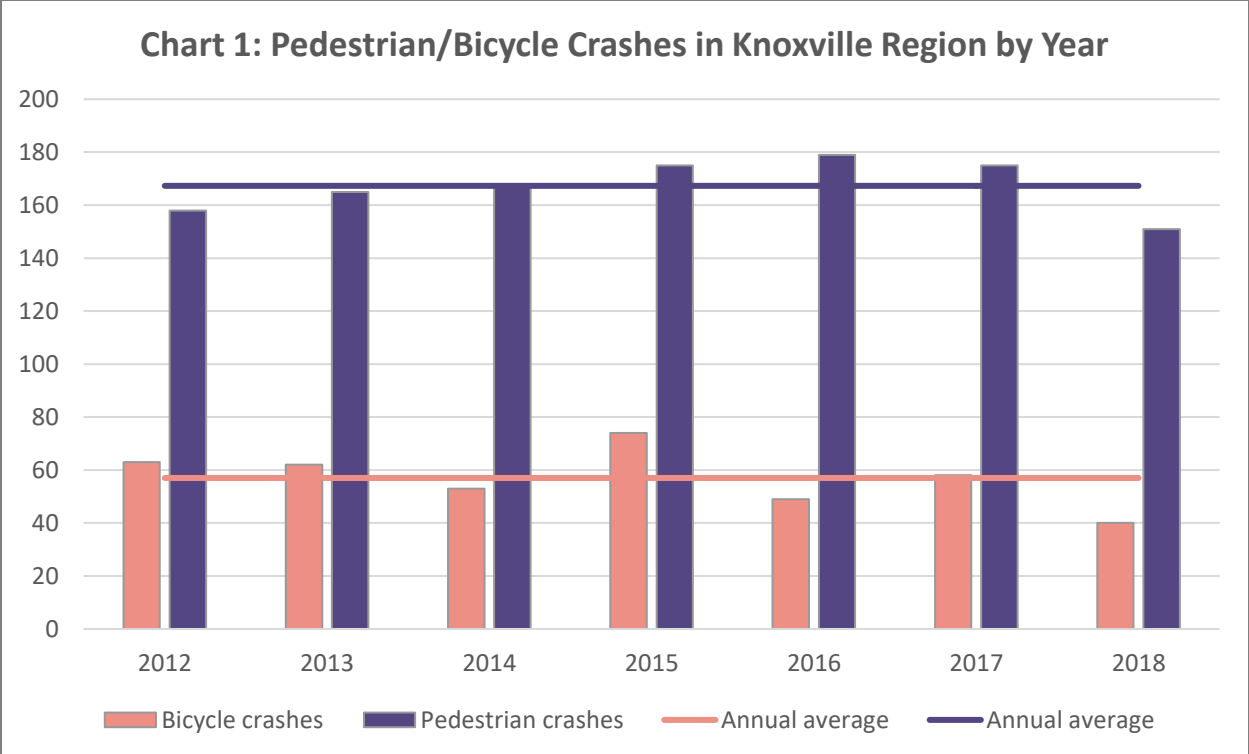# Pedestrian & Bike Crashes

OVERVIEW

- Between January of 2012 and June of 2019, there were 1,685 crashes involving either pedestrians or bicyclists in the Knoxville Region[1]. This results in a rate of 18.7 crashes per month, 225 crashes per year.

- 1,264 crashes (75 percent) involved pedestrians, while 421 involved bicyclists.

- Almost all of the crashes (1,534, or 91 percent) involved the injury or death of a person walking or bicycling.

  - 1,440 crashes involved injuries only, and another 94 involved a fatality. Two crashes resulted in 2 fatalities, for a total of 96 people killed while walking or bicycling. Of the 96 total fatalities, 88 were killed while walking, the other 8 while bicycling.

 - Between January 2015 and June 2019, 24 percent of injury-only crashes involved serious injuries.[2]

Chart 1 shows the number of crashes by year. **Chart 2** shows the number of fatal and serious injury crashes by year.

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[1] For the purposes of this report, the Knoxville Region includes all of Knox, Blount and Loudon counties; Anderson County excluding Rocky Top; the portion of Oak Ridge within Roane County; and the City of Sevierville. This geography was chosen because it encompasses the cities and counties in the Knoxville Regional TPO's Planning Area, as well as the remainder of cities that are only partially within the Planning Area.

[2] 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. Regional crash reports began to include reliable information about the severity of injuries in 2015.

Chart 1: Pedestrian/Bicycle Crashes in Knoxville Region by Year

	2012	2013	2014	2015	2016	2017	2018
Bike	63	62	53	74	49	58	40
Ped	158	165	168	175	179	175	151
Total	221	227	221	249	228	233	191

Legend: Bicycle crashes, Pedestrian crashes, Annual average, Annual average

Chart 2: Ped/Bike Crashes Resulting in Fatality or Serious Injury

Note: Regional crash reports began to include reliable information about the severity of injuries in 2015.

Legend: Fatal Crashes, Serious Injury Crashes
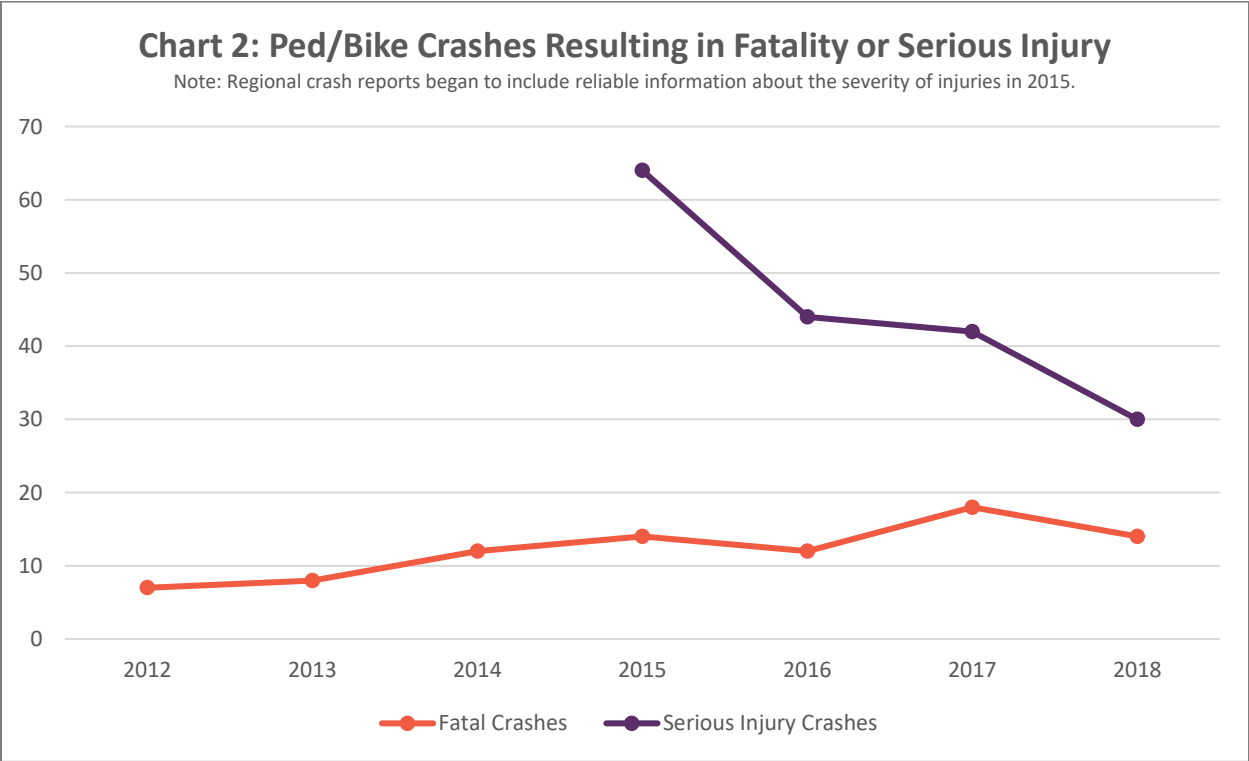
CRASH INFORMATION FOR JURISDICTIONS

The TPO has prepared a detailed report for each jurisdiction describing patterns in the locations of these crashes and the factors contributing to them. Those reports are available on the TPO website at knoxtpo.org/data-and-monitoring/bicycle-pedestrian-crash-analysis/.

LOCATION OF CRASHES

A majority of the crashes in the region occurred in Knoxville. It is likely that Knoxville also has higher rates of people walking and bicycling compared with other locations in the region, although there is not enough data available to determine a crash rate per miles traveled for each jurisdiction.

Chart 3 shows the total number of crashes in each jurisdiction between January 2012 and June of 2019.

CHART 3: Crashes by Jurisdiction

Jurisdiction	Crashes
Knoxville	1009
Knox County (uninc.)	170
Sevierville	108
Oak Ridge	82
Maryville	80
Alcoa	48
Blount County (uninc.)	48
Farragut	32
Lenoir City	31
Anderson County (uninc.)	23
Loudon County (uninc.)	18
Clinton	16
City of Loudon	7

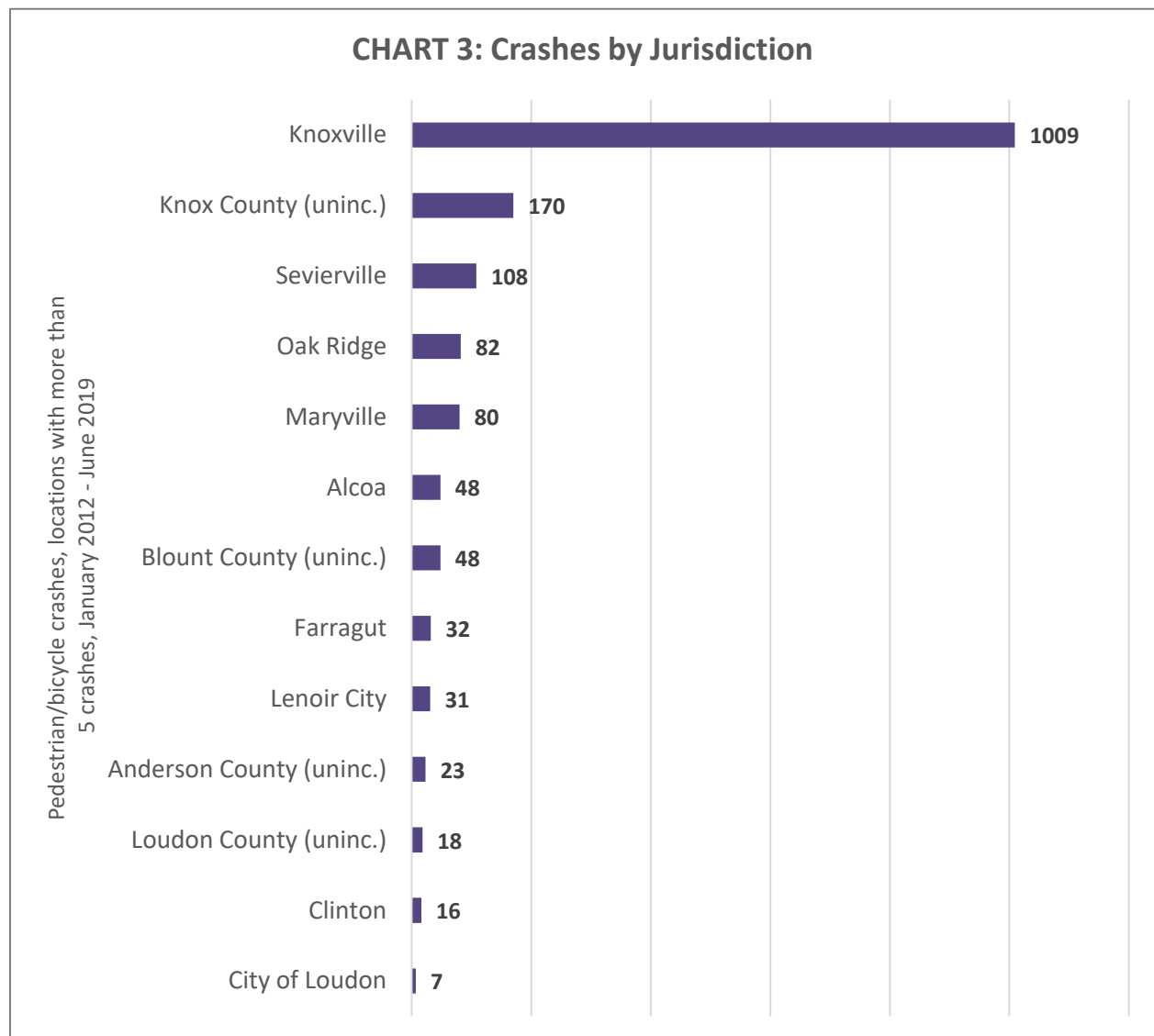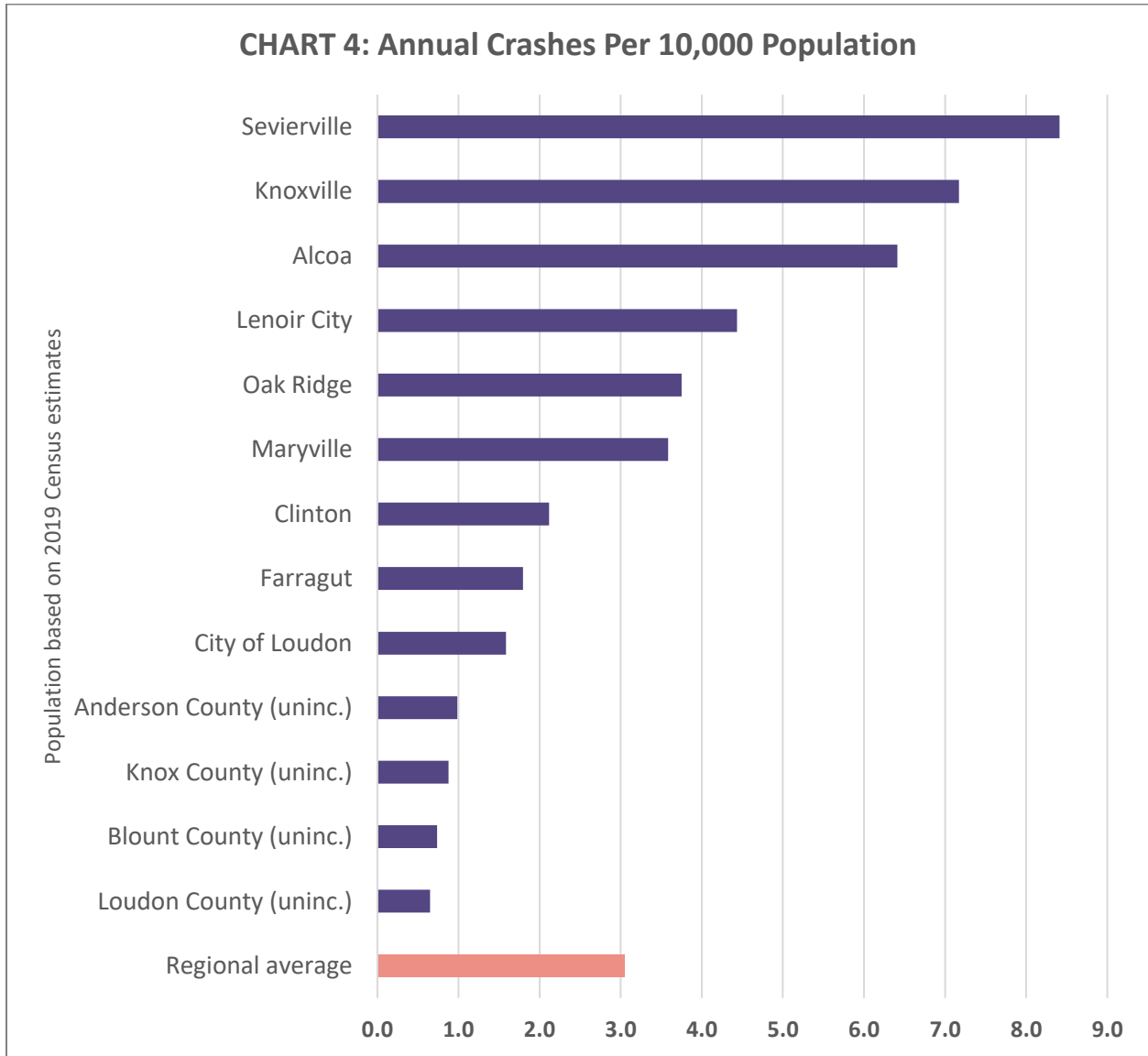Pedestrian/bicycle crashes, locations with more than 5 crashes, January 2012 - June 2019
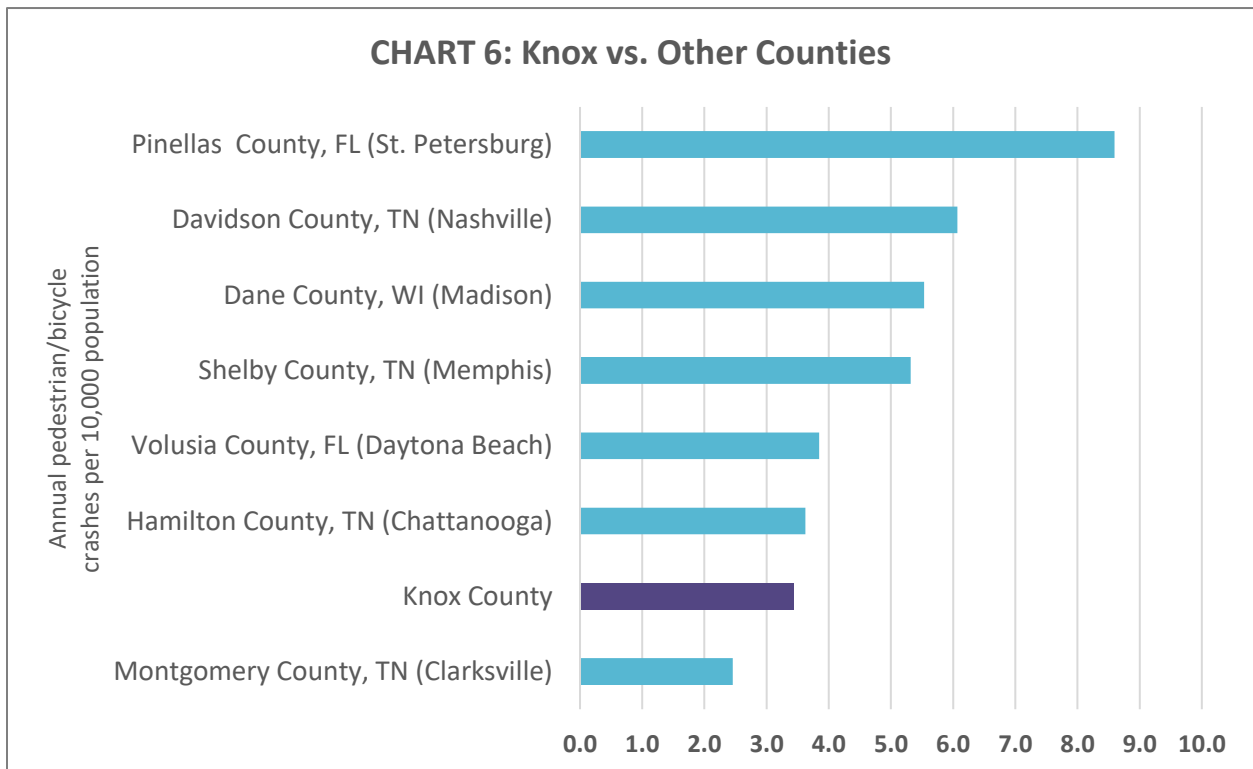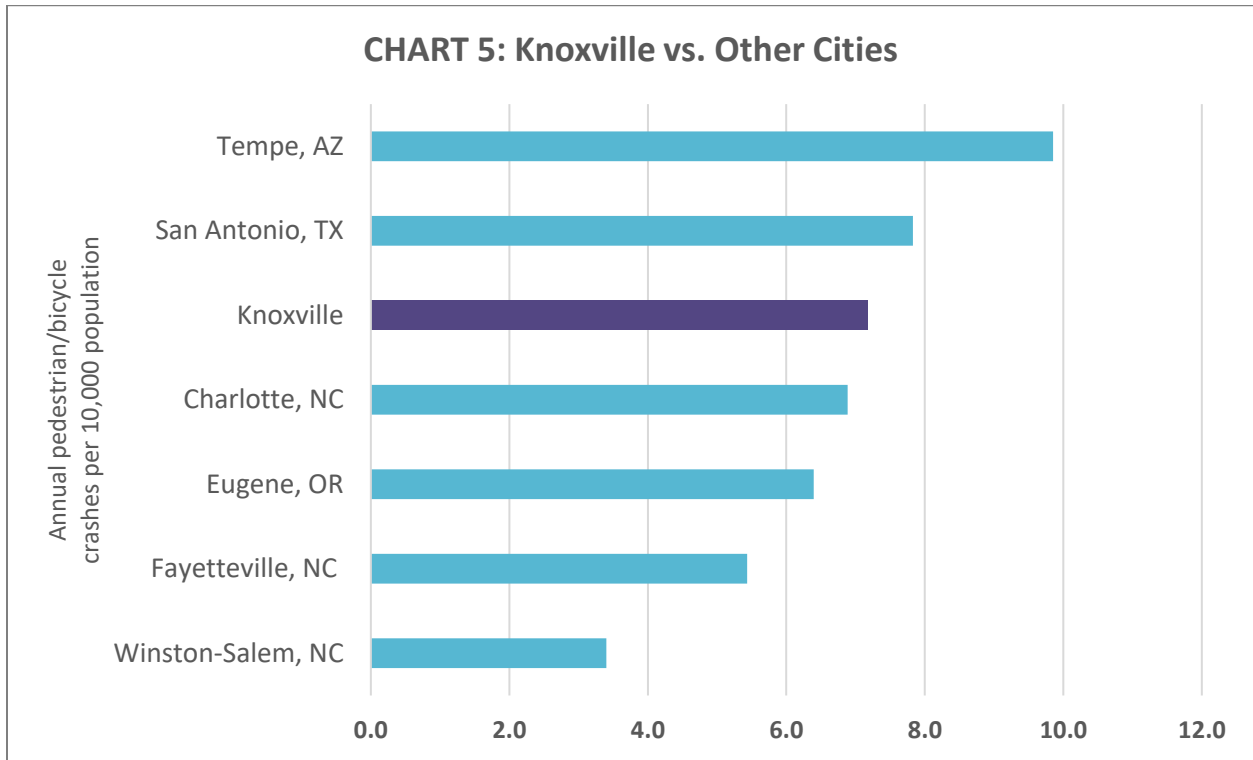
Chart 4 examines crashes per 10,000 population in each jurisdiction. Population is often used to determine a crash rate when data on miles traveled by mode are not available. In general, the crash rate per 10,000 population is higher in urban places compared with rural places, because people are more likely to walk and bicycle in urban settings.

Based on population, Sevierville has the highest crash rate in the region, followed by Knoxville and Alcoa.

CHART 4: Annual Crashes Per 10,000 Population

Population based on 2019 Census estimates

Jurisdiction	Crashes per 10,000
Sevierville	8.4
Knoxville	7.2
Alcoa	6.4
Lenoir City	4.4
Oak Ridge	3.8
Maryville	3.6
Clinton	2.1
Farragut	1.8
City of Loudon	1.6
Anderson County (uninc.)	1.0
Knox County (uninc.)	0.9
Blount County (uninc.)	0.7
Loudon County (uninc.)	0.6
Regional average	3.0

Charts 5 and 6 show a comparison of the crash rates for Knoxville and Knox County with a selection of other U.S. cities and counties. To compare our region's crash rate with other regions would be difficult because of the variation in how regions are defined across the U.S.

CHART 5: Knoxville vs. Other Cities

Annual pedestrian/bicycle crashes per 10,000 population

City	Value
Tempe, AZ	~9.8
San Antonio, TX	~7.8
Knoxville	~7.2
Charlotte, NC	~6.8
Eugene, OR	~6.4
Fayetteville, NC	~5.4
Winston-Salem, NC	~3.4

CHART 6: Knox vs. Other Counties

Annual pedestrian/bicycle crashes per 10,000 population

County	Value
Pinellas County, FL (St. Petersburg)	~8.5
Davidson County, TN (Nashville)	~6.1
Dane County, WI (Madison)	~5.5
Shelby County, TN (Memphis)	~5.4
Volusia County, FL (Daytona Beach)	~3.9
Hamilton County, TN (Chattanooga)	~3.6
Knox County	~3.4
Montgomery County, TN (Clarksville)	~2.5

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.
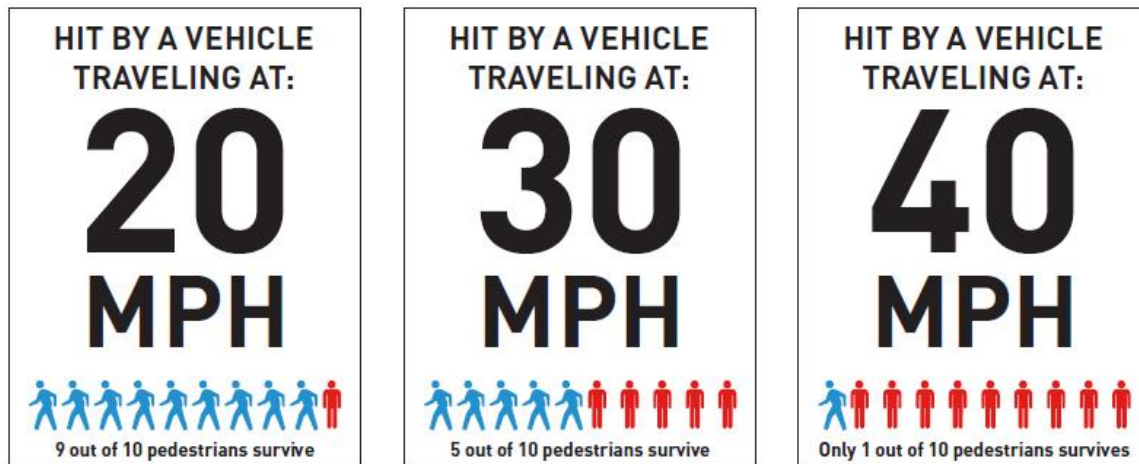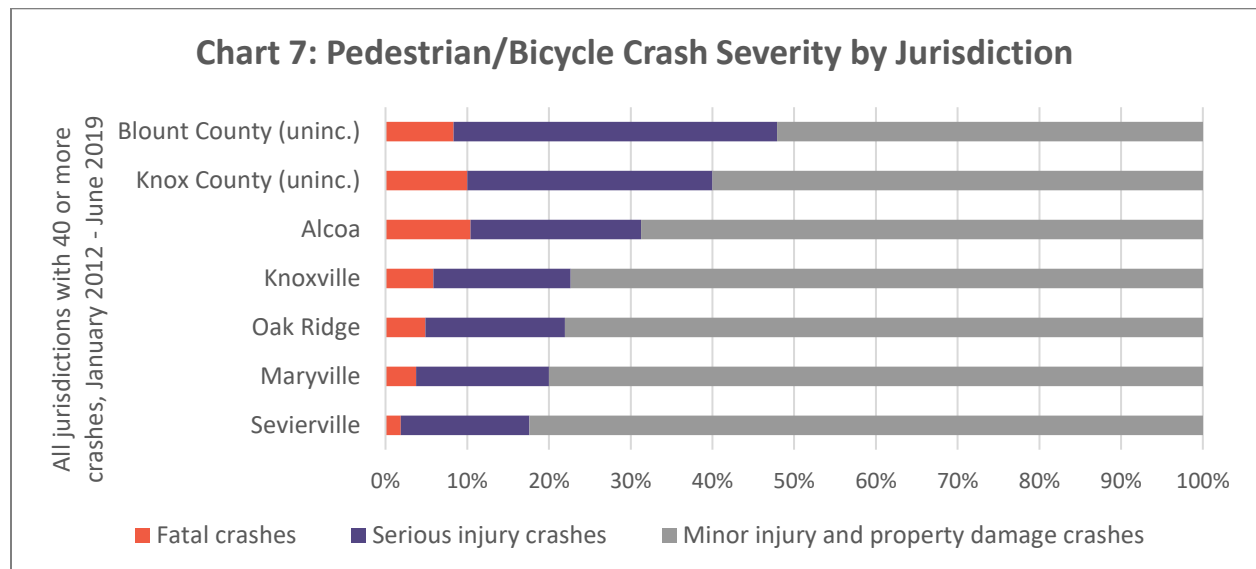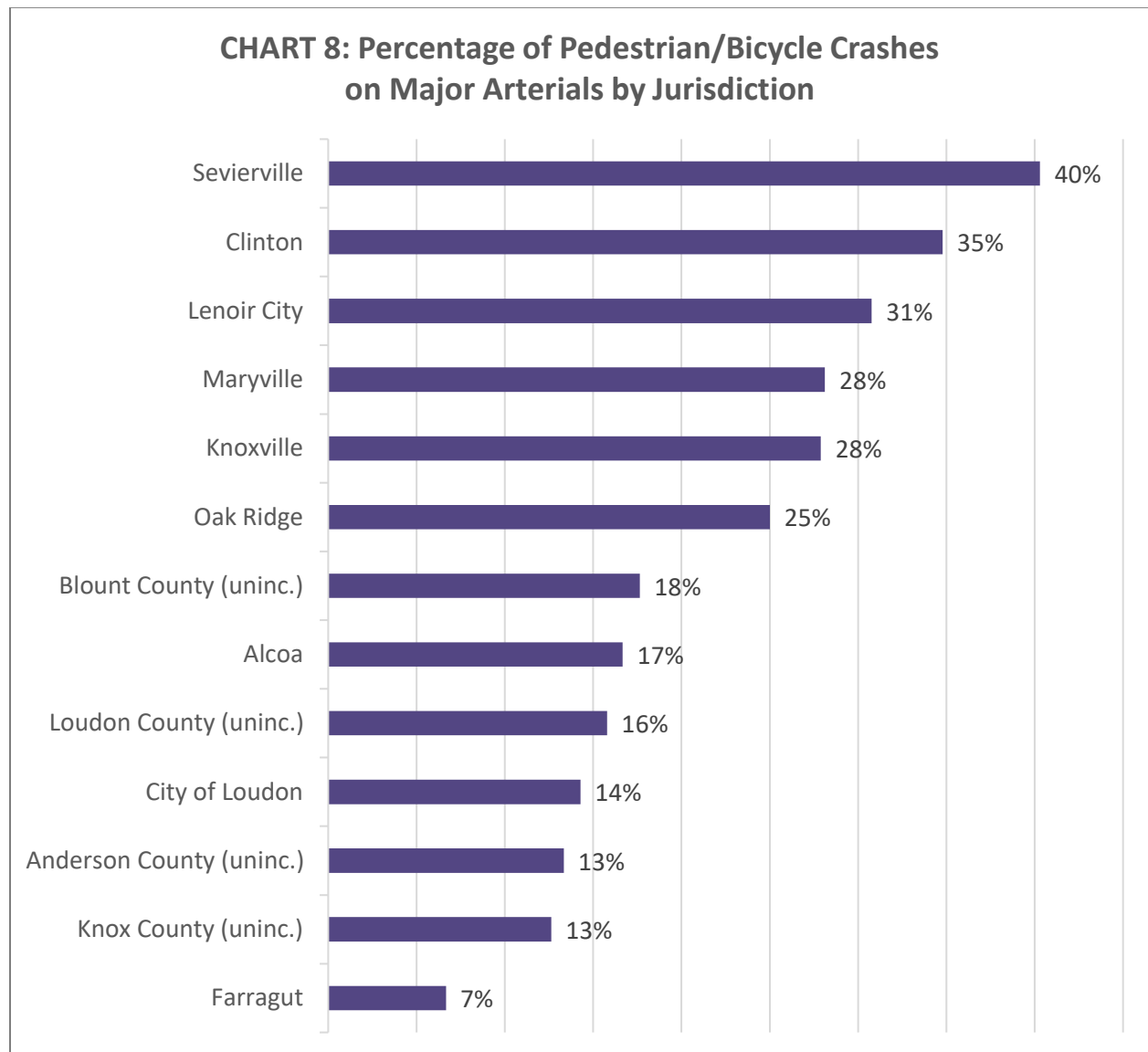
HIT BY A VEHICLE TRAVELING AT: **20 MPH**	HIT BY A VEHICLE TRAVELING AT: **30 MPH**	HIT BY A VEHICLE TRAVELING AT: **40 MPH**
9 out of 10 pedestrians survive	5 out of 10 pedestrians survive	Only 1 out of 10 pedestrians survives

Chart 7 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.

Chart 7: Pedestrian/Bicycle Crash Severity by Jurisdiction

All jurisdictions with 40 or more crashes, January 2012 - June 2019

- Blount County (uninc.)
- Knox County (uninc.)
- Alcoa
- Knoxville
- Oak Ridge
- Maryville
- Sevierville

Legend:
- ■ Fatal crashes
- ■ Serious injury crashes
- ■ Minor injury and property damage crashes

CRASHES ALONG MAJOR ARTERIALS

Major arterials are the surface streets and roads that carry much of the traffic in the Knoxville Region, often at high speeds. Examples of major arterials include Kingston Pike, Clinton Highway, Lamar Alexander Parkway, and Winfield Dunn Parkway. Businesses and employment centers often cluster along major arterials. In communities that offer public transit, bus routes commonly run along them.

Major arterials in the Knoxville Region typically account for around 5% of the locality's total surface street mileage, but see a much larger share of traffic crashes. They also see a disproportionate share of pedestrian/bicycle crashes. **Chart 8** shows the percentage of pedestrian/bicycle crashes that occur along major arterials for each jurisdiction in the Knoxville Region.

CHART 8: Percentage of Pedestrian/Bicycle Crashes on Major Arterials by Jurisdiction

Jurisdiction	Percentage
Sevierville	40%
Clinton	35%
Lenoir City	31%
Maryville	28%
Knoxville	28%
Oak Ridge	25%
Blount County (uninc.)	18%
Alcoa	17%
Loudon County (uninc.)	16%
City of Loudon	14%
Anderson County (uninc.)	13%
Knox County (uninc.)	13%
Farragut	7%

CRASH FACTORS

As part of this analysis of crashes, crash factors are assigned whenever possible. The crash factors identify certain behaviors that might be reduced through some combination of design changes, education, or enforcement. Crash factors have been assigned to 801 (48 percent) of the 1,685 crashes covered in this report. More details on where different crash types are occurring can be found in the detailed report for each jurisdiction, available on the TPO website at knoxtpo.org/data-and-monitoring/bicycle-pedestrian-crash-analysis/.

Certain crash types are more common in urban areas versus rural locations. This section identifies and illustrates the most common crash factor in each jurisdiction.

ILLUSTRATION 1: Examples of crash types where drivers fail to yield and strike pedestrians and bicyclists while turning.
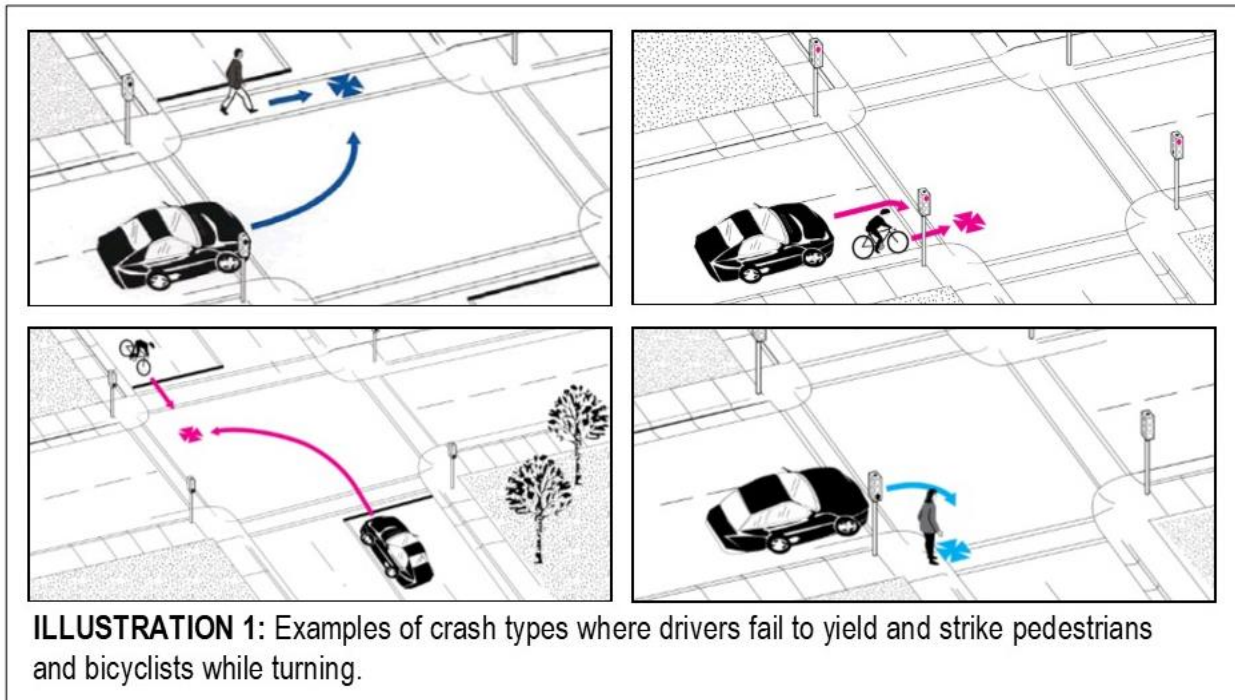
Illustration 1 depicts different ways in which drivers fail to yield while turning[3]. This is the most common crash factor in seven jurisdictions, all of them urban:

- Alcoa[4]
- Farragut
- Knoxville
- Lenoir City
- Maryville
- Oak Ridge
- Sevierville

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[3] 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.

[4] Three crash factors are tied for most common in the City of Alcoa. The other two are drivers failing to yield while going straight, and bicyclists riding in locations without safe facilities, which is indicated when bicyclists are struck from behind or struck while riding on a sidewalk.

Illustration 2 shows a frequent crash factor in rural areas and some suburban locales: people struck by cars while walking in locations without space for pedestrians, such as sidewalks, trails, or shoulders[5]. This is the most common crash factor in four jurisdictions:

- Unincorporated Anderson County[6]
- Unincorporated Blount County
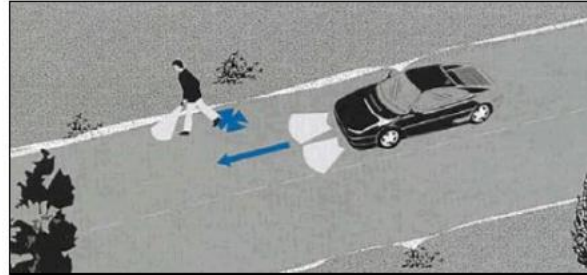- Unincorporated Knox County
- Unincorporated Loudon County

ILLUSTRATION 2: A frequent crash type in rural & suburban areas is pedestrians being struck while walking in locations lacking sidewalks.
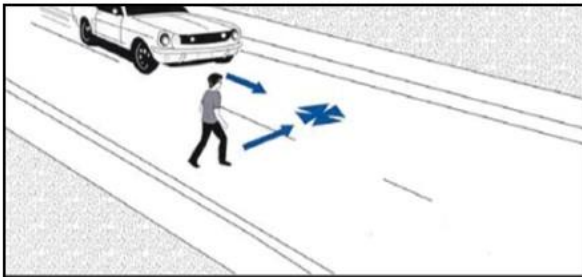

ILLUSTRATION 3: People crossing streets outside of designated crossing areas can be an indication that more and/or better crossing locations are needed.

Illustration 3 depicts a crash type that occurs in both urban and rural settings: people struck by cars while crossing a street outside of an intersection or marked midblock crossing[7]. This is the most common crash factor in one jurisdiction:

- Clinton

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[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] Two crash factors are tied for most common in unincorporated Anderson County. The other one is people struck by cars while crossing a street outside of an intersection or marked midblock crossing.

[7] 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.

METHOLODOGY

Crash data were obtained 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.

This report includes crashes from January 2012 onward because the different law enforcement agencies began submitting crash reports to the TITAN database on different dates. All local agencies were submitting reports by the beginning of 2012.

IMAGE CREDITS

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.