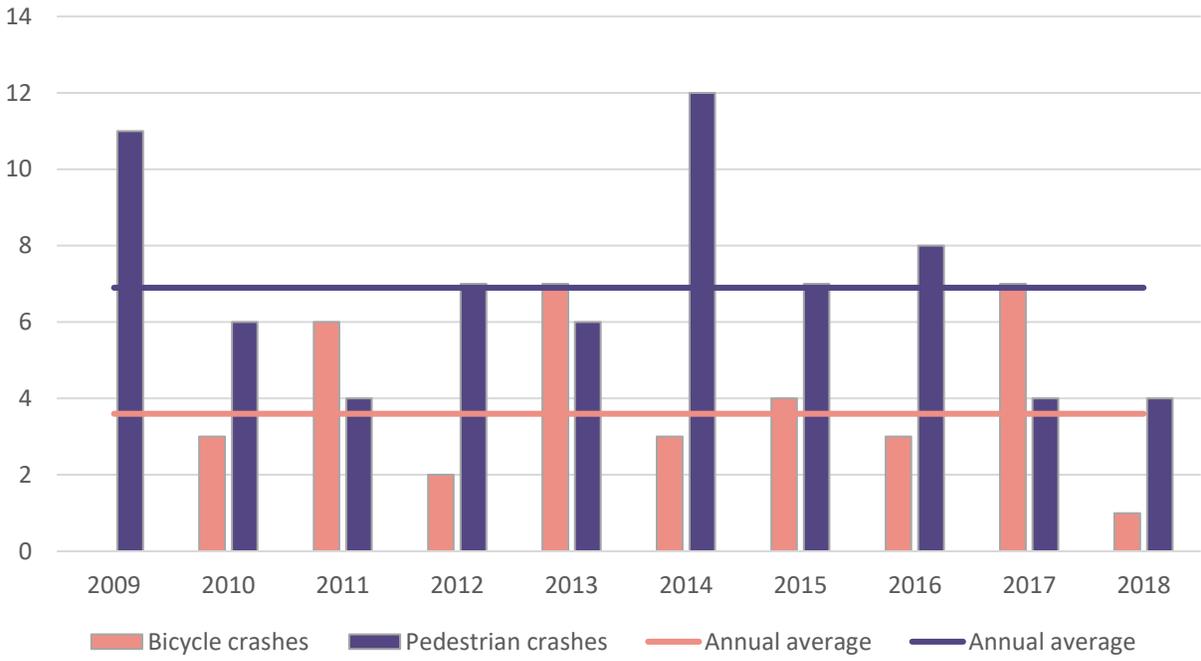


OVERVIEW

- Between January of 2009 and June of 2019, there were 112 crashes involving either pedestrians or bicyclists. This results in a rate of 0.9 crashes per month, 11 crashes per year.
- 75 crashes (67 percent) involved pedestrians, while 37 involved bicyclists.
- Almost all of the crashes (95, or 85 percent) involved the injury or death of a person walking or bicycling.
 - 91 crashes involved injuries only, and another 4 involved a fatality. Three fatalities involved people walking, while the other was a person bicycling.
 - 21 out of 91 (23 percent) injury-only crashes involved serious injuries.¹
- **Chart 1** shows the number of crashes by year. **Chart 2** shows the number of fatal and serious injury crashes by year.

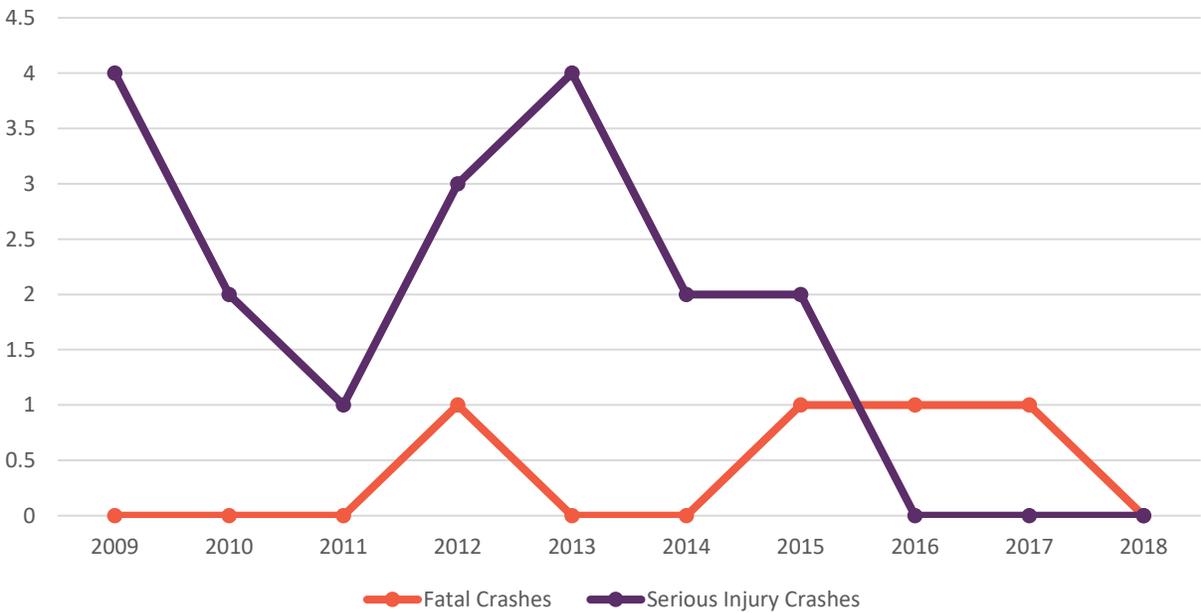
¹ Crash reports rank the severity of crashes as either fatal, suspected serious injury, suspected minor injury, possible injury, or no injury. Suspected serious injury crashes used to be reported as “incapacitating,” and suspected minor injury crashes were reported as “non-incapacitating.” For this report, suspected serious and incapacitating crashes are combined as “serious injury” crashes.

Chart 1: Pedestrian/Bicycle Crashes in Oak Ridge by Year



Bike	0	3	6	2	7	3	4	3	7	1
Ped	11	6	4	7	6	12	7	8	4	4
Total	11	9	10	9	13	15	11	11	11	5

CHART 2: Pedestrian/Bicycle Crashes in Oak Ridge Resulting in Fatality or Serious Injury



CRASH SEVERITY

Crashes in suburban and rural locations are less common, but tend to be more severe. This is likely due to higher travel speed of motor vehicles, compared with speeds in urban areas. For example, Cumberland Avenue in Knoxville has the most pedestrian/bicycle crashes per mile of any corridor in the Region, yet it hasn't seen any pedestrian/bicycle fatalities since 2007. By contrast, Oak Ridge Highway in Knox County saw only five pedestrian/bicycle crashes over eight years, but three of those crashes resulted in fatalities.

The graphic below illustrates the likelihood of a pedestrian being killed in a crash based on the speed of the motor vehicle.

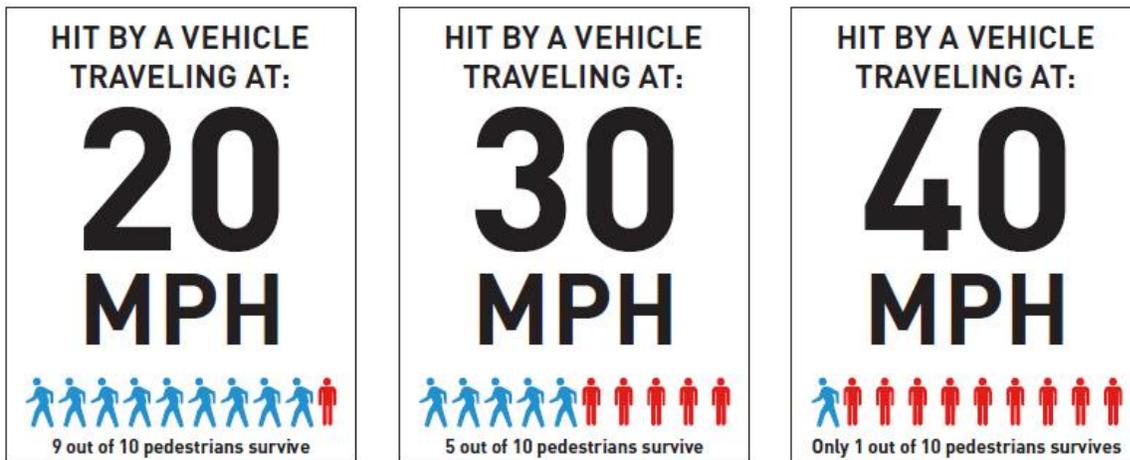
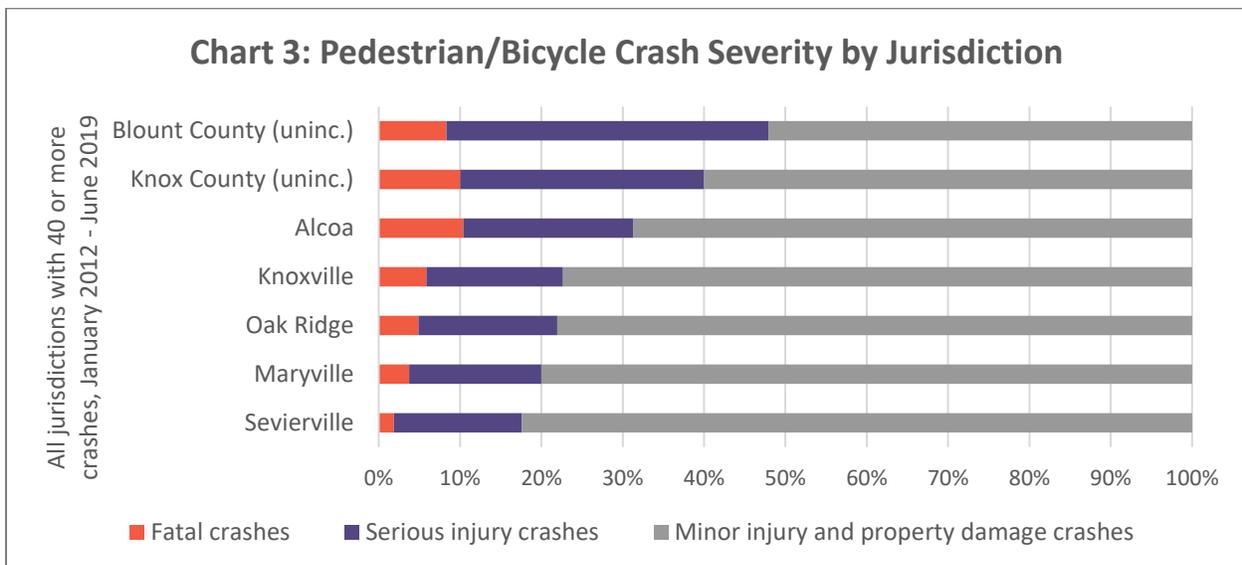


Chart 3 compares the prevalence of fatal and serious injuries in pedestrian/bicycle crashes among all jurisdictions with more than 40 pedestrian/bicycle crashes between January 2012 and June 2019.



MAJOR ARTERIALS

- A disproportionate share of pedestrian/bicycle crashes, especially serious crashes, occurred on major arterials (streets such as Illinois Avenue and Oak Ridge Turnpike).
 - 25 percent of crashes (28 crashes) occurred on major arterials. 17 took place on Oak Ridge Turnpike, while 11 occurred on Illinois Avenue (8 on South Illinois and 3 on North Illinois).
 - 19 of the major arterial crashes involved people walking, while 9 involved bicyclists
 - Crashes on major arterials resulted in 5 serious injuries, which is 24 percent of all serious injuries resulting from pedestrian/bicycle crashes.
 - Crashes on major arterials resulted in 2 of the 4 fatalities.

TYPES OF CRASHES ANALYZED IN THIS REPORT

This report analyzes certain crash factors. It focuses on identifying locations and behaviors where interventions – in the form of design changes, education, or enforcement – may help to prevent future crashes. 41 (37 percent) of the 112 total crashes fit into one of these categories. Categories of crashes analyzed in this report are:

- **Drivers failing to yield while turning.** These are crashes where the report indicates that the pedestrian or bicyclist was behaving properly while traveling along or across a street, and the driver failed to yield while making a turn. These crashes suggest the need for changes to the geometry of the intersections and/or to the function of the traffic signals to prevent future crashes. Education and traffic enforcement can also help prevent these types of crashes.
- **People struck by cars while walking in locations without sidewalks.** These are crashes where the report indicates the pedestrian was walking along a street without sidewalks and was struck by a car. These crashes indicate the need for sidewalks to be installed.
- **Drivers failing to yield while going straight.** These are crashes where the report indicates that the pedestrian or cyclist was crossing the street in a legal crosswalk², either marked or unmarked, and was struck by a driver. These crashes indicate the need for better design of crossing locations, which may include reducing crossing distances and the addition of signs, beacons, or signals. Education and traffic enforcement can also help prevent this type of crash.
- **Bicyclists riding in locations without safe facilities.** This category encompasses two crash factors: crashes where a bicyclist was struck from behind, or was struck while riding on the sidewalk.³ These crashes indicate the need for a safe bicycle facility along a corridor.
- **People struck by cars while crossing a street outside of an intersection or marked midblock crossing.** These are crashes where the report indicates a pedestrian was struck while crossing a street at a location other than an intersection or a marked midblock crossing. These crashes suggest the need for additional crossings, as the existing crossings may be dangerous or inconvenient. Education of pedestrians can also help prevent this type of crash.
- **Bicyclists riding in an unsafe manner or location.** This category encompasses two crash factors: crashes where the bicyclist was either riding on the street against traffic, or riding at night with no lights. These crashes suggest the need for education for bicyclists.

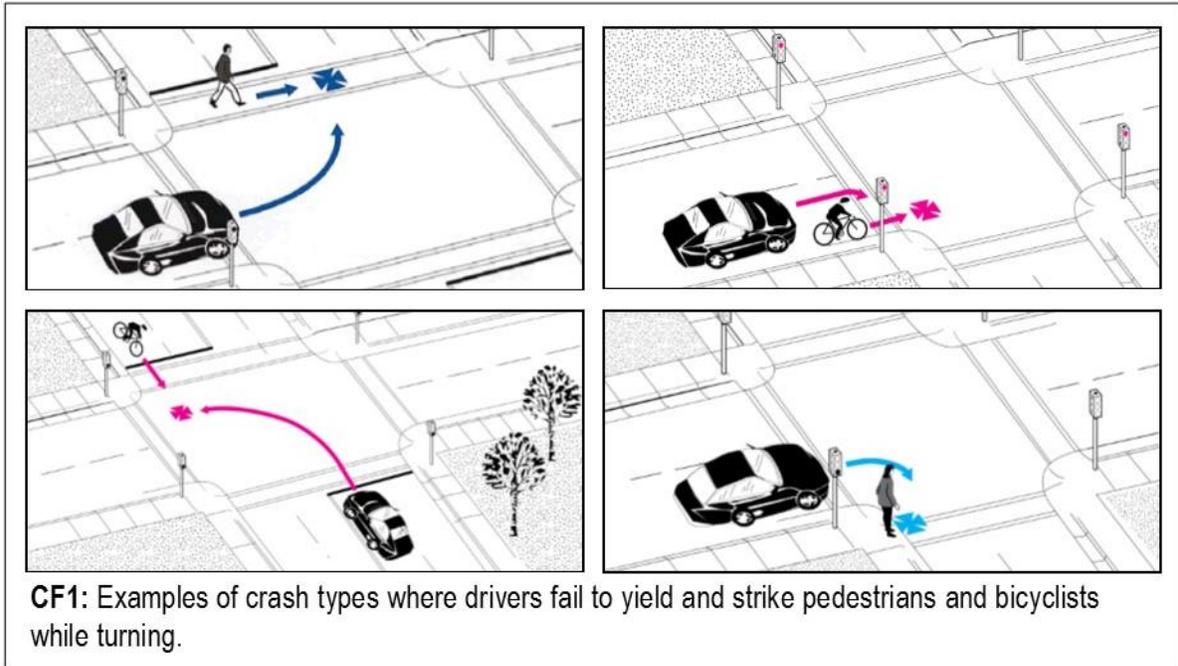
² Tennessee Code Annotated 55-8-101 (11) defines “crosswalk” as “(A) That part of a roadway at an intersection included within the connections of the lateral lines of the sidewalks on opposite sides of the highway measured from the curbs or, in the absence of curbs, from the edges of the traversable roadway; or (B) Any portion of a roadway at an intersection or elsewhere distinctly indicated for pedestrian crossing by lines or other markings on the surface.”

³ Riding a bicycle on the sidewalk is legal. Bicycle safety educators generally warn against it, because of the danger from turning motor vehicles.

TABLE 1: Crash Factors		Number of Crashes			Percent of Crashes*
		Ped	Bike	Total	
1. Drivers failing to yield while turning (22 total crashes)	Turning left	6	4	10	24
	Turning right (not right on red)	7	4	11	27
	Turning right on red light	1	0	1	2
	Direction of turn unclear	0	0	0	0
2. Pedestrian struck while walking along corridor without sidewalks		2	n/a	2	5
3. Driver failing to yield while going straight		4	1	5	12
4. Bicyclist riding on sidewalk		n/a	0	0	0
5. Pedestrian crossing street outside of an intersection or marked crosswalk		8	n/a	8	20
6. Bicyclist riding against traffic		n/a	0	0	0
7. Driver striking bicyclist from behind		n/a	3	3	7
8. Bicyclist riding at night with no lights		n/a	1	1	2

*Percentages may not total to 100 due to rounding

Crash Factor 1: Drivers failing to yield while turning



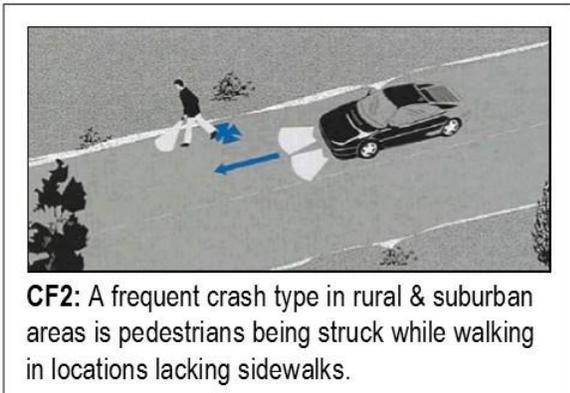
Of the crashes where a crash factor has been identified, 22 (54 percent) involved a pedestrian or bicyclist hit by a car whose driver failed to yield properly when turning.⁴

- Of these, 10 crashes involved drivers turning left; 11 involved a right turn (not on a red light); and 1 involved a right turn on red.
- 16 of these crashes involved injuries, 2 of them serious injuries, with no fatalities.
- 14 of these crashes involved pedestrians, and the remaining 8 involved bicyclists.
- 4 corridors saw multiple crashes of this type:
 - 7 crashes along Illinois Ave (5 on South Illinois, 2 on North Illinois)
 - 5 crashes along Oak Ridge Turnpike
 - 3 crashes along South Rutgers Avenue
 - 2 crashes along Bethel Valley Road
- **Table 2** has more details about the locations of these crashes.

⁴ This crash factor is identified only where the bicyclist or pedestrian involved was traveling safely and within the law and the driver failed to yield

TABLE 2: Locations of failure-to-yield crashes (number in red indicates bicyclist involved)				
Corridor	Cross street/area	Left turns	Right turn (not on red)	Right turn on red
Bethel Valley Rd	Melton Valley Access Rd	1		
	DOE access road		1	
Briarcliff Ave	north of Fairbanks Rd		1	
Fairbanks Rd	West of Coal Yard Rd		1	
Florida Ave	Faunce Rd	1		
N Illinois Ave	Hillside Rd	1		
	W Outer Dr	1		
Oak Ridge Turnpike	Athens Rd	1		
Oak Ridge Turnpike	west of Bradley Ave		1	
Oak Ridge Turnpike	Florida Ave		1	
Oak Ridge Turnpike	Illinois Ave		1	
Oak Ridge Turnpike	Tulane Ave			1
Outer Drive	Georgia Ave		1	
Robertsville Rd	Highland Ave		1	
S Illinois Ave	Tulsa Rd	1		
	E Vanderbilt Rd		1	
	Rutgers Ave	1	1	
S Rutgers Ave	West of S Illinois Ave		1	
	Manhattan Ave	1		
	Northwestern Ave	1		
White Oak Ave	Sixth St	1		

Crash Factor 2: People struck by cars while walking in locations without sidewalks



In 2 crashes (5 percent), a person walking along a street without a sidewalk was hit by a driver.⁵ Both crashes involved injuries, 1 serious, and no fatalities. One crash occurred on Highland Avenue south of Hoyt Lane, and the other on Old Batley Road east of North Illinois Avenue.

Crash Factor 3: Driver failing to yield while going straight

In 5 crashes, drivers were going straight and failed to yield for a person walking or bicycling across the street in a legal crosswalk, either marked or unmarked, or who otherwise had the right of way.⁶

4 of these crashes involved pedestrians. All of the crashes involved injuries, with 1 serious injury.

Table 3 shows the locations of all crashes of this type.

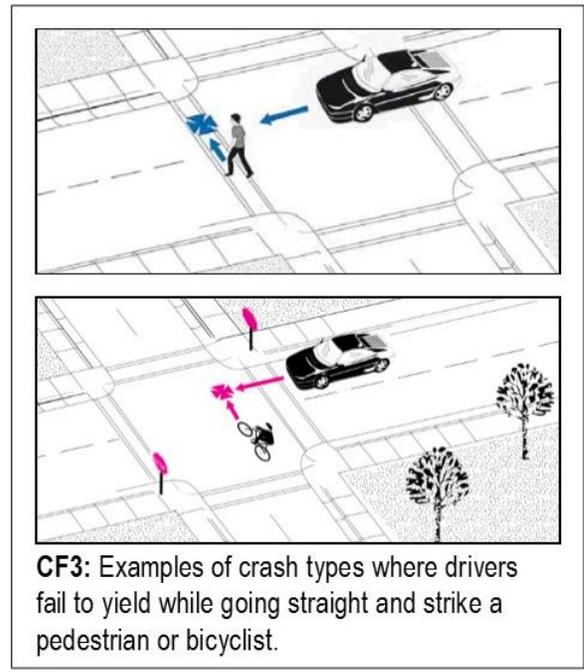
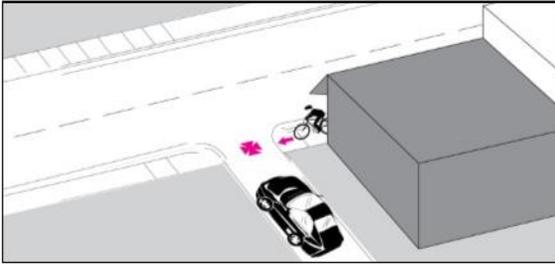


TABLE 3: Areas with pedestrians struck by drivers going straight and failing to yield	
Crash occurred on this street	In this area
E Tennessee Ave	Towne Rd
Johnson Rd	Jay Ln
Louisiana Ave	Lasalle Rd
	Robertsville Rd
Manhattan Ave	S Purdue Ave

⁵ This crash factor is identified only where the crash report finds that the pedestrian was walking along the side of the road when the crash happened, not cases where pedestrians entered the road to cross.

⁶ This crash factor is not identified where the crash report finds that the person walking or bicycling entered the street in a way that failed to give the driver sufficient time to yield the right of way.

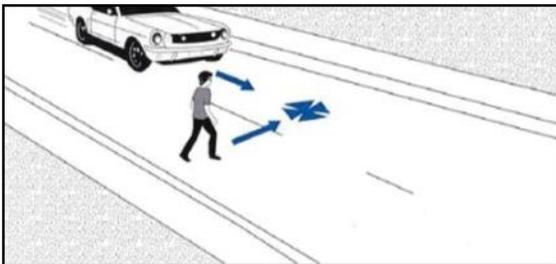
Crash Factor 4: Bicyclist riding on sidewalk



CF4: It's legal for bicyclists to ride on sidewalks. But it can put them in danger of being struck by a driver who does not expect to see them in that location.

No crashes of this type were reported in Oak Ridge during the time analyzed in this report.

Crash Factor 5: Pedestrian crossing street outside of an intersection or marked crosswalk



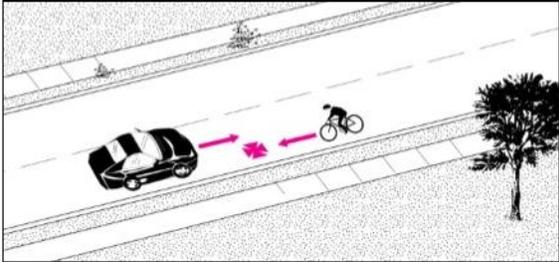
CF5: People crossing streets outside of designated crossing areas can be an indication that more and/or better crossing locations are needed.

In 8 crashes (20 percent), pedestrians were crossing the street outside of an intersection or marked crosswalk. 7 of these crashes involved injuries, 3 of them serious injuries, with 1 additional fatality. Two of these crashes occurred on Oak Ridge Turnpike. **Table 4** shows the locations of all crashes of this type.

TABLE 4: Areas with pedestrians struck while crossing outside of an intersection or marked crosswalk

Crash occurred on this street	In this area
Broadway Ave	east of Michigan Ave
Jefferson Ave	north of Robertsville Rd
N Illinois Ave	south of W Outer Dr
Oak Ridge Turnpike	west of E Division Rd/Tennyson Rd
	west of Robertsville Rd
Pennsylvania Ave	east of Vermont Ave
S Rutgers Ave	north of Manhattan Ave
W Outer Dr	west of Walsh Lane

Crash Factor 6: Bicyclist riding against traffic



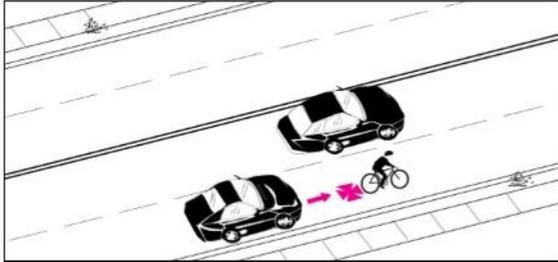
The diagram shows a top-down view of a two-lane road. A car is in the left lane, moving to the right. A bicyclist is in the right lane, moving to the left, against the flow of traffic. Pink arrows indicate the direction of travel for both the car and the bicyclist.

CF6: Some bicyclists ride against traffic in the mistaken belief that it's safer than riding in the same direction as other traffic.

No crashes of this type were reported in Oak Ridge during the time analyzed in this report.

Crash Factor 7: Driver striking bicyclist from behind

3 bicyclists were struck from behind by drivers (7 percent of crashes). Only 1 of these crashes involved an injury, which was a serious injury. **Table 5** shows the locations of all crashes of this type.



The diagram shows a top-down view of a two-lane road. A car is in the left lane, moving to the right. A bicyclist is in the right lane, also moving to the right. A pink arrow points from the car towards the bicyclist, indicating the direction of the impact.

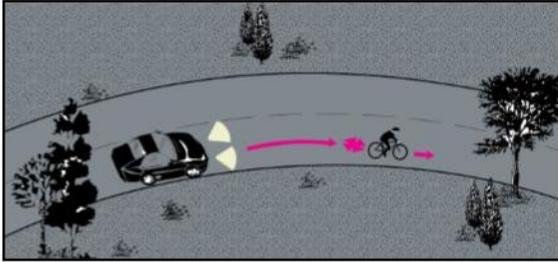
CF7: Drivers striking bicyclists from behind is a relatively uncommon but very dangerous crash type, accounting for 25% of fatal bicycle crashes across the U.S.

TABLE 5: Locations with bicyclists being struck from behind by drivers

Crash occurred on this street	In this area
Edgemoor Rd	east of Melton Lake Drive
S Illinois Ave	north of Inn Lane
Scarboro Rd	south of Booster Station Rd

Crash Factor 8: Bicyclist riding at night with no lights

1 bicyclist was struck while riding at night with no lights. It was an injury crash.



The diagram shows a top-down view of a road at night. A car is in the left lane, moving to the right. A bicyclist is in the right lane, also moving to the right. The car's headlights are shown as yellow beams. The bicyclist is not illuminated, and there are no lights on the bicyclist.

CF8: Tennessee law requires bicyclists riding after dark to use a mounted headlight and rear reflectors. A rear red light is also recommended.

Methodology

Crash data were downloaded from the TITAN database maintained by the State of Tennessee. Crashes were mapped in ArcMap GIS software based on latitude/longitude or closest intersection, where lat/long data were not available. TPO staff then reviewed the location of each crash to correct data errors. TPO staff assigned crash factors based on information obtained from individual crash reports, including crash narratives and information about citations issued.

Image credit

All crash type images are from the Pedestrian and Bicycle Crash Analysis Tool (PBCAT), which was developed by the Federal Highway Administration (FHWA), in cooperation with the National Highway Traffic Safety Administration (NHTSA). The purpose of the PBCAT is to assist with analysis of pedestrian/bicycle crashes with the goal of preventing them.