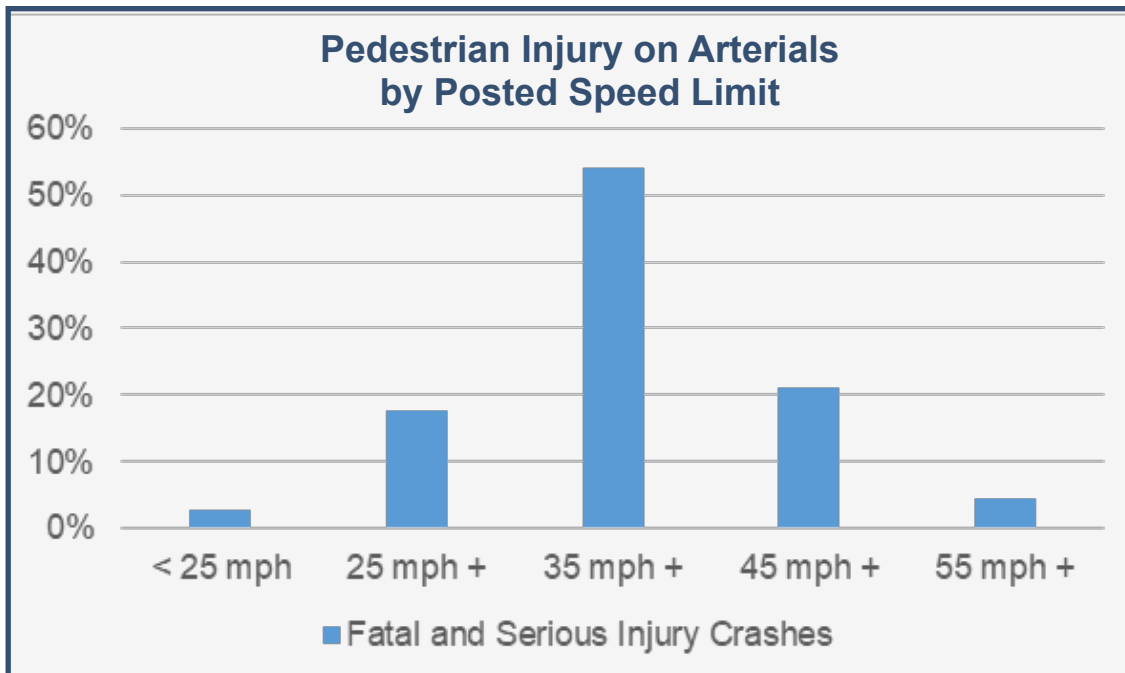
Pedestrians Injury by Roadway Classification



This is an important factor to understand, as arterial roads provide the connections to so many destinations for Central Ohio's residents. For people who do not have access to a vehicle, are unable to travel by car, or choose not to travel by car, getting to these destinations can be a challenging and dangerous experience. These roadways also are often major barriers within communities that residents must cross to get to and from their homes.

Bicyclist Injury by Roadway Classification





Another important factor in the severity of crashes is speed. An assessment of the posted speed limits on the arterials where the fatalities and serious injuries occurred indicated that arterials with posted speed limits of 35 mph pose the most significant threat to people walking and bicycling in Central Ohio.

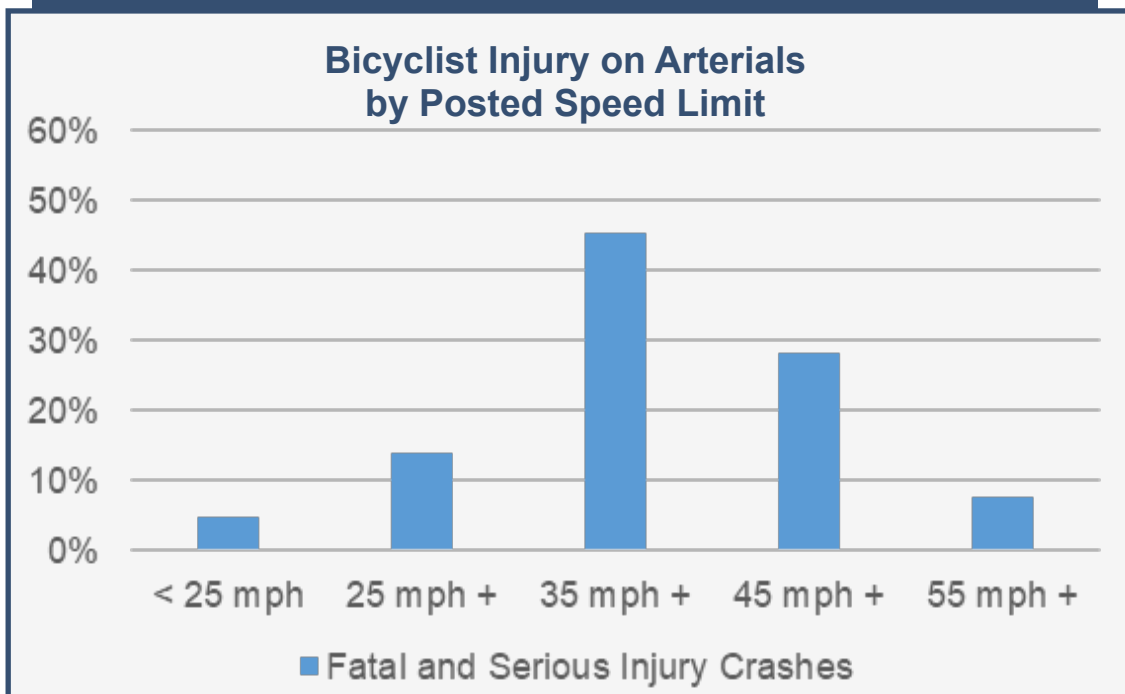
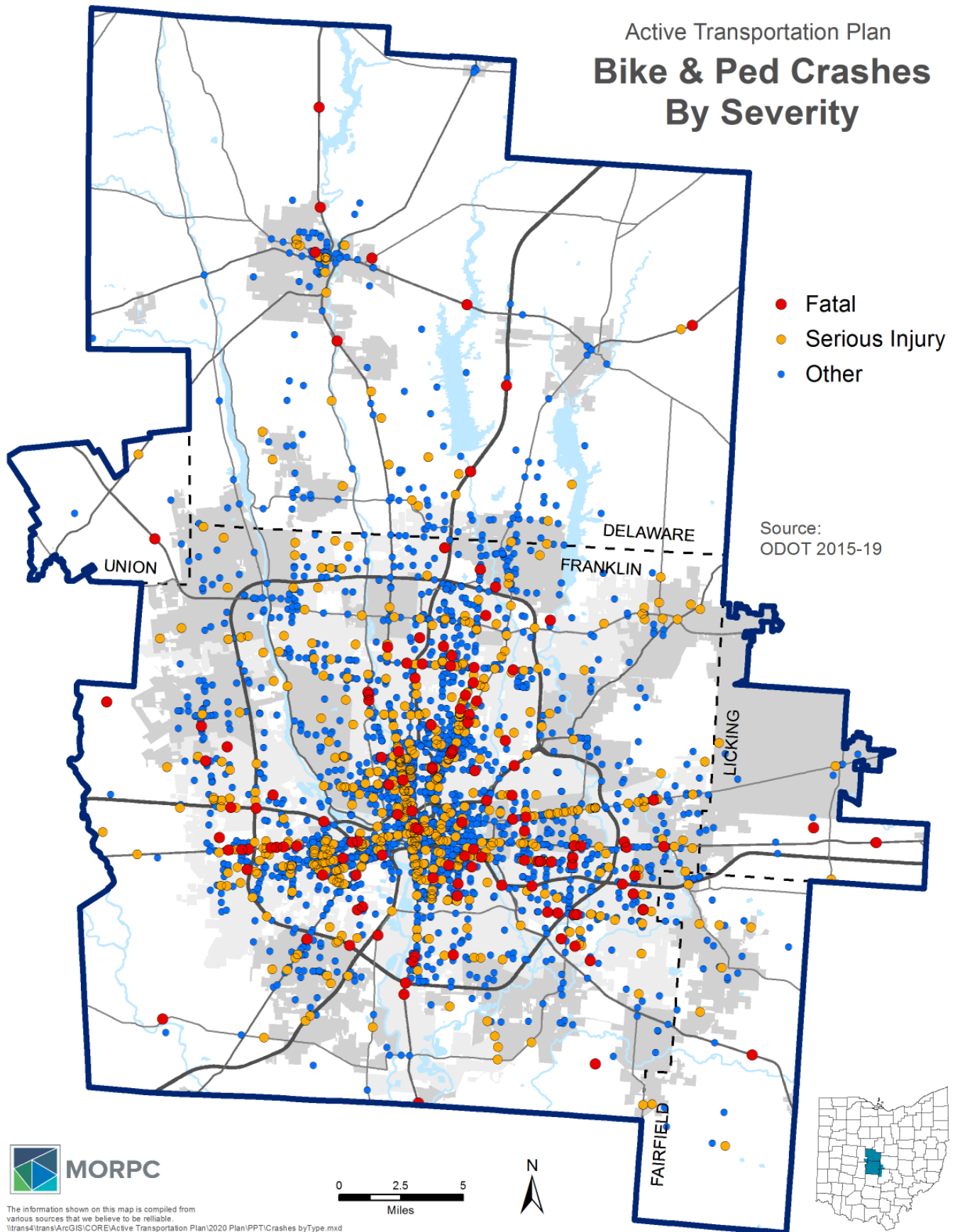


Figure B.



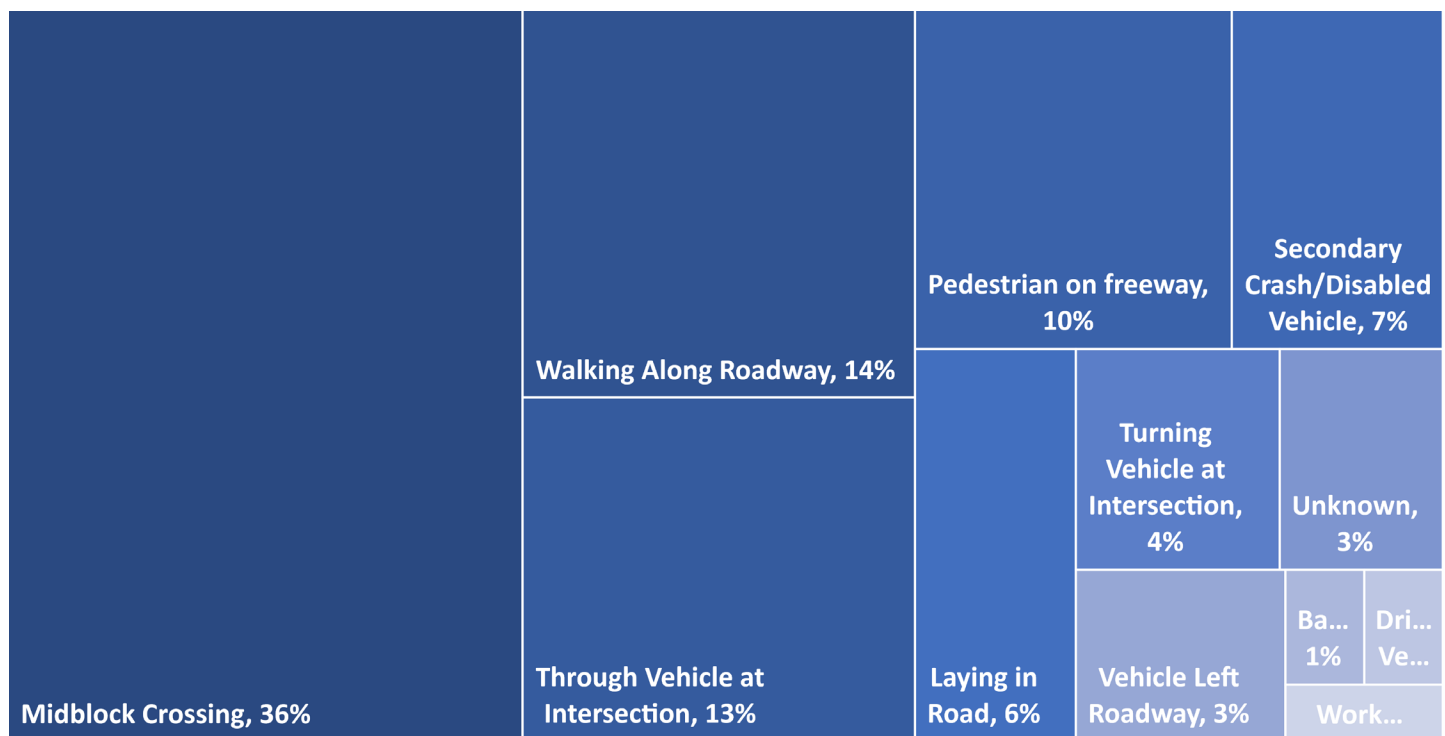
TOP PEDESTRIAN-INVOLVED FATAL CRASH TYPES

Building on the understanding that our region's arterials pose the highest risk to pedestrians, the following section will provide an overview of the prevailing fatal pedestrian crash typologies in Central Ohio.

As shown in the graph below, midblock crossing crashes make up the lion's share of all fatal pedestrian crashes, accounting for 36% of them.

The next deadliest pedestrian crash types are walking along the roadway (14%) and a through vehicle striking a pedestrian at an intersection (13%).

The following pages will provide more detailed overviews of each crash type, as well as the conditions in which they are most likely to occur.



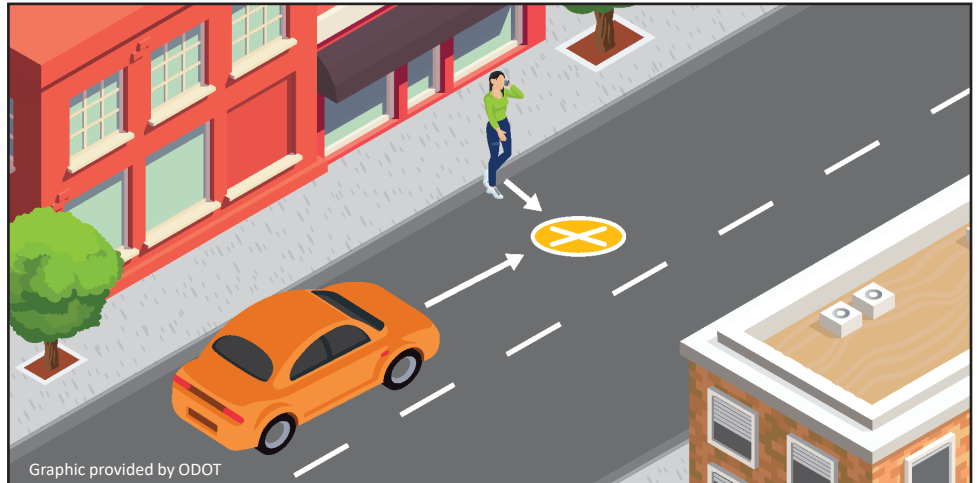
1. Midblock Crossing (36%)

2. Walking Along Roadway (14%)

3. Through Vehicle at Intersection (13%)

Mid-Block Crossings

Vehicle collisions with pedestrians crossing in the middle of a block are the most common fatal pedestrian crash type in Central Ohio. Over 80% of these occur on arterial roadways where midblock crossings are more frequent and vehicles tend to travel faster. Furthermore, 88% of these occurred after dark, with 64% of those on roadways with lighting, and 24% of roadways without lighting.



81% on **arterial** roadways

64% after dark, on roadways with lighting

24% after dark, on roadways **without lighting**

Walking Along Roadway

Pedestrians struck while walking along the roadway make up the second most common fatal pedestrian crash type. 71% of these crashes occur on arterial roadways, where vehicles are traveling at high speeds and sidewalks are not always available. In addition, 82% of these crashes occurred after dark, with 47% happening on roadways without lighting. This underscores the importance of pedestrians being highly visible to drivers.



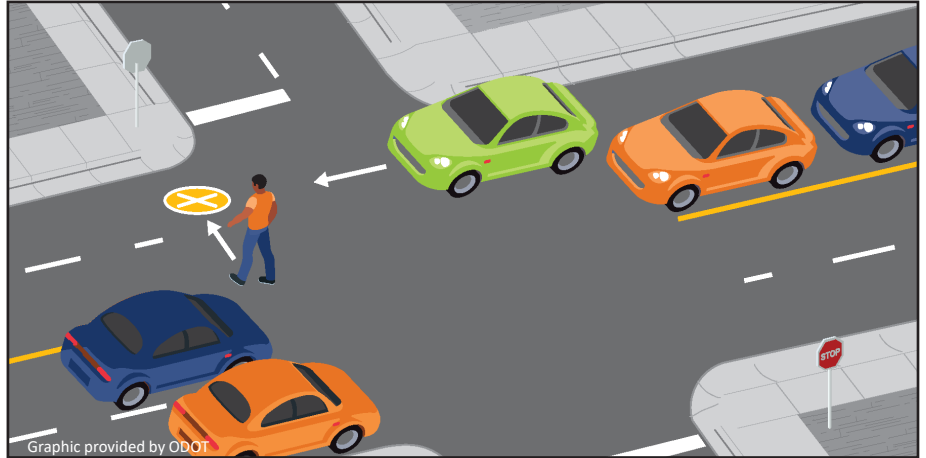
71% on **arterial** roadways

35% after dark, on roadways with lighting

47% after dark, on roadways **without lighting**

Through-Vehicle at an Intersection

Finally, through-vehicle collisions with a pedestrian at an intersection make up the third most common fatal pedestrian crash type. Over 90% of these occur on arterial roadways where vehicles often pass through intersections at high speeds. Furthermore, 60% of these crashes occurred after dark on roadways with lighting, and 33% of them during daylight hours, indicating that these crashes are more than just a visibility issue.



93% on **arterial** roadways

60% after dark, on roadways with lighting

33% during **daylight** hours



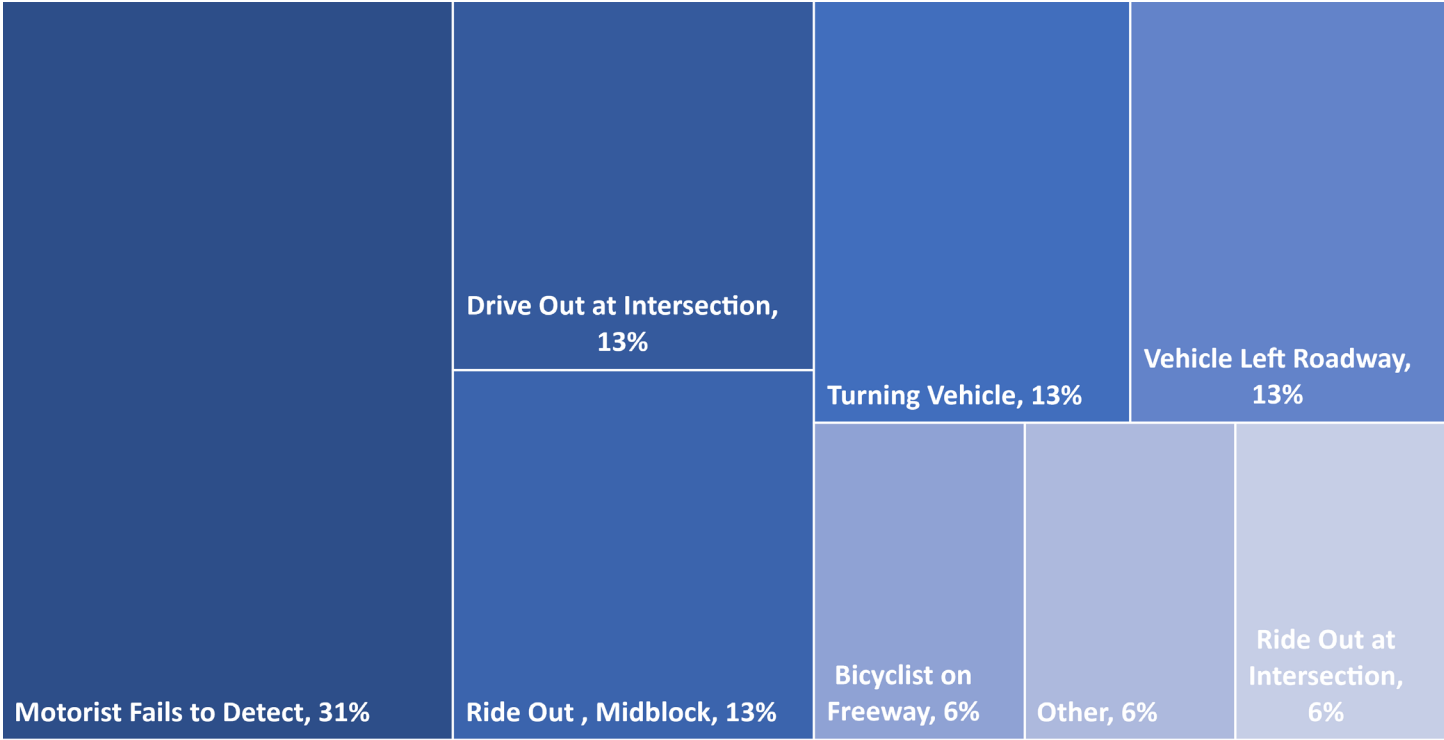
TOP BICYCLIST-INVOLVED FATAL CRASH TYPES

Similar to fatal pedestrian crashes, most bicyclist-involved fatal crashes are occurring on our region’s arterial roadways. The following section will delve deeper into these crashes to provide an overview of the most common types of bicyclist-involved fatal crashes.

The single most common bicyclist-involved fatal crash typology is the result of motorists failing to detect a bicyclist riding on the road in front

of them. These account for nearly a third of all bicyclist-involved fatal crashes.

There are four other bicyclist-involved fatal crash typologies that each make up 13% of all bicyclist-involved fatal crashes. The following pages will an overview of each of these crash types and describe the conditions in which they occurred the most.



- 1. Motorist Fails to Detect Bicyclist (31%)
- 2. Drive out at Intersection; Ride out/Midblock; Turning Vehicle; Vehicle Left Roadway (13%)

Motorist Failing to Detect Bicyclist

The most common bicyclist-involved fatal crash occurred when motorists failed to detect a bicyclist riding in the road ahead of them. 80% of these crashes occurred on arterial roadways, and the same proportion ensured after dark on roadways without lighting. This highlights the massive importance that bicyclists be visible to motorists at all times of the day. This visibility is improved by slowing vehicles down on arterials, enabling drivers to have a wider field of vision.



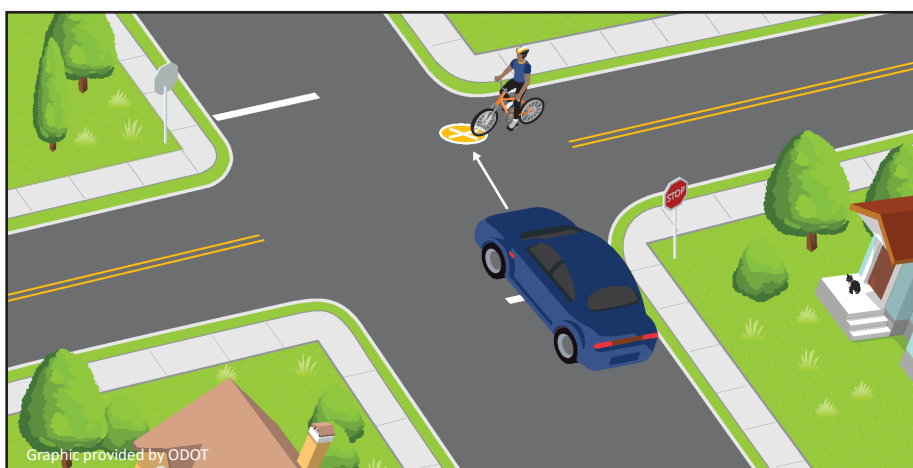
80% on **arterial** roadways

20% after dark, on roadways with lighting

80% after dark, on roadways **without** lighting

Drive out at Intersection

Over a tenth of bicyclist-involved fatal crashes occurred at an intersection where a motorist failed to yield to and thus struck a crossing bicyclist. All of these crashes occurred on arterial roadways and during daylight hours, indicating that this crash type is more than a visibility issue. A combination of slowing down vehicles on arterials and educating drivers to always yield to bicyclists can help bring these crash types down to zero.

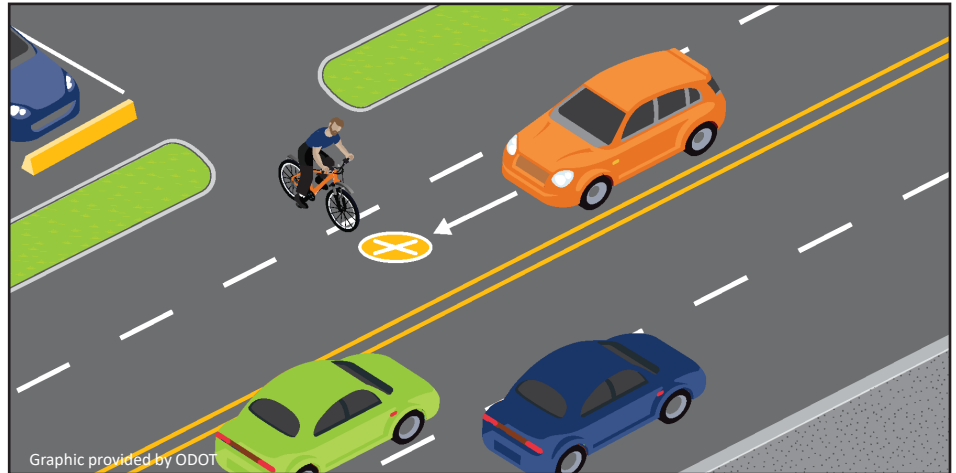


100% on **arterial** roadways

100% during daylight hour

Ride out, Midblock

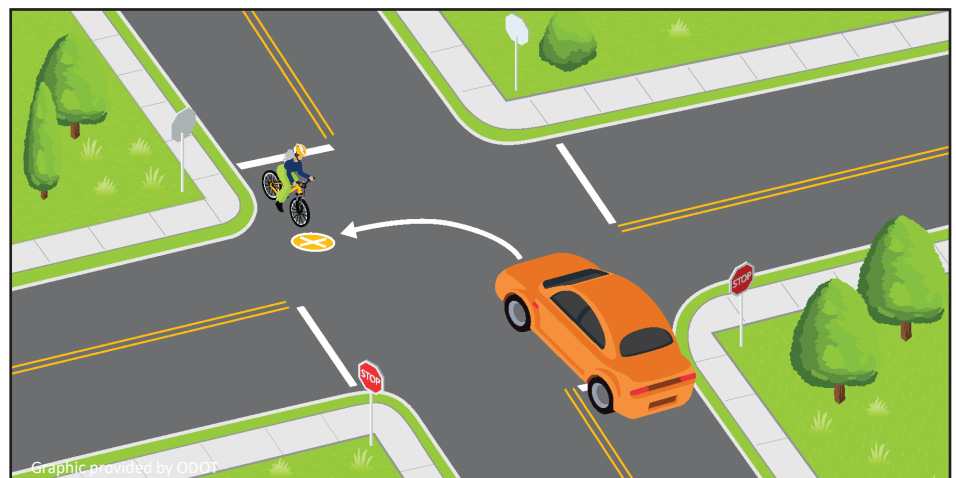
Another 13% of bicyclist-involved fatal crashes occurred when a bicyclist crossing at the middle of a block was struck by a vehicle. All of these crashes occurred on arterial roadways where, similar to the pedestrian-involved crash types, midblock crossings are more common and vehicles are traveling faster. Half of these crashes took place during daylight hours, suggesting that high vehicle speed is another significant factor affecting the visibility of bicyclists to motorists on arterials.



100% on arterial roadways
50% during daylight hours

Vehicle Turning

Bicyclists struck by a vehicle turning at an intersection made up another 13% of bicyclist-involved fatal crashes. These occur when a turning vehicle fail to yield to and thus strike a passing bicyclist. As with the “Drive out at an Intersection” crash typology, a combination of traffic calming intervention and driver education is needed to ensure that vehicles are always yielding to bicyclists.



100% on arterial roadways
100% after dark, on roadways with lighting

Vehicle Left Roadway

Lastly, 13% of bicyclist-involved fatal crashes occurred when a motorist left the roadway and struck a bicyclist riding alongside the travel lane. All of these crashes occurred on arterials and after dark on roadways without lighting. Once again, this underscores the need to ensure that bicyclists are visible to motorists throughout the day. This may entail improving lighting conditions on arterials, outreach to supply bicyclists with bike-lights and safety vests, vehicle speed calming interventions, and enforcement of penalties for distracted driving.



100% on arterial roadways

100% after dark, on roadways without lighting



CONCLUSION

This memo provides important information about the current state of active transportation safety in Central Ohio. Key considerations include the rising numbers of pedestrian- and bicyclist-involved fatal crashes within the MPO over the last 5 years and that the majority of most fatal crash types are occurring on our region's arterial roadways, despite the fact that these roadways only make up a fifth of all roadways in Central Ohio. The data presented in this technical memo can help communities better evaluate where they should prioritize investment in active transportation improvements.

The tools and resources developed for the 2020-2050 Active Transportation Plan can be used in combination with this information to help communities further assess roadway conditions and determine what the most appropriate active transportation infrastructure investments might be. Those resources can be found on MORPC's website at www.morpc.org/ATP.



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111 Liberty Street, Suite 100
Columbus, Ohio 43215
morpc.org