

# Boston Region Vision Zero Action Plan

## Appendix B: Existing Conditions Data Analysis



March 5, 2026

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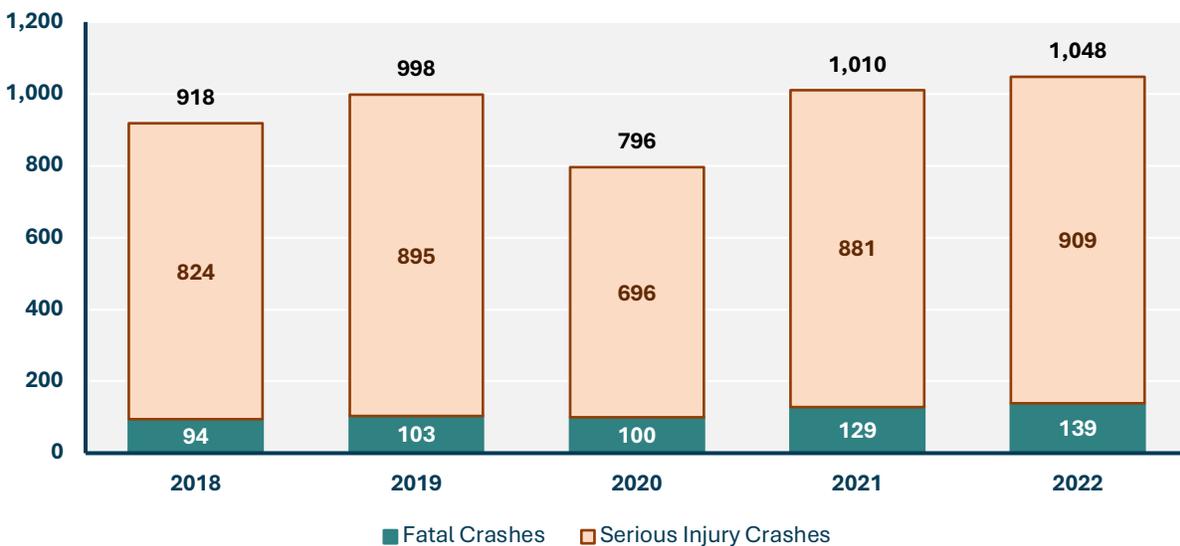
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# 1 Introduction

The Boston Region Metropolitan Planning Organization (MPO) developed a Vision Zero Action Plan to be compliant with the federal Safe Streets and Roads for All (SS4A) grant program requirements for safety action plans. Key to this plan is an overview of existing conditions at the regional level, providing a snapshot of safety outcomes in recent years. The Boston Region MPO's planning area includes 97 municipalities and is divided into eight subregions. The region is made up of multiple [community types](#), including regional urban centers, maturing suburbs, developing suburbs, and inner core communities.

Figure B-1 shows crashes that resulted in fatalities and serious injuries over the past five years in the Boston region. In all years except 2020, when traffic volumes were lower due to the COVID-19 pandemic, the total number of fatal and serious injury crashes increased 14 percent from 918 in 2018 to 1,048 in 2022. The number of fatal crashes increased 47 percent from 94 in 2018 to 139 in 2022. **The number of fatalities each year is equivalent to the number of people that could fill more than two MBTA buses** and does not take into account the thousands of people—family, friends, and co-workers—emotionally, financially, and mentally impacted by traffic crashes in the region.

**Figure B-1 | Fatal and Serious Injury Crashes in the Boston Region (2018-22)**



Note: This chart includes fatal and serious injury crashes along Interstates and other access-controlled roadways.

Source: MassDOT IMPACT Tool.

This appendix describes key takeaways regarding high-level crash trends and other observations from recent years. However, it is not the only source to draw from when considering future strategies and actions to achieve Vision Zero. Previously developed plans such as the [MassDOT Strategic Highway Safety Plan and Vulnerable Road User \(VRU\) Assessment](#), the City of [Boston's Vision Zero Action Plan](#), the City of [Somerville's Vision Zero Action Plan](#), the City of [Cambridge's Vision Zero Action Plan](#), the Town of Dedham's Local Road Safety Plan, the [Town of Weymouth's Safety Action Plan](#), the [City of Salem's Safe Streets for All Action Plan](#), and other local safety plans in the region as well as programs such as the [MassDOT Highway Safety Improvement Program](#) and [Boston Region Transportation Improvement Program](#) all lend valuable insights about safety in the region. Insights from these sources will be used by the Boston Region MPO to understand patterns of crashes and common risk factors, to develop crash profiles, and to inform strategies and actions to address those risk factors.

## Data Sources and Processing

The primary source of data reported in this appendix is crash data from the [MassDOT Open Data Portal](#) and the [MassDOT IMPACT tool](#), a tool for researching, querying, and downloading crash-related data in the Commonwealth. The most recent 10 years of cleaned and processed data were downloaded (2013–22), but most of the trends discussed here are based on data analyzed from the most recent five years of available data (2018–22) to focus on recent crash trends.

The crash dataset does not include crashes that were not reported to police and is subject to inconsistencies in reporting practices across the region. While there are known issues with the crash data, particularly within the City of Boston and City of Waltham, the MPO staff worked under the assumption that the majority of data was correct and suitably accurate to tell the story of crash trends in the region.

Because the recording of crash data attributes and categories evolved throughout the study period, assumptions had to be made to ensure consistency among injury classification schemes (represented in the data by the *Maximum Injury Severity Reported* field). For reporting purposes, crashes are categorized into the KABCO scale, a common injury severity scale. Definitions for each level of the KABCO scale and values in the *Maximum Injury Severity Reported* field correspond to each level are described below in Table B-1. Judgements about injury severity are normally made by the reporting officer responding to the crash and the crash data are cleaned and processed by MassDOT staff when entered into the MassDOT database.

**Table B-1 | Crash Severity Classification Scale**

KABCO Category	Definition	Corresponding Values in MassDOT Crash Data
Fatal Injury (K)	Any injury that results in death due to the crash. <sup>1</sup>	<ul style="list-style-type: none"> <li>Fatal Injury (K)</li> </ul>
Suspected Serious Injury (A)	Any injury that prevents the injured person from normally continuing activities that person was capable of before the injury occurred, such as a severe laceration or a broken limb.	<ul style="list-style-type: none"> <li>Suspected Serious Injury (A)</li> <li>Non-fatal Injury—Incapacitating</li> </ul>
Suspected Minor Injury (B)	Any visible injury that is not a suspected serious injury, such as a lump on the head or minor lacerations.	<ul style="list-style-type: none"> <li>Suspected Minor Injury (B)</li> <li>Non-fatal Injury—Non-incapacitating</li> </ul>
Possible Injury (C)	Any injury reported by an individual involved in the crash that is not visible to the reporting officer, such as dizziness or a complaint of pain.	<ul style="list-style-type: none"> <li>Possible Injury (C)</li> <li>Non-fatal Injury—Possible</li> </ul>
No Apparent Injury (O)	There is no evidence of physical injury and the individuals involved in the crash do not complain of any injury.	<ul style="list-style-type: none"> <li>No Apparent Injury (O)</li> <li>No Injury</li> </ul>
Not Reported or Unknown	Used when the injury severity is unknown.	<ul style="list-style-type: none"> <li>Not Reported</li> <li>Unknown</li> <li>Not Applicable</li> <li>[Blank]</li> </ul>

<sup>1</sup> Crash report data indicate that some people passed away during crashes, but not as a result of the crash. These incidents are coded as “Deceased not caused by crash” in the MassDOT IMPACT data and are not included in this analysis.

Source: Federal Highway Administration KABCO Injury Classification Scale and Definitions.

After cleaning and standardizing the injury severity information, all crashes on Interstates, expressways, other fully access-controlled roadways, and ramps were filtered and removed from the dataset.<sup>1</sup> This represented 16 percent of fatal and serious injury crashes that occurred from 2018 to 2022.

By concentrating on non-access-controlled roads, Vision Zero initiatives can more effectively address the areas where interventions are most needed and can have the greatest impact on reducing traffic-related fatalities and serious injuries. For this reason, **all crash breakdowns and analyses in this appendix exclude crashes along Interstates, expressways, other fully access-controlled roadways, and ramps, unless otherwise noted.**

Additional location information, such as the municipality, community type, and subregion in which the crash occurred, was joined to the crashes.<sup>2</sup> Also, historical data from the Fatality Analysis Reporting System (FARS) were collected to analyze long-term fatality trends at a timescale not

<sup>1</sup> Ramp crashes were identified by searching for the word “Ramp” in the *Street Name* field of the MassDOT IMPACT data.

<sup>2</sup> Location information primarily came from a file maintained by the Boston Region MPO, available at [https://raw.githubusercontent.com/CTPSSTAFF/geocrosswalks/main/output/muni\\_info.csv](https://raw.githubusercontent.com/CTPSSTAFF/geocrosswalks/main/output/muni_info.csv).

available in the MassDOT IMPACT tool and to compare the Boston Region MPO area to peer MPO regions. The FARS dataset cannot be filtered to consistently remove crashes along access-controlled roadways.

# 2 Overall Fatality Trends

FARS data were used to analyze overall fatality trends for the Boston region. This was done by reviewing long-term fatality trends and by comparing the region's fatality rates to peer areas. Analyzing long-term fatality trends helps tell the story of the region's progress on safety over time, which can inform future progress. Previous advances in transportation safety technology, such as seat belts, airbags, and more considerate vehicle design, helped drive fatality numbers down in the region.<sup>3</sup> New technological advances complemented by effective investments in other areas, such as vehicle design, self-enforcing roadway design, education, and "right-sized" enforcement, will assist in the pursuit to reach Vision Zero.

The comparison of the Boston region and similar regions in other states is shown to benchmark the region and to encourage future communication of best practices and lessons learned between the Boston Region MPO and its peer organizations. Given the Federal Highway Administration's (FHWA) commitment to zero deaths, the vision of no roadway fatalities is shared by the entire country and applicable to each MPO.<sup>4</sup>

## Key Takeaways

- Since 1980, fatalities in the Boston region have decreased 68 percent, from more than 300 a year to current levels of more than 100 a year.
- Fatalities decreased sharply from 1980 to 2000 before decreasing at a slower pace since the turn of the millennium.
- To jumpstart a more consistent downward trend in fatalities and achieve Vision Zero in a reasonable time frame, fatalities must be reduced at a faster pace compared to recent years.
- Fatality rates in the Boston region are comparable to peer regions. The Boston region has the lowest rate of fatalities per resident compared to peer regions.

<sup>3</sup> According to the National Highway Traffic Safety Administration, contributing factors to historical declines in fatalities may have included passenger vehicle safety enhancements and increases in seatbelt use. Source: <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/811368>

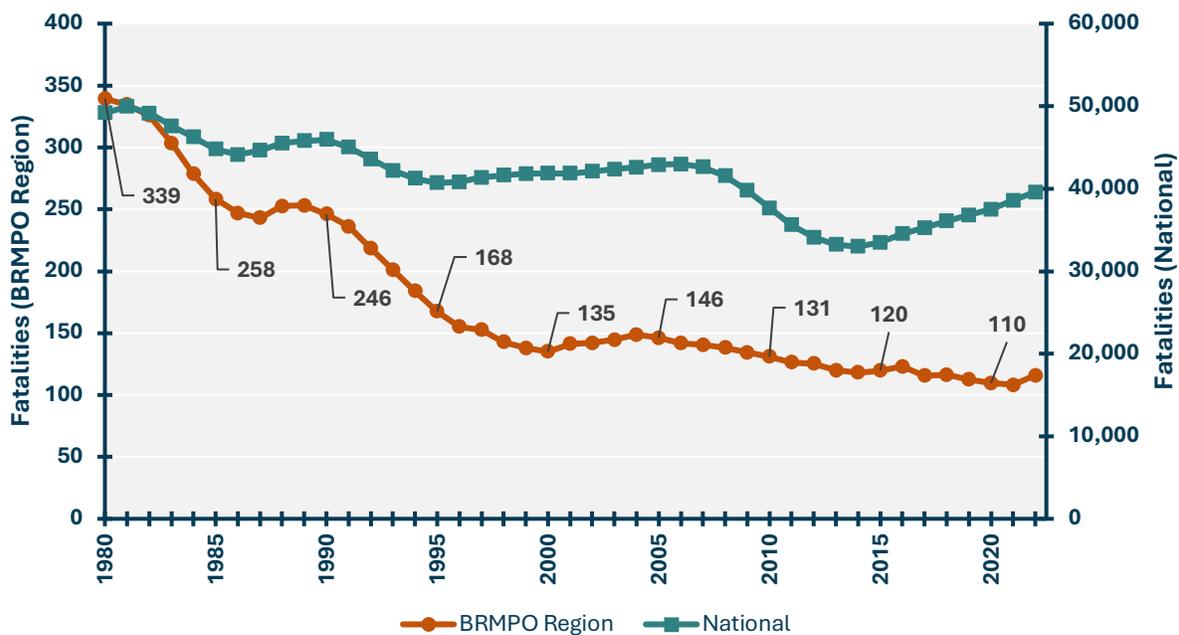
<sup>4</sup> Federal Highway Administration, Zero Deaths and Safe System, <https://highways.dot.gov/safety/zero-deaths>.

## Long-Term Trends

The historical fatality data from FARS are shown in Figure B-2. The data in this figure were smoothed with a five-year rolling average to account for the inherent randomness in fatal crashes and to make long-term trends easier to observe.

Between 1980 and 2022, the five-year average of Boston region fatalities experienced a general downward trend, decreasing by 68 percent over the entire time period. From 1980 to 2000, fatalities decreased at a rate of approximately 10 fatalities fewer per year on average. Since 2000, the rate of decline in fatalities slowed dramatically to approximately one fatality fewer per year on average. The trend of fatality rates declining over time is fairly consistent, with exceptions in the periods between 1987–89, 2000–04, and most recently in 2020–22.

**Figure B-2 | Long-Term Fatality Trend (1980–22)**



Note: Data from FARS and the MassDOT IMPACT tool may not match exactly due to data-processing discrepancies. Data from FARS also include fatalities on Interstates and access-controlled roads.

BRMPO = Boston Region Metropolitan Planning Organization.

Source: Fatality Analysis Reporting System (FARS) and National Highway Traffic Safety Administration (NHTSA).

This trend for the region compares favorably to the national trend, seen in Figure B-2. Nationally, according to FARS, fatalities decreased approximately 17 percent from 1980 to 2022, a much smaller decrease than the 68 percent seen in the Boston region. Additionally, the national fatality

numbers have constantly increased in the past decade, increasing by 20 percent from 2014 to 2022. In the same time period, the numbers have marginally decreased in the Boston region.

**If the fatality numbers in the Boston region continue to decrease at a rate similar to the period from 1980 to 2000, the region would reach Vision Zero in the next 10 to 15 years. If fatalities continue to decrease at a rate similar to the past two decades, the region will not reach Vision Zero for another 100 years.** Effective and strategic investments must be made in transportation safety to reverse the plateaued trend of recent years and enable the region to reach Vision Zero.

## Comparison to Peer Areas

Despite the challenges outlined above, the Boston region maintains some of the lowest fatality rates among peer metropolitan areas. The following metropolitan areas were analyzed using fatality data from FARS and population data from the US Census Bureau to develop fatality rates per population.

- Philadelphia, Pennsylvania
- Baltimore, Maryland
- Washington, DC
- Providence, Rhode Island
- New York City, New York

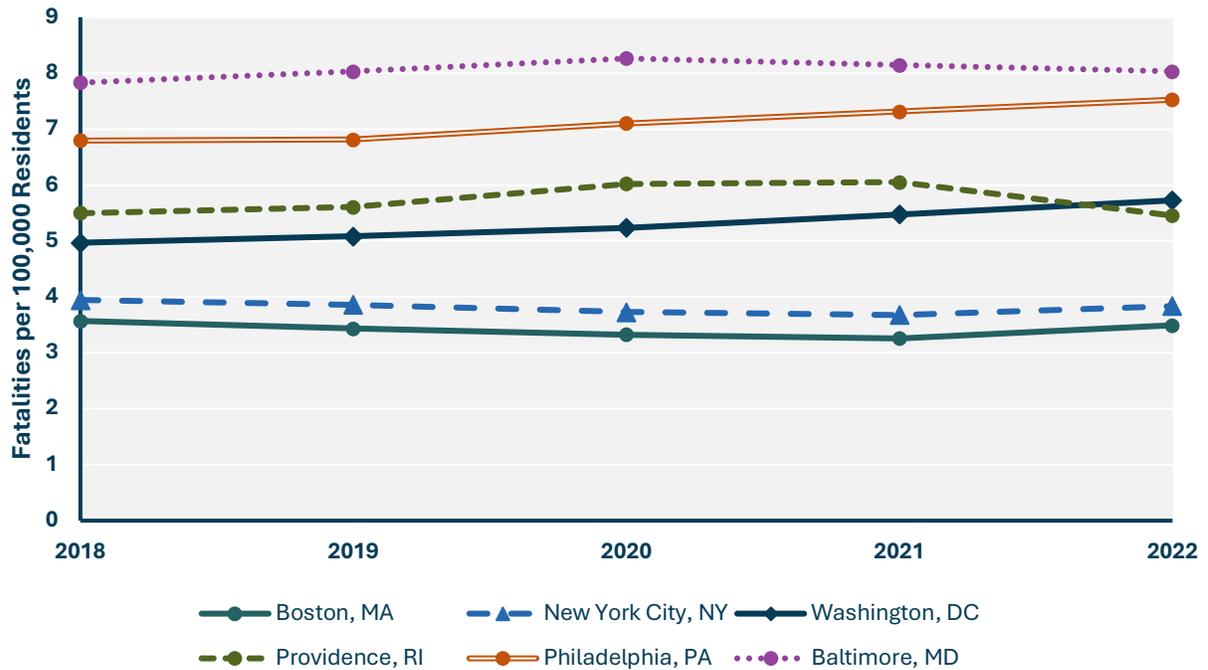
Peer MPOs were chosen based on proximity (all these MPOs are in the mid-Atlantic or New England regions), similar sizes, and land use patterns.

Figure B-3 shows the fatality rate, measured in fatalities per 100,000 residents, from 2018 to 2022. Among these peers, the Baltimore and Philadelphia regions averaged between 7 and 8 fatalities per 100,000 residents, the Washington and Providence regions averaged between 5 and 6, and New York City and Boston averaged between 3 and 4. **The Boston region has the lowest fatality rate out of all these peers, and its 2023 fatality rate is approximately 3.5 fatalities per 100,000 people.**

The Boston region is most similar to the New York City region, both in terms of rate of fatalities and recent trends. Both regions saw decreases from 2018 to 2021 before slight increases in 2022. Because of these similarities, Vision Zero actions taken by the New York City region may be applicable to Boston and worthy of further study. Recent safety strategies from Providence could also be considered, as the Providence region was the only region to experience a recent downward trend in the fatality rate, decreasing from approximately 6 fatalities per 100,000 residents in 2021 to just under 5.5 in 2022.

These low fatality rates show that current safety strategies are making an impact and indicate that the Boston region should expand upon its proven programs for crash reduction and continue its existing Vision Zero work to eventually meet the Vision Zero goal.

**Figure B-3 | Fatality Rate for Peer MPOs Compared to the Boston Region (2018–22)**



Note: Data from FARS include fatalities on Interstates and access-controlled roads.

Source: Fatality data from the Fatality Analysis Reporting System (FARS) and National Highway Traffic Safety Administration (NHTSA). Population data from the American Community Survey and US Census Bureau.

# 3 | Current Trends

While long-term historical trends are important for setting the stage and telling the overall story of safety in the region, the specific contributing factors for those crashes can change over time. This section contains a review of recent crash data to identify current contributing factors linked to the most common and highest density crash types.<sup>5</sup> Crashes were analyzed by severity, by time of day and year, by roadway type and ownership, and by other factors to help predict factors that may lead to more crashes in the future.

These breakdowns, combined with the emphasis area analysis in Section 4, will help focus on the most vital and overrepresented crashes and enable the prioritization of solutions, strategies, and actions to maintain progress on the road to Vision Zero.

## Key Takeaways

- Crashes cost the Boston region approximately \$5.3 billion each year. Of that total, \$2.5 billion (or 46 percent) comes from fatal and severe crashes alone.
- Nighttime crashes are disproportionately more likely to be fatal or serious compared to daytime crashes. Potential contributing factors are the increased prevalence of impaired driving and speeding at night.
- While a plurality of fatal and serious injury crashes occur on principal arterials, minor arterials have higher rates of fatal and serious injury crashes.
- Seventy-one percent of all fatal and serious injury crashes and 83 percent of those crashes involving a bicyclist occur on locally owned roadways.
- Motorcyclists are 10 times more likely than passengers in cars to die or suffer a serious injury in a crash.
- In high-density business and commercial centers, 38 percent of fatal and serious injury crashes involve vulnerable roadway users and 39 percent involve light trucks. Both percentages are significantly higher than the percentage of crashes in areas with other land use types.

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<sup>5</sup> As stated in Section 1, the summaries in this section do not include crashes on access-controlled roadways.

## Crash Severity

From 2018 to 2022, a total of 188,683 roadway crashes occurred in the Boston region, with 2 percent (3,986 crashes) resulting in fatalities or serious injuries. Overall, less severe crashes (KABCO injury severity levels C and O) accounted for more than 85 percent of total crashes.

To quantify the economic impact of crashes, cumulative crash costs were calculated for each severity level using the 2024 recommended comprehensive crash unit costs developed by MassDOT for highway safety analysis.<sup>6</sup> These cumulative costs include both direct economic costs (e.g., medical expenses, emergency services, and congestion costs) and quality-adjusted life years values, which estimate the societal and individual impacts of reduced health and lifespan due to crashes.

Table B-2 summarizes the total number of crashes by severity level, along with the crash unit cost and corresponding cumulative crash costs for the region between 2018 and 2022. During this period, crashes incurred an estimated total cost of \$26.5 billion, averaging approximately \$5.3 billion per year. Fatal and serious crashes make up more than 46 percent of these crash costs alone. **Evenly distributing the cost of crashes among residents of the Boston region would result in crashes costing each resident more than \$1,500 each year.**

**Table B-2 | Crashes by Injury Severity Level (2018–22)**

Maximum Injury Severity Level	Number of Crashes	Percent of Total Crashes	Comprehensive Crash Unit Cost	Cumulative Crash Cost (millions)	Percent of Cumulative Crash Cost
Fatality (K)	427	0.2%	\$19,435,000	\$8,299 M	31.3%
Suspected Serious Injury (A)	3,559	1.9%	\$1,112,900	\$3,961 M	15.0%
Suspected Minor Injury (B)	21,338	11.3%	\$354,100	\$7,556 M	28.5%
Possible Injury (C)	18,745	9.9%	\$208,000	\$3,899 M	14.7%
No Apparent Injury (O)	132,315	70.1%	\$20,900	\$2,765 M	10.4%
Other/Unknown	12,299	6.5%	-	-	-
<b>Total</b>	<b>188,683</b>	<b>100.0%</b>	<b>-</b>	<b>\$26,480 M</b>	<b>100.0%</b>

Source: Crashes from the MassDOT IMPACT Portal; Crash costs from [Crash Costs for Highway Safety Analysis](#), MassDOT.

<sup>6</sup> Crash Costs for Highway Safety Analysis, MassDOT. Source: <https://www.mass.gov/info-details/crash-costs-for-highway-safety-analysis>.

## Crashes by Time

Travel behaviors and crash frequency are correlated with time of day and day of the week. The total number of vehicle-miles traveled (VMT) and, therefore, the opportunities for crashes is generally greater on weekdays when people are driving to and from jobs compared to the weekend. Also, while more people drive during daytime hours, the lack of adequate lighting conditions and lower volumes of traffic can lead to higher speeds and severe crashes at night.<sup>7</sup>

To better understand the temporal crash patterns, crash data were evaluated according to time of day and sorted into six four-hour periods. Figure B-4 and Figure B-5 show the distribution of total crashes as well as fatal and serious injury crashes across these time periods by day of week.

**Weekday afternoon periods (2:00 PM to 6:00 PM) experienced the highest fatal and serious injury crash frequency, closely followed by weekday morning periods (6:00 AM to 10:00 AM).**

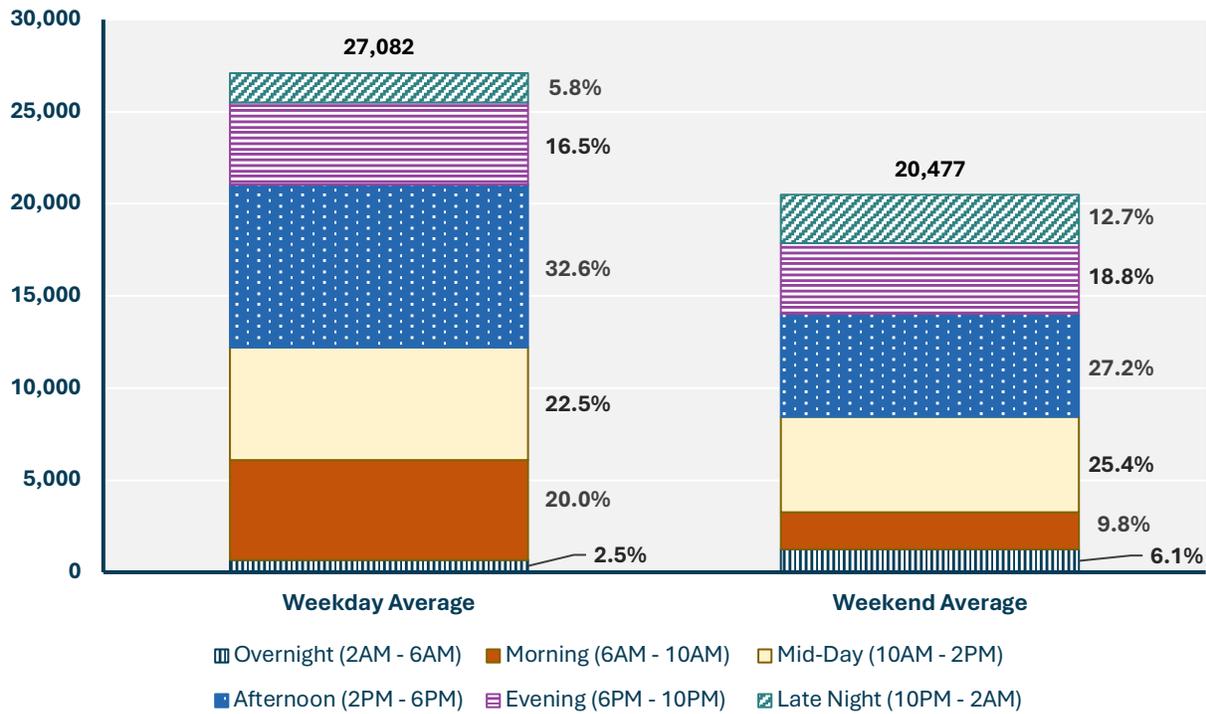
Given that both periods include peak commuting times, the high crash frequency is likely attributable to higher traffic volumes and increased traffic congestion.

While 28 percent of all roadway crashes occurred during evening, late night, or overnight hours (6:00 PM to 6:00 AM), 40 percent of the fatal and serious injury crashes occurred during the same time period. This suggests that while more crashes happen in the daytime, **nighttime crashes are more likely to result in severe outcomes.** Despite the overwhelming majority of these fatal and serious injury crashes happening when the sun is down, only 7 percent of crashes in this time period occurred in dark, *unlighted* areas compared to 70 percent that occurred in dark, *lighted* areas. This indicates that while lighting is an important contributing factor in nighttime crashes, it is not the only contributing factor. The prevalence of drivers operating under the influence is also correlated with nighttime crashes. **During nighttime, drivers under the influence are eight times more likely (13 percent) to be a cause of a fatal or serious injury crash compared to daytime (2 percent),** per MassDOT IMPACT data.

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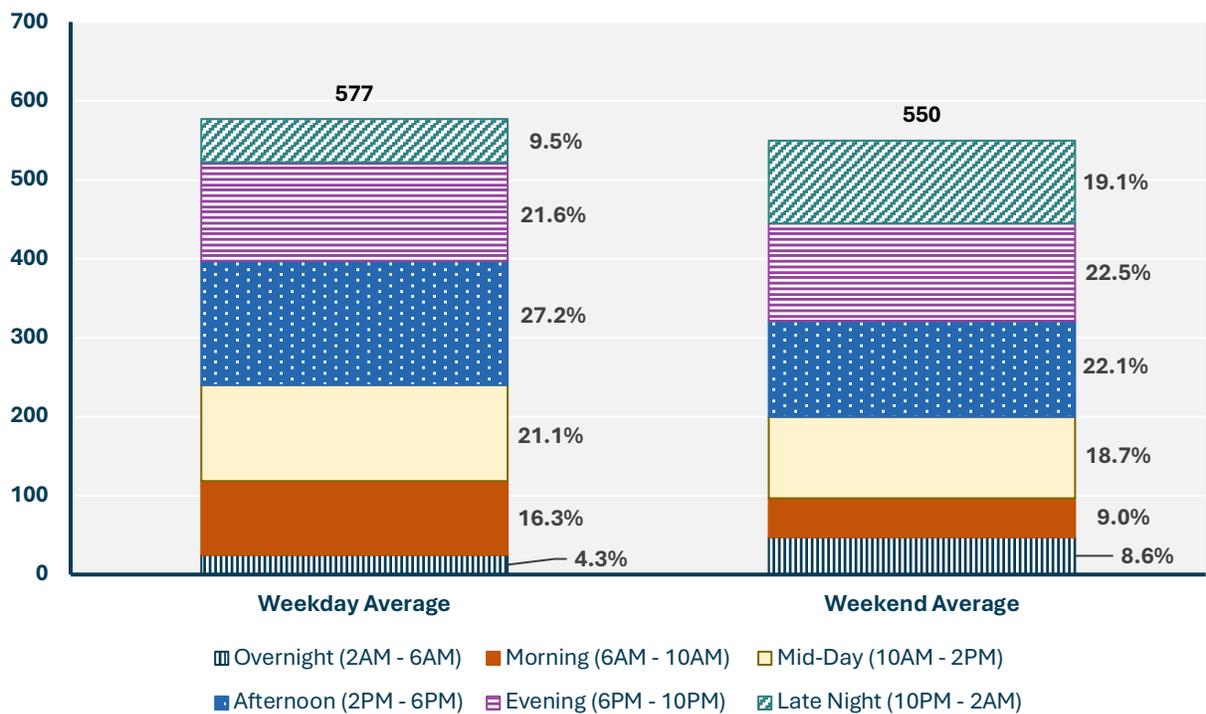
<sup>7</sup> Enhancing Nighttime Safety for All Roadway Users, NHTSA. Source: [https://highways.dot.gov/sites/fhwa.dot.gov/files/2024-02/FHWA-SA-23-021\\_Nighttime%20Safety.pdf](https://highways.dot.gov/sites/fhwa.dot.gov/files/2024-02/FHWA-SA-23-021_Nighttime%20Safety.pdf).

Figure B-4 | Total Crashes by Time of Day and Day of Week (2018–22)



Source: MassDOT IMPACT Portal.

Figure B-5 | Fatal and Serious Injury Crash by Time of Day and Day of Week (2018–22)



Source: MassDOT IMPACT Portal.

## Crashes by Functional Classification

One method to classify roadway types is by *functional classification*, which is a hierarchy of road types that serve different needs. *Arterials* are generally main thoroughfares that limit cross-traffic and are often controlled by traffic signals, while *collectors* generally serve to funnel traffic from local roads on to the arterials. *Local roads* serve individual houses and neighborhoods and make up the largest percentage of roadways by mileage, but they often have the lowest traffic volumes and lowest average speeds. Analyzing crashes by roadway type influences further systemic analysis of crashes and can help the Boston Region MPO develop packages of systemic roadway projects.

**Between 2018 and 2022 in the Boston region, principal arterials accounted for the largest share of both total crashes (42 percent) and fatal and serious injury crashes (38 percent).**

However, minor arterials showed a disproportionately higher percentage of fatal and serious injury crashes (33 percent) compared to their share of total crashes (28 percent). Table B-3 presents a detailed breakdown of fatal and serious injury crashes, total crashes, and fatal and serious injury crashes with vulnerable road users (VRUs) involved by functional classification.<sup>8</sup> Regarding fatal and serious injury crashes that involved at least one VRU, principal arterials still accounted for the plurality (39 percent). VRU-involved crashes were more likely to occur on local roads compared to fatal and serious injury crashes (16 percent vs. 14 percent) and less likely on minor arterials (30 percent vs. 33 percent).

Table B-3 also normalizes these crash breakdowns by the centerline mileage of roadways in each functional classification. **All types of crashes, regardless of severity of VRU-involvement, occur at a greater rate per mile on principal arterials and minor arterials.** Twice the number of crashes per mile are likely to occur on minor arterials compared to major collectors, and twice the number of crashes per mile are likely to occur on principal arterials compared to minor arterials. This is likely due to the higher vehicle volumes and, therefore, more opportunities for crashes on roadways with higher functional classifications.

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<sup>8</sup> Vulnerable road users (VRUs) are pedestrians on foot or on a mobility-assistance device, a bicyclist or other cyclist, or a person on a personal conveyance vehicle. Motorcyclists are not considered as VRUs for the purpose of this analysis.

Table B-3 | Crashes by Functional Classification (2018–22)

Functional Classification	All Crashes			Fatal and Serious Injury Crashes			All VRU Crashes			Fatal and Serious Injury VRU Crashes		
	Number	Percent of Total	By Mileage	Number	Percent of Total	By Mileage	Number	Percent of Total	By Mileage	Number	Percent of Total	By Mileage
Principal Arterial	74,122	42.0%	89.2	1,518	38.1%	1.8	3,153	39.7%	3.8	428	38.9%	0.51
Minor Arterial	50,317	28.5%	35.3	1,303	32.7%	0.9	2,263	28.5%	1.6	326	29.7%	0.23
Major Collector	22,192	12.6%	17.4	586	14.7%	0.5	1,054	13.3%	0.8	160	14.6%	0.13
Minor Collector	74	0.0%	6.0	1	0.0%	0.1	1	0.0%	0.1	0	0.0%	0.00
Local	28,220	16.0%	3.6	541	13.6%	0.1	1,422	17.9%	0.2	177	16.1%	0.02
Unknown	1,321	0.7%	-	35	0.9%	-	55	0.7%	-	8	0.7%	-
<b>Total</b>	<b>176,384</b>	<b>100.0%</b>	<b>15.6</b>	<b>3,986</b>	<b>100.0%</b>	<b>0.4</b>	<b>7,951</b>	<b>100.0%</b>	<b>0.7</b>	<b>1,099</b>	<b>100.0%</b>	<b>0.10</b>

Notes: The *By Mileage* column equates to the number of crashes divided by the centerline mileage of roadways with that functional classification.

As noted in Section 1, Data Sources and Processing, fully access-controlled roadways, which include Interstates and Principal Arterials—Other Freeways and Expressways, were removed from this analysis and are not shown in this table.

VRU = vulnerable road user.

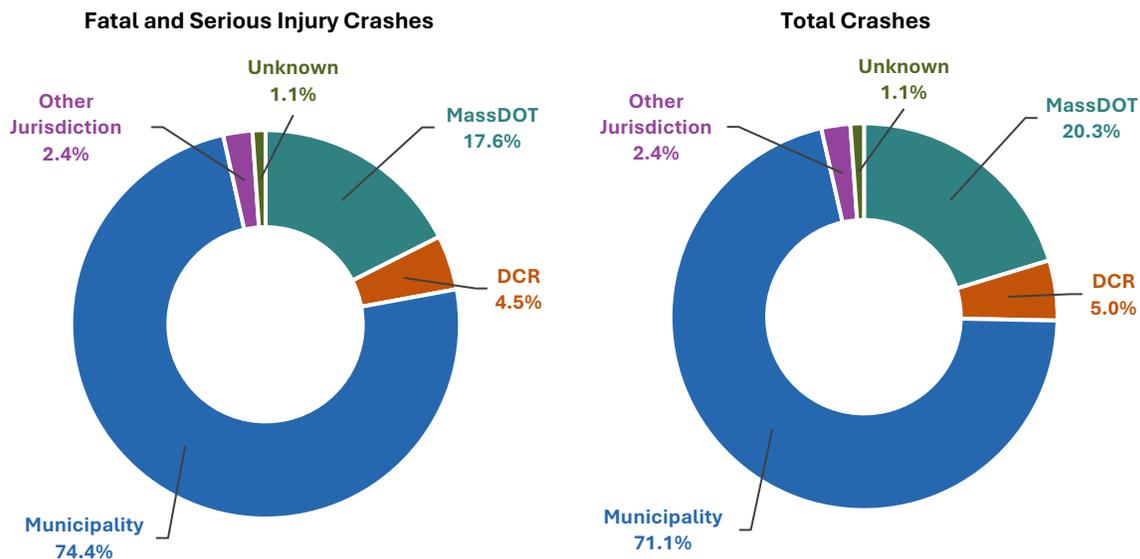
Source: MassDOT IMPACT Portal.

## Crashes by Roadway Ownership

Vision Zero can only be achieved in the Boston region by coordinating among many jurisdictions, law enforcement agencies, and roadway owners. Analyzing crashes by roadway ownership can help guide these discussions and can help justify additional attention and support to overrepresented roadway owners.

Figure B-6 illustrates the distribution of crashes according to roadway ownership. Between 2018 and 2022, the **majority of crashes (71 percent) occurred on roads under municipal jurisdiction**, followed by those owned by MassDOT (20 percent) and the Department of Conservation and Recreation (DCR) (5 percent).<sup>9</sup>

**Figure B-6 | Crashes by Roadway Ownership (2018–22)**



Source: MassDOT IMPACT Portal.

Notably, a crash on a municipally owned road was more likely to result in a fatality or serious injury (2.4 percent) compared to the likelihood observed on roads under MassDOT (2 percent) and DCR (2 percent) ownership. This suggests that there may be specific safety challenges for locally managed roads. These safety challenges on locally managed roads include the following:

<sup>9</sup> The Department of Conservation and Recreation maintains select roads and parkways in the Commonwealth of Massachusetts, such as Storrow Drive, the Jamaicaaway, the Veterans of Foreign Wars Parkway, and others.

- **Intersection-related crashes:** Almost half (46 percent) of fatal and serious injury crashes on municipal roads occurred at or near intersections. Of those intersection crashes, 47 percent were at four-way intersections and 48 percent were at T-intersections.
- **Bicyclist-involved crashes:** The majority (84 percent) of bicyclist-involved fatal and serious injury crashes occurred on municipal roads, and bicyclist-involved crashes on municipal roads were more likely to result in fatalities or serious injuries compared to those on MassDOT and DCR roads.
- **Occupant protection-related crashes:** Municipal roads had a higher percentage (3 percent) of fatal and serious injury crashes involving vehicle occupants not using a seat belt, compared to MassDOT roads (2 percent) and DCR roads (2 percent).

## Crashes by Vehicle Type

To understand the impact of vehicle type on crash severity, the distribution of total crashes and fatal and serious injury crashes was analyzed over a five-year period, as shown in Table B-4 . Passenger cars, which accounted for the 96 percent of the region's annual VMT, were the most frequently involved vehicle type and were involved in 75 percent of fatal and serious injury crashes.<sup>10</sup> Trucks followed at 35 percent.

The analysis of crashes involving motorcyclists reveals that motorcycles have the highest vulnerability among all vehicle types, with 83 fatal and serious injury crashes per 100 million VMT on average. Due to various factors, such as lack of external protection and inherent vehicle instability, **the rate of fatal and serious injury crashes for motorcycles was approximately 30 times greater than the 2.8 per 100 million VMT observed for passenger cars.** This underscores the importance of targeted interventions such as education programs promoting helmet use and other safe riding behaviors.

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<sup>10</sup> MassDOT, Massachusetts Vehicle Census, MassDOT, <https://geodot-homepage-massdot.hub.arcgis.com/pages/massvehiclecensus>.

**Table B-4 | Crashes by Vehicle Type (2018–22)**

Vehicle Type	All Crashes			Fatal and Serious Injury Crashes			Fatal and Serious Injury VRU Crashes		
	Number	Percent of Total	Rate per 100 Million VMT	Number	Percent of Total	Rate per 100 Million VMT	Number	Percent of Total	Rate per 100 Million VMT
Passenger Car	148,412	84.1%	142	2,977	74.7%	2.8	713	64.9%	0.7
Motorcycle	2,169	1.2%	433	418	10.5%	83.4	9	0.8%	1.8
Truck	69,271	39.3%	2,187	1,389	34.8%	43.9	366	33.3%	11.6
Bus	2,079	1.2%	391	37	0.9%	7.0	10	0.9%	1.9
Other	401	0.2%	113	44	1.1%	12.4	9	0.8%	2.5
Unknown/Not Reported	263	0.1%	-	31	0.8%	-	25	2.3%	-
<b>Total</b>	<b>176,384</b>	<b>-</b>	<b>162</b>	<b>3,986</b>	<b>-</b>	<b>3.7</b>	<b>1,099</b>	<b>-</b>	<b>1.0</b>

Note: A single crash may have involved more than one type of vehicle, so the *Total* row will be not equal the sum of all the rows above it.

VMT = vehicle-miles traveled. VRU = vulnerable road user.

Source: MassDOT IMPACT Portal.

## Crashes by Land Use

Analyzing crashes by land use is crucial for understanding how the built environment influences roadway safety. Different land uses create distinct roadway designs, traffic patterns, and user behaviors, all of which can significantly impact the frequency and severity of crashes.

Table B-5 shows that within urbanized areas, commercial areas had the highest proportion of fatal and serious injury crashes (30 percent), potentially due to high volumes of vehicles, pedestrians, and delivery trucks. This trend is particularly pronounced **in high-density business and commercial centers, where 38 percent of fatal and serious injury crashes involved VRUs and 39 percent involved light trucks.** This indicates the potential need for roadway safety improvements, including safer pedestrian crosswalks, dedicated bike lanes, and improved intersection designs.

In addition, high-density residential areas exhibited a high involvement of light trucks in fatal and serious injury crashes (41 percent) and had the highest proportion of fatal and serious injury crashes compared to all crashes (3 percent). This significant light truck presence poses a great potential risk of severe crashes involving VRUs, especially considering the high levels of pedestrian and bicycle activity typical of these areas.

Table B-5 | Crashes by Land Use (2018–22)

Reported Land Use	Fatal and Serious Injury Crashes			Fatal and Serious Injury VRU Crashes		Fatal and Serious Injury Crashes Involving Light Trucks	
	Number	Percent of Total	Proportion of Crashes that Result in a Fatality or Serious Injury	Number	Percent of Land Use's Total Fatal and Serious Injury Crashes	Number	Percent of Land Use's Total Fatal and Serious Injury Crashes
High-density business/commercial center	136	15.1%	2.5%	52	38.2%	53	39.0%
High-density residential (5,000 or more persons per square mile)	116	12.9%	2.8%	26	22.4%	47	40.5%
Low-density commercial	136	15.1%	1.6%	48	35.3%	46	33.8%
Low-density residential (less than 5,000 persons per square mile)	86	9.5%	1.7%	13	15.1%	31	36.0%
Not applicable (i.e., not a principal arterial nor in an urbanized area)	303	33.6%	1.7%	94	31.0%	91	30.0%
Other urban area, including undeveloped land	124	13.8%	1.6%	24	19.4%	30	24.2%
<b>Total</b>	<b>901</b>	<b>100.0%</b>	<b>1.8%</b>	<b>257</b>	<b>28.5%</b>	<b>298</b>	<b>33.1%</b>

Note: Land use information is taken from the *Urban Location Type* field from the MassDOT IMPACT Portal. Land use information is only available for a subset (22 percent) of fatal and serious injury crashes. This table only displays that subset.

VRU = vulnerable roadway user.

Source: MassDOT IMPACT Portal.

## Crashes by Collision Type

Since different crash types are often associated with certain roadway conditions and driver behaviors, an analysis of collision types can help provide insights into the underlying contributing factors and the according safety countermeasures.

As shown in Table B-6 , while the most common crash types were angle crashes (29 percent) and rear-end crashes (26 percent), single-vehicle crashes had the highest share of fatal and serious injury crashes (40 percent), making them the crash type with the second highest risk of fatalities and serious injuries. Although head-on crashes were less frequent, they posed the greatest risk for severe outcomes, as the vehicle impact forces involved in the crash were typically much stronger compared to other multi-vehicle crash types.

**Table B-6 | Crashes by Collision Type (2018–22)**

Collision Type	Number of Fatal and Serious Injury Crashes	Percent of Fatal and Serious Injury Crashes	Number of Total Crashes	Percent of Total Crashes	Proportion of Fatal and Serious Injury Crashes
Single-vehicle	1,588	39.8%	33,835	19.2%	<b>4.7%<sup>1</sup></b>
Rear-end	436	10.9%	46,388	26.3%	0.9%
Angle	1,003	25.2%	51,365	29.1%	2.0%
Sideswipe, same direction	174	4.4%	22,530	12.8%	0.8%
Sideswipe, opposite direction	102	2.6%	6,461	3.7%	1.6%
Head-on	476	11.9%	6,016	3.4%	<b>7.9%<sup>1</sup></b>
Rear-to-rear	8	0.2%	1,363	0.8%	0.6%
Other	97	2.4%	5,879	3.3%	1.6%
Unknown/Not Reported	102	2.6%	2,547	1.4%	4.0%
<b>Total</b>	<b>3,986</b>	<b>100.0%</b>	<b>176,384</b>	<b>100.0%</b>	<b>2.3%</b>

<sup>1</sup> Percentages indicate a high risk of fatal and serious injury crashes.

Source: MassDOT IMPACT Portal.

Among the single-vehicle fatal and serious injury crashes, the most common first harmful events were collisions with pedestrians (35 percent), followed by collisions with utility poles (15 percent) and curbs (8 percent). The high proportion of pedestrian involvement in single-vehicle fatal or serious injury crashes indicates potential concerns such as vehicles leaving the roadway due to driver impairment, distraction, or excessive speeds, and encroaching onto sidewalks. These findings suggest the potential need for infrastructure improvement, such as protected sidewalks, as well as increased public awareness of safer driving behavior, particularly in areas with high pedestrian activity.

# 4 | Emphasis Areas

In conjunction with the analyses described in Section 3, summarizing crashes by emphasis areas will further narrow the focus on specific crash types and assist in the prioritization of investments in the Boston region. The Massachusetts Highway Safety Improvement Program (HSIP) identifies emphasis areas for the entire Commonwealth.<sup>11</sup> Paired with the conclusions from Section 3, these emphasis areas are a helpful framework for identifying common crash issues, analyzing contributing factors, and linking them with a set of countermeasures and strategies.

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<sup>11</sup> MassDOT, Massachusetts Highway Safety Improvement Program, <https://www.mass.gov/info-details/highway-safety-improvement-program>.

## Key Takeaways

- Through an analysis of the data, *Intersections*, *Lane Departure*, *Vulnerable Road Users*, *Older Drivers*, *Speeding*, and *Large Vehicles* emerged as key emphasis areas, which will narrow the focus of strategies and actions within this plan.
- Intersection-related crashes were the most common type of fatal and serious injury crashes in the Boston region from 2018 to 2022, accounting for 44 percent of these crashes.
- Compared to other road users, vulnerable road users are eight times more likely to be killed or seriously injured in a crash.
- Lane departure crashes are correlated with instances of impaired driving and speeding, which emphasizes the importance of context-sensitive roadway design and awareness efforts targeting these high-risk behaviors.
- Key risk factors associated with older drivers, such as age-related declines in physical and cognitive function, underlying medical conditions, individual driving habits, and limitations in roadway design and vehicle features, make the older driver emphasis area an important focus for reducing fatal and serious injury crashes.
- The Boston region experienced a substantial increase (91 percent) in speeding-related crashes from 2018 to 2022, therefore, speeding is identified as an emphasis area for this plan.
- Crashes involving large vehicles are particularly dangerous for those not wearing seatbelts or those traveling at night.

Emphasis areas studied in this plan include the following:

- **Intersections:** Crashes that occur within intersections or are related to the operation of intersection approaches
- **Lane Departure:** Crashes that occur when a vehicle intentionally or unintentionally crosses an edge or centerline or otherwise leaves the traveled way
- **Older Drivers:** Crashes that involve at least one driver who is 65 years of age or older
- **Pedestrians:** Crashes that involve a pedestrian on foot or using a mobility device such as a wheelchair
- **Younger Drivers:** Crashes that involve at least one driver who is between 15 and 20 years old

- **Motorcyclists:** Crashes that involve a motorcyclist
- **Distracted Driving:** Crashes occurring when the driver is distracted by an electronic device, a passenger, or a distraction outside the vehicle
- **Bicyclists:** Crashes that involve a bicyclist
- **Impaired Driving:** Crashes involving a driver suspected to be under the influence of alcohol
- **Large Vehicles:** Crashes that involve large trucks, tractor trailers, buses, or other large vehicles
- **Speeding:** Crashes occurring when the driver exceeded the authorized speed limit
- **Occupant Protection:** Crashes involving a driver or passenger who is not wearing a seat belt

More specific information, including the exact queries used to filter to these emphasis areas, are available on [MassDOT's website](#).

Table B-7 lists the fatal and serious injury crashes for each emphasis area for both the Boston region and the Commonwealth of Massachusetts, the percentage of total fatal and serious injury crashes within each emphasis area, and the change in fatal and serious injury crashes from 2018 to 2022. Emphasis areas that are notably more prevalent in the region compared to the Commonwealth are highlighted in red.

To narrow the focus of this analysis, the following six emphasis areas emerged as key emphasis areas to address in the Boston Region Vision Zero Action Plan.

- Intersections
- Lane Departure
- Vulnerable Road Users (pedestrians and bicyclists)
- Older Drivers
- Large Vehicles
- Speeding

The *Intersections*, *Lane Departure*, and *Older Drivers* emphasis areas were the top three emphasis areas in terms of the percentage of the region's fatal and serious injury crashes. Given Vision Zero's focus on the safety of people outside of vehicles, the *Pedestrian* and *Bicyclist* emphasis areas were combined for a *VRU* emphasis area. When these categories are combined, the *VRU* emphasis area

is the second most-prevalent emphasis area by crash percentage. Additionally, the *Intersections* category, both *VRU* categories, and the *Older Drivers* category were overrepresented when compared to the rest of the Commonwealth. All of these emphasis areas each represent more than 20 percent of fatal and serious injury crashes in the region.

In addition to the above emphasis areas, the *Large Vehicles* emphasis area was also overrepresented compared to the rest of the Commonwealth. While these crashes only contribute to 5 percent of fatal and serious injuries in the region, this emphasis area was consistently noted by key regional stakeholders as an important focus moving forward.

The *Speeding* emphasis area, while not one of the emphasis areas with the largest number of fatal and serious injury crashes, was one of the fastest growing areas of concern over the past five years. Speeding-related fatal and serious injury crashes increased by more than 90 percent from 2018 to 2022, which is the second-fastest growing emphasis area except for the *Bicyclists* category. Additionally, high vehicle speeds were mentioned repeatedly as a key issue by stakeholders. Because of the recent high growth of this emphasis area and the feedback of stakeholders, *Speeding* emerged as the final emphasis area.

Despite the fact that the other emphasis areas were not selected as part of the key emphasis area list, this does not mean they are not important for the region and individual municipalities to focus on when thinking about how to improve roadway safety. Strategies and actions in the plan will still relate to and address these emphasis areas, as several are interconnected. The focus of the majority of the strategies and actions in the Vision Zero Action Plan, however, will be on the key emphasis areas.

Table B-7 | Emphasis Area Summary (2018–22)

Massachusetts HSIP Emphasis Area	Boston Region			Massachusetts	
	Number of Fatal and Serious Injury Crashes	Percent of Total Fatal and Serious Injury Crashes	Percent Change from 2018 to 2022	Percent of Total Fatal and Serious Injury Crashes	Percent Change from 2018 to 2022
Intersections	1,756	<b>44.1%</b>	7.0%	39.7%	15.6%
Lane Departure	842	21.1%	<b>42.8%</b>	25.9%	37.7%
Older Drivers	837	<b>21.0%</b>	<b>23.5%</b>	20.0%	18.5%
Pedestrians	781	<b>19.6%</b>	-3.9%	14.9%	11.0%
Younger Drivers	449	11.3%	<b>53.7%</b>	12.7%	52.2%
Motorcyclists	424	10.6%	<b>62.9%</b>	14.5%	58.6%
Distracted Driving	314	7.9%	<b>36.5%</b>	8.9%	23.4%
Bicyclists	300	<b>7.5%</b>	<b>92.3%</b>	5.1%	60.9%
Impaired Driving	277	6.9%	23.9%	8.3%	48.0%
Large Vehicles	215	<b>5.4%</b>	20.0%	5.3%	27.2%
Speeding	205	5.1%	<b>90.6%</b>	6.6%	84.8%
Occupant Protection	182	4.6%	<b>37.5%</b>	4.8%	15.0%

Note: Percentages bolded in red are greater than the corresponding percentage in the entire Commonwealth of Massachusetts. Data in this table do not represent crashes along Interstates, expressways, other fully access-controlled roadways, or ramps.

HSIP = Highway Safety Improvement Program.

Source: Data Query and Visualization from MassDOT IMPACT Portal.

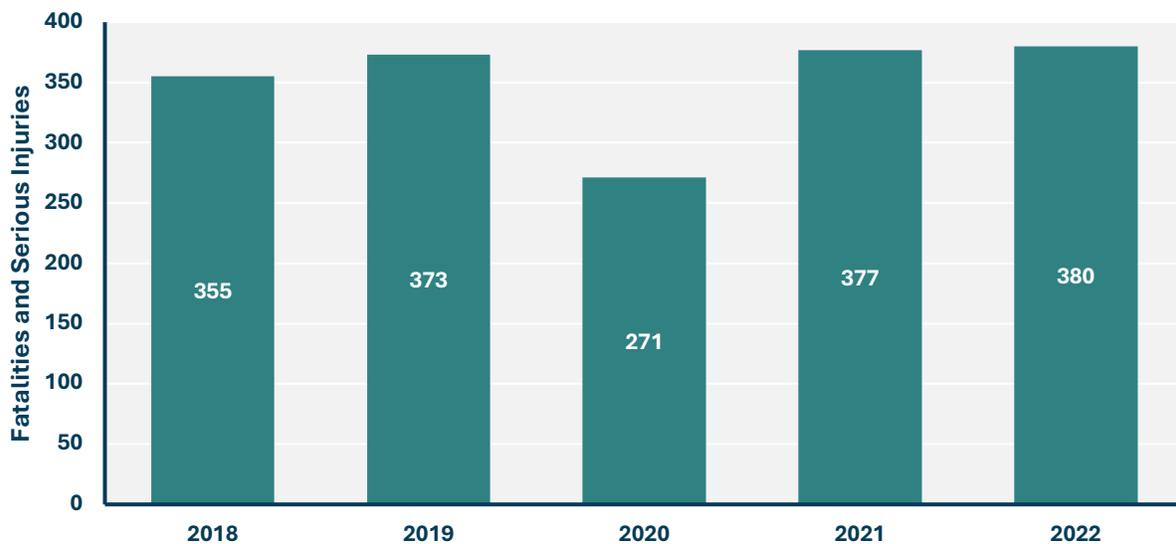
Because of their outsized importance, more details about the contributing factors of the six key emphasis areas are provided below to better tailor the strategies and actions of the region's plan.

## Intersections

Intersection crashes include those crashes that are directly located within intersections or related to the operation of intersection approaches. These are critical points of conflict among various road users, including motorized vehicles, pedestrians, and cyclists, leading to a high incidence of crashes.

**Among all the identified emphasis areas, intersection-related crashes were the most common type of fatal and serious injury crashes from 2018 to 2022, contributing to 44 percent of the region's total.** While these crashes were slightly overrepresented compared to the statewide percentage of 40 percent, they remained relatively stable with fewer than 400 per year over the five-year period, except for a brief decline in 2020 likely due to reduced traffic volumes during the pandemic. As shown in Figure B-7, by 2022 these crashes had increased by 7 percent compared to 2018, a much slower rate than the statewide increase of 16 percent.

**Figure B-7 | Intersection-Related Fatal and Serious Injury Crashes (2018–22)**



Source: MassDOT IMPACT Portal.

Given the distinct safety challenges posed by each intersection's unique combination of geometry, configuration, and traffic control, intersection-related crashes were further analyzed by intersection type and traffic control type. As indicated in Table B-8, **four-way intersections and T-intersections accounted for the majority (94 percent) of fatal and serious injury crashes at intersections.** Additionally, the proportion of fatal and serious injury crashes relative to total

intersection crashes increased with the number of intersection approaches, likely due to increased complexity of intersection configurations.

**Table B-8 | Fatal and Serious Injury Crashes by Intersection Type (2018–22)**

Intersection Type	Number of Fatal and Serious Injury Crashes	Percent of Fatal and Serious Injury Intersection Crashes	Proportion of Crashes that Resulted in a Fatality or Serious Injury
Y-Intersection	81	4.6%	1.9%
T-Intersection	812	46.2%	2.3%
Four-way Intersection	837	47.7%	2.4%
Five-Point or More	26	1.5%	2.4%
<b>Total</b>	<b>1,756</b>	<b>100.0%</b>	<b>2.3%</b>

Source: MassDOT IMPACT Portal.

Among fatal and serious injury crashes at T-intersections and four-way intersections, nearly half (45 percent) occurred at signalized intersections, followed by 32 percent at uncontrolled intersections. To enhance intersection safety, potential countermeasures include optimizing signal timing, prohibiting right turns on red, or converting conventional intersections to roundabouts. The selection of specific interventions should consider factors such as location, traffic volumes, and the walkability of the surrounding area.

## Vulnerable Road Users

VRUs face unique challenges and a higher risk of injury compared to other road users. While walking and biking can offer significant health and environmental benefits, VRUs are more susceptible to serious injuries and fatalities when involved in collisions with motor vehicles. As shown in Table B-9, from 2018 to 2022 VRU-involved crashes accounted for 5 percent of total roadway crashes. However, they accounted for 27 percent of fatal and serious injury crashes within the region. **If a VRU is involved in a crash, they are eight times more likely to be killed or seriously injured compared to a person in a vehicle.**

**Table B-9 | Fatal and Serious Injury Crashes by VRU Involvement (2018–22)**

VRU Involvement	Number of Fatal and Serious Crashes	Percent of Fatal and Serious Injury Crashes	Number of Total Crashes	Percent of Total Crashes	Proportion of Crashes that Resulted in a Fatality or Serious Injury
VRU-Involved	1,058	27%	7,951	5%	13.3%
Non-VRU-Involved	2,908	73%	168,433	95%	1.7%
<b>Total</b>	<b>3,986</b>	<b>100%</b>	<b>176,384</b>	<b>100%</b>	<b>2.3%</b>

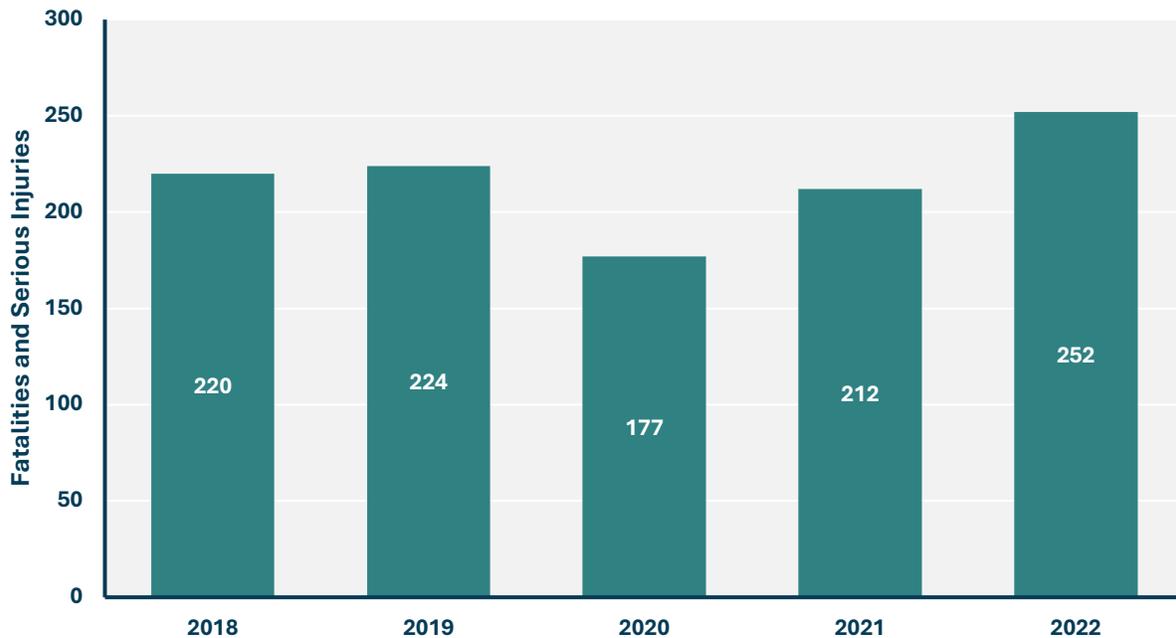
Note: Numbers in the *Total* row may differ from other tables and figures due to inconsistent data availability for certain fields.

VRU = vulnerable road user.

Source: MassDOT IMPACT Portal.

Figure B-8 illustrates the annual number of fatal and serious injury crashes involving pedestrians and bicyclists over a five-year period. Between 2020 and 2022, these crashes steadily increased from 177 to 252, a 42.4 percent growth in just three years. This upward trend is consistent with the overall pattern observed across the Commonwealth. However, the rate of increase in the Boston region was more pronounced, particularly for crashes involving bicyclists. Crashes involving bicyclists rose 90.6 percent compared to 60.9 percent statewide. It is unclear whether this substantial rise is a result of less safe conditions for VRUs or because more people are using active transportation modes and are thus more exposed.

Figure B-8 | Vulnerable Road User Fatal and Serious Injury Crashes (2018–22)



Source: MassDOT IMPACT Portal.

A deeper analysis of fatal and serious injury crashes involving VRUs reveals contributing factors.

- Location:** While the majority (52 percent) of VRU crashes occurred outside of intersections (i.e., mainline) locations, a higher percentage of VRU crashes occurred at intersections compared to other crashes. Among those crashes at mainline locations, 40 percent of severe crashes involving VRUs were on principal arterials.
- Speeds:** Twenty-five percent of severe crashes involving VRUs occurred on roadways with a 30 mile per hour (mph) speed limit. Roadways with a 55 mph speed limit, particularly minor arterials, exhibited the highest proportion of fatal and serious VRU crashes relative to all VRU crashes on those roads (40 percent of VRU crashes on minor arterials with a speed limit of 55 mph resulted in fatalities or serious injuries).
- Lighting Conditions:** More than half (57 percent) of fatal and serious injury crashes involving VRUs occurred during daylight hours. Crashes in dark lighting conditions accounted for 30 percent. VRUs face an increased risk in dark conditions without lighting, as 28 percent of the VRU crashes under such conditions resulted in a fatality or serious injury.
- Vehicle Types:** Although large vehicles were involved in only 5 percent of severe VRU crashes, their involvement nearly doubled the likelihood of a VRU crash resulting in a fatality or serious injury since these vehicles have a much higher impact force on the VRU compared to other vehicle types.

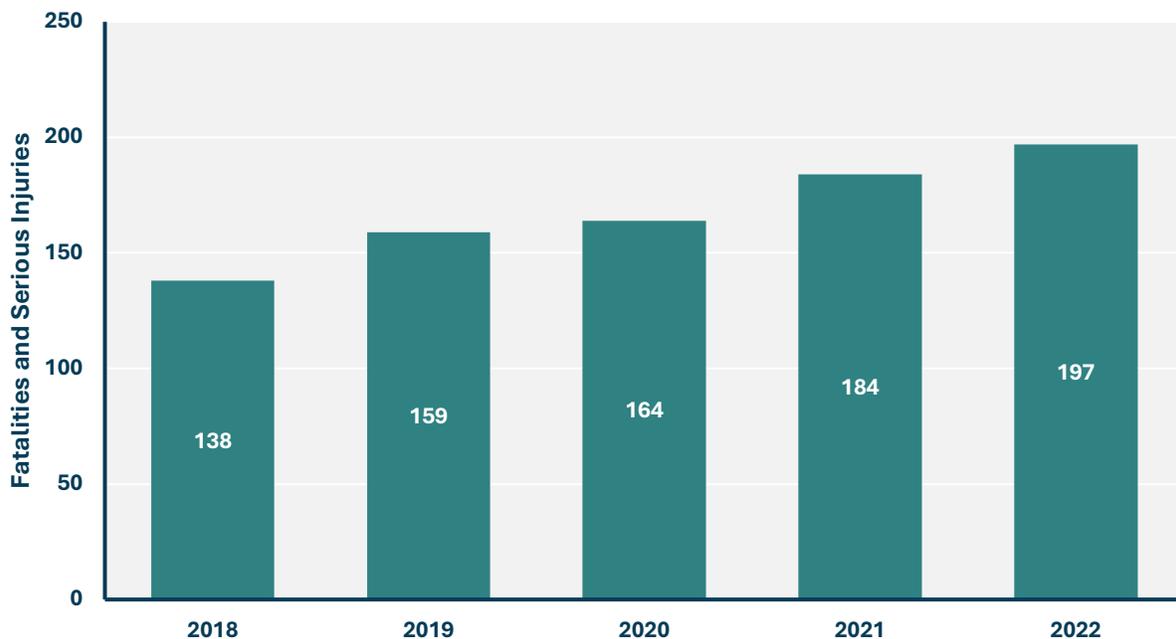
- **Impairment:** While data are not available at the regional level, the [MassDOT VRU Safety Assessment](#) indicates that in the entire Commonwealth 25 percent of pedestrians and 16 percent of bicyclists who were hospitalized from crashes were under the influence of alcohol or drugs at the time of the crash.

## Lane Departure

A lane departure crash, as defined by FHWA, is a crash that occurs after a vehicle crosses an edge line or a center line or otherwise leaves the traveled way. Besides intersection crashes and VRU crashes, lane departures are the third leading cause of fatal and serious injury crashes both statewide and within the Boston region.

Between 2018 and 2022, **lane departure crashes accounted for 21 percent of fatal and serious injury crashes in the Boston region, despite comprising only 4 percent of all crashes.** This finding emphasizes the potential severity of lane departure crashes. As shown in Figure B-9, fatal and serious injury crashes in the region resulting from lane departures gradually increased from 138 in 2018 to 197 in 2022, a 43 percent rise over five years, comparable to the statewide increase of 38 percent. These trends indicate a persistent challenge in preventing vehicles from leaving their intended travel lanes.

**Figure B- 9 | Lane Departure Fatal and Serious Injury Crashes (2018–22)**



Source: MassDOT IMPACT Portal.

The causes of lane departure crashes are multifaceted, ranging from environmental characteristics (such as lighting and weather conditions) and roadway attributes (such as curvature and grade) to driver behavior. Contributing factors include the following:

- **Roadway Type:** Severe crashes occurred most often on two-way undivided roadways, accounting for 67 percent of all fatal and serious injury lane departure crashes. Therefore, this emphasis area should consider placing greater focus on addressing cross-centerline crashes compared to cross-median issues.
- **Collision Type:** Collisions with fixed objects such as trees (22 percent) and utility poles (26 percent) are the most frequent “first harmful event” types.
- **Lighting Conditions:** Lane departure crashes occurring during dusk are more likely to result in fatalities and serious injuries (20 percent) compared to daylight (13 percent), highlighting the need for improved visibility measures during transitional lighting conditions.

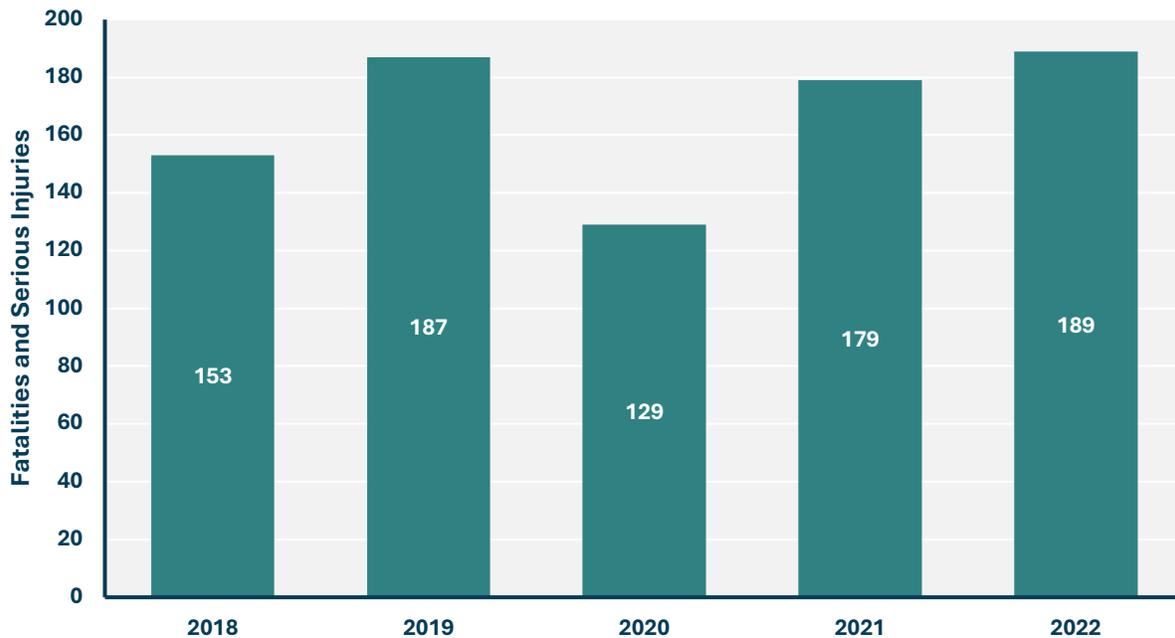
Additionally, dangerous driver behaviors were found to greatly increase the risk of lane departure crashes. More than half (51 percent) of fatal and serious injury crashes involving impaired driving and nearly half (46 percent) of speeding-related fatal and serious injury crashes ended in a lane departure. As shown in Table B-7 , lane departures normally make up 21 percent of all fatal and serious injury crashes. Therefore, **impaired driving or speeding doubles the chance of having a fatal or serious injury lane departure crash**, emphasizing the importance of context-sensitive roadway design and awareness efforts targeting these high-risk behaviors.

## Older Drivers

Within the Boston region, 21 percent of fatal and serious injury crashes involved older drivers (drivers aged 65 and older), slightly higher than the statewide share of 20 percent, which underscores the safety concerns for this particular demographic.

As demonstrated in the five-year trend in Figure B-10 , fatal and serious injury crashes involving older drivers increased by 22 percent in 2019 compared to the previous year, followed by a 31 percent decline in 2020, likely due to pandemic-related impacts on travel, and then quickly rebounded to 2019 levels within the next two years. Overall, the rate of increase in older driver-related fatal and serious injury crashes over the five-year period slightly outpaced the statewide rate, indicating a growing need for targeted safety interventions.

Figure B-10 | Older Driver Fatal and Serious Injury Crashes (2018–22)



Source: MassDOT IMPACT Portal.

Several key factors can contribute to the increased risk of fatal and serious injury crashes involving older drivers. These include age-related declines in physical and cognitive function, underlying medical conditions, individual driving habits, and limitations in roadway design and vehicle features.<sup>12</sup>

- Lighting Conditions:** The majority (76 percent) of fatal and serious injury crashes involving older drivers occurred during daylight hours. However, dark, unlit conditions might be the most dangerous scenario for older drivers, as 6 percent of total older driver-related crashes in these conditions resulted in a fatality or serious injury (compared to 2.2 percent during daylight hours). This highlights the need for improved roadway lighting in areas with significant populations of older drivers.
- Medical Conditions:** An analysis of driver contributing circumstances in crashes indicates that driver illness or a history of heart conditions, epilepsy, or fainting was nearly twice as high in crashes involving older drivers. Also, some older drivers' medical conditions make them more likely to suffer a severe injury compared to younger drivers.
- Land Use:** Fatal and serious injury crashes involving older drivers showed a greater concentration in commercial areas than in residential areas. High-density business and

<sup>12</sup> National Highway Traffic Safety Administration, Traffic Safety Facts: Older Population, Source: <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813616>.

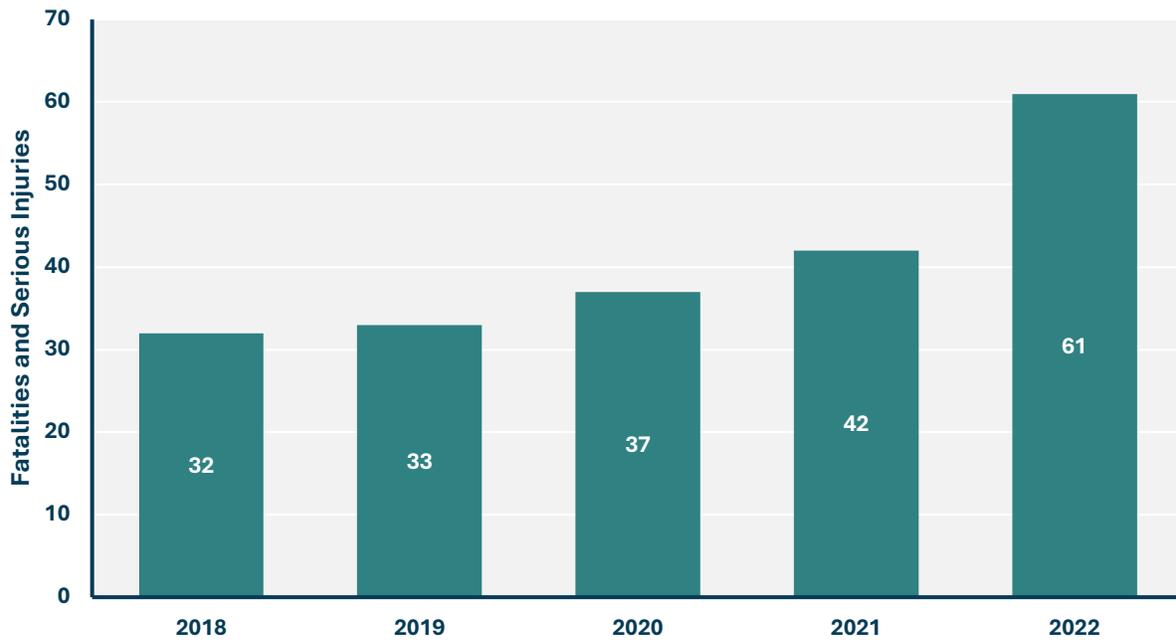
commercial centers posed the highest risk, with more than 3 percent of all crashes in these areas ending in a fatality or serious injury (other areas were generally between 1 and 2 percent). This may be due to the increased complexity of busy environments, including higher pedestrian and vehicle traffic, and more frequent unexpected events such as sudden stops.

- **Intersection Type:** Among all intersection types, five-point or more intersections had the highest proportion of fatal and serious injury crashes (5 percent) relative to all older driver-related crashes. This emphasizes the potential benefits of simplified designs and enhanced signage in complex intersections.

## Speeding

Speeding has consistently been identified as a contributing factor in fatal and serious injury crashes by stakeholders in the region. While speed-involved crashes only accounted for a small proportion (5 percent) of the total fatal and serious injury crashes, the **Boston region experienced a substantial 91 percent increase in speeding crashes from 2018 to 2022**. Although a similar increase (85 percent) was observed statewide, addressing speeding-related issues remains a critical priority for the region.

The yearly variation in speeding-related fatal and serious injury crashes is shown in Figure B-11 . Mirroring the upward trend in lane departure crashes, speeding-related fatal and serious injury crashes also exhibited a consistent increase over the five-year period. Notably, 2022 recorded the highest year-over-year growth rate of 45 percent.

**Figure B-11 | Speeding-Related Fatal and Serious Injury Crashes (2018–22)**

Source: MassDOT IMPACT Portal.

As previously discussed, speeding behavior can be a significant contributing factor to lane departures, given that nearly half of speeding-related fatal and serious injury crashes also involved a lane departure. Additionally, speeding was also found to be prevalent in severe crashes involving impaired driving and motorcyclists. In fatal and serious injury crashes, impaired drivers were three times more likely to be speeding compared to non-impaired drivers (14 percent vs. 5 percent), and motorcyclists were almost twice as likely to be speeding compared to car drivers (9 percent vs. 5 percent). Further analysis of potential risk factors associated with speeding-related fatal and serious injury crashes suggests the following:

- **Posted Speed Limit:** In fatal and serious injury crashes involving speeding, the most common speed limit was 30 mph (30 percent), followed by 25 mph and 35 mph (10 percent each). Since lower speed limits typically occur on local roads with lower design standards and higher non-motorist activity, speeding in these areas was more likely to result in a fatality or serious injury. This suggests the need for a careful review of speed limits on local roads and more self-enforcing roadway design to discourage speeding.
- **Functional Classification:** Fatal and serious injury crashes involving speeding mostly occurred on principal arterials (33 percent) and minor arterials (29 percent). While the proportion of fatal and serious injury crashes relative to total speed-related crashes did not vary significantly across different functional classifications, the higher prevalence of speeding on local roads and major collectors still deserves attention.
- **Time of Day:** Evening (6:00 PM to 10:00 PM) and late night (10:00 PM to 2:00 AM) periods had the highest percentages of fatal and serious injury crashes involving speeding. Compared to daytime periods, the percentage of speeding during these hours was nearly three times higher, indicating a possible need for targeted driving engagement and speed monitoring. However, despite a lower speeding rate, the midday period (10:00 AM to 2:00 PM) had the highest likelihood of speeding-related crashes resulting in severe injuries (12 percent of total speeding-related crashes were fatal and serious injury crashes). This may be due to higher level of pedestrian and cyclist activity during this time, which increases the risk of severe collisions when speeding occurs.

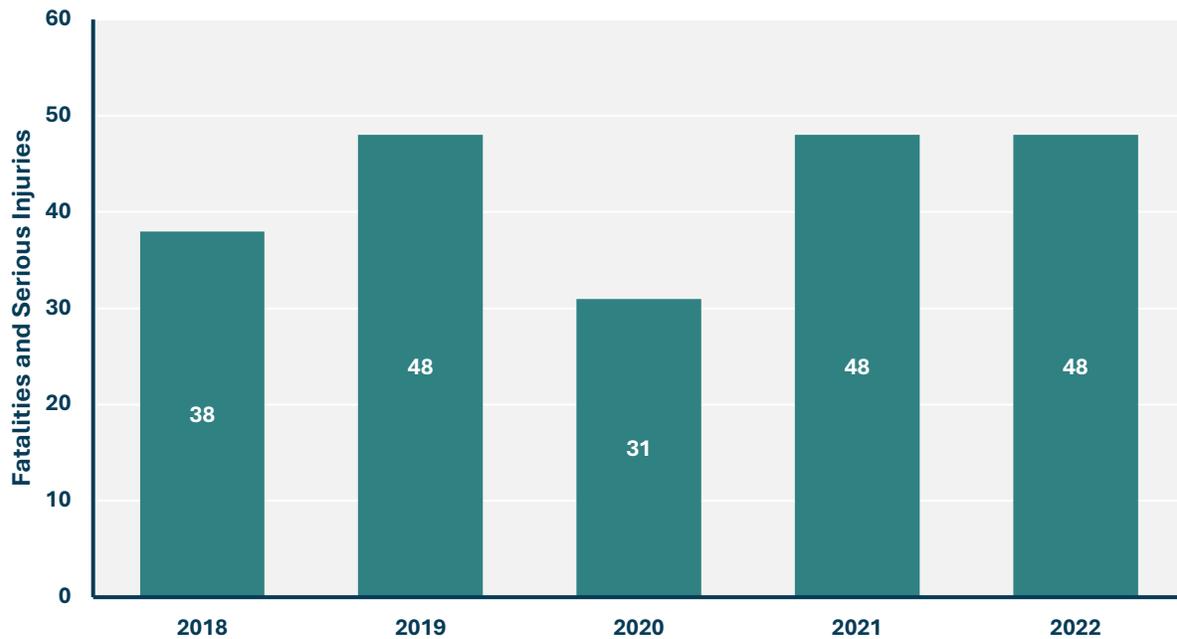
## Large Vehicles

Based on the MassDOT HSIP emphasis area definition, large vehicles include buses, single-unit trucks, and tractor-trailers. From 2018 to 2022, large vehicles were involved in 5.4 percent of fatal and serious injury crashes, slightly higher than the statewide percentage of 5.3 percent. Of the 215 large vehicle-related fatal and serious injury crashes recorded during this period, 17 percent involved buses, 41 percent involved single-unit trucks, and 31 percent involved at least one tractor-trailer.

As illustrated in Figure B-12, the number of fatal and serious injury crashes involving large vehicles rose by 26 percent from 2018 to 2019, followed by a 35 percent decline in 2020 likely due to reduced overall traffic. From 2020 to 2022, the number of such crashes remained steady at 48 per year. Overall, the number of large vehicle-related fatal and serious injury crashes in the region has been increasing at a slower rate compared to the statewide trend.

Between 2018 and 2022, 263 people were killed or seriously injured in crashes involving large vehicles: 56 percent of them were vehicle drivers, 23 percent were passengers, and 21 percent were VRUs.

Figure B-12 | Large-Vehicle-Related Fatal and Serious Injury Crashes (2018–22)



Source: MassDOT IMPACT Portal.

Potential contributing factors identified for large vehicle-related fatal and serious injury crashes include the following:

- **Roadway Type:** The majority of fatal and serious injury crashes involving large trucks occurred on principal arterials (42 percent) and minor arterials (30 percent). More than half (58 percent) of these fatal and serious injury crashes occurred on two-way, undivided highways, indicating less separation of opposing lanes may contribute to increased crash risk.
- **Speed Limit:** While 30 mph was the most common speed limit for large vehicle-related fatal and serious injury crashes (24 percent), roadways with a speed limit of 55 mph were associated with a significantly higher risk of fatal or serious injuries.
- **Time of Day:** Seventy-nine percent of large vehicle-related fatal and serious injury crashes occurred during the daytime (6:00 AM to 6:00 PM). However, fatalities and serious injuries occurred more at nighttime, especially during the overnight period (2:00 AM to 6:00 AM) when the presence of other contributing factors such as inadequate lighting, speeding, and driver fatigue were more likely. Analysis of lighting conditions also suggests that large vehicle-related crashes under dark, unlit conditions had the highest likelihood (4 percent) of resulting in fatalities and serious injuries.

- **Occupant Protection:** Ninety-two of 603 vehicle occupants (17 percent) involved in large vehicle crashes resulting in fatalities and serious injuries were not wearing a seat belt at the time of the crash. Of the 92 unrestrained occupants, 66 (72 percent) were killed or seriously injured in the crash, indicating that lack of seat belt use significantly increases a person's risk of severe injury or death, particularly in a crash involving a large vehicle. The majority (58 percent) of unrestrained vehicle occupants who were killed or seriously injured in the crashes were passengers.

# 5 | Subregion Analysis

The Boston region is divided into eight subregions to promote coordination among local cities and towns and to better understand transportation needs in each subregion. While previous sections of this appendix focused on the entire region, it is important to recognize the potential of significant variations at more local levels. To gain a more detailed understanding of the unique safety challenges faced by each subregion and to inform the development of more effective and locally adapted safety strategies, this section examines the existing safety performance and identifies top emphasis areas for each of the eight subregions:

- Inner Core Committee (ICC)
- Minuteman Advisory Group on Interlocal Coordination (MAGIC)
- MetroWest Regional Collaborative (MetroWest)
- North Suburban Planning Council (NSPC)
- North Shore Task Force (NSTF)
- South Shore Coalition (SSC)
- SouthWest Advisory Planning Committee (SWAP)
- Three Rivers Interlocal Council (TRIC)

## Key Takeaways

- Although the ICC subregion has the highest number of fatal and serious injury crashes, it has the third-lowest rate per 100,000 residents.
- The SWAP and SSC subregions have the highest rates of fatal and serious injury crashes (147.7 and 133.0 per 100,000 residents, respectively) in the region.
- The total number of fatal and serious injury crashes in the SWAP subregion almost doubled from 2018 to 2022.
- The ICC subregion has the most unique overrepresented emphasis areas (pedestrians, intersections, and bicyclists) compared to the rest of the subregions, which highlights its distinct relationship to the rest of the region.

## Subregion Summary

Table B-10 shows a crash summary for the eight subregions within the Boston Region MPO's planning area. *Total crashes*, regardless of severity, and *fatal and serious injury crashes* are summarized. For both the *total crashes* and the *total fatal and serious injury crash* categories, the following information is presented:

- The total number of crashes within each category between 2018 and 2022
- The percentage of all of the region's crashes in that category within each subregion
- The change in the total number of crashes in that category from 2018 to 2022
- The total number of crashes in that category per 100,000 residents

The ICC subregion, which has the largest population of all subregions, has both the highest number of fatal and serious injury crashes (more than 2,000, which is 50 percent of the fatal and serious injury crashes in the entire region) as well as the highest number of total crashes (78,000, which is 42 percent of the crashes in the entire region). However, despite these high overall numbers, the **ICC subregion has the lowest rate of total crashes per 100,000 residents (4,459) and the third-lowest rate of fatal and serious injury crashes per 100,000 residents (117.3).**

The MetroWest and SWAP subregions have the highest rates for all crashes (8,637 and 8,546 crashes per 100,000 residents, respectively). The SWAP and SSC subregions have the highest rates for fatal and serious injury crashes (147.7 and 133.0, respectively). These three subregions consist more of rural and suburban-style land uses compared to the urban nature of the ICC; this could explain some of the difference as more rural areas tend to have higher amounts of driving (VMT per capita), which leads to higher rates of crashes per capita. Per MassDOT Vehicle Census data, these three subregions each average more than 8,000 VMT per resident, higher than the regionwide average of approximately 6,500 VMT per resident.

Similar to the entire region, each subregion is experiencing a decline in the total number of crashes of all severities. The NSPC, MetroWest, and MAGIC subregions all decreased their total number of crashes by more than 13 percent from 2018 to 2022. This trend contrasts with the total number of fatal and serious injury crashes specifically; every subregion is experiencing an increasing trend for fatal and serious injury crashes except for the NSTF subregion. The SSC, SWAP, and NSPC subregions are all seeing increases of more than 45 percent in the number of fatal and serious injury crashes. **In the SWAP subregion, in particular, the total number of fatal and serious injury crashes has almost doubled from 2018 to 2022.** The SWAP subregion is also the fastest growing subregion in terms of population, but the 2 percent increase in population during this time period does not fully explain the increase in fatal and serious injury crashes.

Table B-10 | Subregion Summary (2018–22)

Subregion	Total Crashes				Fatal and Serious Injury Crashes			
	Number	Percent of Total	Percent Change (2018–22)	Per 100,000 Residents	Number	Percent of Total	Percent Change (2018–22)	Per 100,000 Residents
Inner Core Committee (ICC)	78,485	41.6%	-7.0%	4,459	2,065	51.8%	2.6%	117.3
Minuteman Advisory Group on Interlocal Coordination (MAGIC)	11,675	6.2%	-13.2%	6,420	193	4.8%	2.3%	106.1
MetroWest Regional Collaborative (MetroWest)	21,659	11.5%	-15.0%	8,637	296	7.4%	4.5%	118.0
North Suburban Planning Council (NSPC)	13,965	7.4%	-17.8%	6,407	257	6.5%	63.4%	117.9
North Shore Task Force (NSTF)	18,369	9.7%	-0.6%	6,183	314	7.9%	-8.6%	105.7
South Shore Coalition (SSC)	14,412	7.6%	-1.5%	6,412	299	7.5%	45.5%	133.0
SouthWest Advisory Planning Committee (SWAP)	13,253	7.0%	-9.6%	8,546	229	5.7%	96.9%	147.7
Three Rivers Interlocal Council (TRIC)	16,718	8.9%	-8.2%	6,199	331	8.3%	-7.6%	122.7
<b>Total</b>	<b>188,536</b>	<b>100.0%</b>	<b>-8.5%</b>	<b>5,616</b>	<b>3,984</b>	<b>100.0%</b>	<b>20.3%</b>	<b>118.7</b>

Note: Numbers in the *Total* row may differ from other tables and figures due to inconsistent data availability for certain fields.

Source: Crashes from the MassDOT IMPACT Portal and 2020 population estimates from the US Census Bureau.

## Emphasis Areas by Subregion

Table B-11 shows the top emphasis areas for each subregion. The top emphasis areas were found using two different methods:

- **The top three emphasis areas were identified based on the total number of fatal and serious injury crashes.** For example, the ICC subregion's emphasis area with the highest number of fatal and serious injury crashes is the *Intersections* emphasis area.
- **The top three most overrepresented emphasis areas by fatal and serious injury crashes were identified.** Results were calculated using MassDOT's [test of proportions](#) methodology and represent the emphasis areas that are the most unique to each subregion compared to the entire region. A statistical test was used to compare the percentage of fatal and serious injury crashes in each emphasis area between the entire region and each subregion. The emphasis areas with the most statistically significant differences are noted here. For example, the ICC subregion is significantly overrepresented in the *Pedestrian* emphasis area.<sup>13</sup>

The top three emphasis areas by the total number of fatal and serious injury crashes for each subregion almost universally align with the top three emphasis areas for the region. All subregions except the ICC subregion have the same top three emphasis areas, and the *Intersection* emphasis area is the primary one in every region. The only outlier is the *Pedestrians* emphasis area in the ICC subregion, which contains much of the urban core and the highest pedestrian mode share.

The top three overrepresented emphasis areas vary in each subregion, each reflecting the subregion's different unique characteristics and crash circumstances. The *Lane Departure* emphasis area is overrepresented in every subregion except the ICC subregion, emphasizing the importance of lane departures in the more suburban communities. **In the ICC subregion, every overrepresented emphasis area (*Pedestrians*, *Intersections*, and *Bicyclists*) is unique among all the other subregions**, highlighting the unique crash history in the region's core.

Unique instances of overrepresented emphasis areas not within the six key emphasis areas identified in Section 4 include the following:

- The *Young Drivers* emphasis area in the MetroWest, NSPC, and SWAP subregions

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<sup>13</sup> Performing a [two-proportion z-test](#) comparing the 24.4 percent share of pedestrian fatal and serious injury crashes in the ICC subregion to the 19.6 percent share in the Boston region yields a p-value of less than 0.01, which means the *Pedestrian* emphasis area is significantly overrepresented in the ICC subregion. The three emphasis areas with the lowest p-values are the three most overrepresented emphasis areas for each subregion.

- The *Motorcycle* emphasis area in the NSTF and SWAP subregions
- The *Distracted Driving* emphasis area in the NSTF and SSC subregions

**Table B-11 | Notable Subregion Emphasis Areas (2018–22)**

Subregion	Top 3 Emphasis Areas by Fatal and Serious Injury Crashes	Top 3 Overrepresented Emphasis Areas by Fatal and Serious Injury Crashes
Inner Core Committee (ICC)	<ol style="list-style-type: none"> <li>1. Intersections</li> <li>2. Pedestrians</li> <li>3. Older Drivers</li> </ol>	<ol style="list-style-type: none"> <li>1. Pedestrians</li> <li>2. Intersections</li> <li>3. Bicyclists</li> </ol>
Minuteman Advisory Group on Interlocal Coordination (MAGIC)	<ol style="list-style-type: none"> <li>1. Intersections</li> <li>2. Lane Departure</li> <li>3. Older Drivers</li> </ol>	<ol style="list-style-type: none"> <li>1. Lane Departure</li> <li>2. Older Drivers</li> <li>3. Large Vehicles</li> </ol>
MetroWest Regional Collaborative (MetroWest)	<ol style="list-style-type: none"> <li>1. Intersections</li> <li>2. Lane Departure</li> <li>3. Older Drivers</li> </ol>	<ol style="list-style-type: none"> <li>1. Lane Departure</li> <li>2. Speeding Related</li> <li>3. Young Driver</li> </ol>
North Suburban Planning Council (NSPC)	<ol style="list-style-type: none"> <li>1. Intersections</li> <li>2. Lane Departure</li> <li>3. Older Drivers</li> </ol>	<ol style="list-style-type: none"> <li>1. Lane Departure</li> <li>2. Young Driver</li> <li>3. Older Drivers</li> </ol>
North Shore Task Force (NSTF)	<ol style="list-style-type: none"> <li>1. Intersections</li> <li>2. Lane Departure</li> <li>3. Older Drivers</li> </ol>	<ol style="list-style-type: none"> <li>1. Lane Departure</li> <li>2. Motorcycle</li> <li>3. Distracted Driving</li> </ol>
South Shore Coalition (SSC)	<ol style="list-style-type: none"> <li>1. Intersections</li> <li>2. Lane Departure</li> <li>3. Older Drivers</li> </ol>	<ol style="list-style-type: none"> <li>1. Lane Departure</li> <li>2. Distracted Driving</li> <li>3. Older Drivers</li> </ol>
SouthWest Advisory Planning Committee (SWAP)	<ol style="list-style-type: none"> <li>1. Intersections</li> <li>2. Lane Departure</li> <li>3. Older Drivers</li> </ol>	<ol style="list-style-type: none"> <li>1. Motorcycle</li> <li>2. Young Driver</li> <li>3. Lane Departure</li> </ol>
Three Rivers Interlocal Council (TRIC)	<ol style="list-style-type: none"> <li>1. Intersections</li> <li>2. Older Drivers</li> <li>3. Lane Departure</li> </ol>	<ol style="list-style-type: none"> <li>1. Older Drivers</li> <li>2. Lane Departure</li> <li>3. Speeding Related</li> </ol>

Source: MassDOT IMPACT Portal.

# 6 | Municipality Analysis

The Boston Region MPO area encompasses 97 cities and towns, stretching from Boston to Ipswich in the north, Marshfield in the south, and to approximately Interstate 495 in the west. Building upon the regional and subregional analyses of safety performance over the past five years, this section focuses on investigating the existing conditions at the municipal level.

The top 10 municipalities with the highest number of fatal and serious injury crashes and the top 10 municipalities with the highest fatal and serious injury crash rates are summarized here. There is an overview of crashes and top emphasis areas for each municipality. By identifying municipalities with the most significant fatal and serious injury crash concerns, the Boston Region MPO can prioritize safety investments in those areas of greatest need to maximize the potential safety impacts.

## Key Takeaways

- In general, the top 10 municipalities with the highest number of fatal and serious injury crashes have seen decreasing numbers of crashes in recent years, while those municipalities with lower numbers of crashes are seeing an increasing number.
- In general, the municipalities with the highest fatal and serious injury crash rates are suburban-style municipalities on the outer edges of the region.
- The most common overrepresented emphasis areas are the Intersections, Pedestrians, and Speeding emphasis areas.

## Municipality Summary

Table B-12 and

Table B-13 show a summary of the 10 municipalities in the Boston region with the most fatal and serious injury crashes and the highest fatal and serious injury crash rates, respectively.<sup>14</sup> *Total crashes*, regardless of severity, and *fatal and serious injury crashes* are summarized. For both the *total crashes* and the *total fatal and serious injury* crash categories, the following information is presented:

- The total number of crashes within each category
- The percentage of all of the region’s crashes in each category within each municipality
- The change in the total number of crashes in each category from 2018 to 2022
- The total number of crashes in each category per 100,000 residents

In general, out of the top 10 municipalities shown in Table B-12 , the municipalities with the highest numbers of fatal and serious injury crashes (Boston, Lynn, Quincy, and Cambridge) are having fewer of those crashes, while the those with lower numbers (Newton, Revere, Malden, Chelsea, Framingham, and Weymouth) are having more crashes. Chelsea has experienced a surge in fatal and serious injury crashes in recent years, almost doubling from 12 in 2018 to 23 in 2022. Weymouth and Framingham have also experienced significant increases in recent years; fatal and serious injury crashes increased by 90 and 73 percent in these towns, respectively.

The top 10 municipalities shown in Table B-13 are generally municipalities that are on the outer edges of the region and are more suburban in land use compared to the core of the region. The exceptions to this are Lynn, Saugus, and Chelsea, all denser municipalities north of Boston. For the other seven towns, this suggests a link between some of the land uses and policies of the outer suburban region as it relates to higher crash rates. For Lynn, Saugus, and Chelsea, more study is needed to identify potential causes for the higher-than-expected crash rates

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<sup>14</sup> Per MassDOT IMPACT crash data, the City of Waltham has the highest number of fatal and serious injury crashes and the highest crash rate, but this is likely an over-counting error as the annual number of fatalities and serious injuries was, on average, more than 10 times higher between 2019 and 2022 compared to 2013 through 2018. For this reason, Waltham is not included in Table B-12 nor fatalities and serious injuries was, on average, more than 10 times higher between 2019 and 2022 compared to 2013 through 2018. For this reason, Waltham is not included in Table B-12 nor

**Table B-12 | Top 10 Municipalities with Fatal and Serious Injury Crashes (2018–22)**

Municipality	Total Crashes				Fatal and Serious Injury Crashes			
	Number	Percent of Total	Percent Change (2018–22)	Per 100,000 Residents	Number	Percent of Total	Percent Change (2018–22)	Per 100,000 Residents
Boston <sup>1</sup>	10,362	5.5%	-22.1%	1,527	320	8.0%	-58.3%	47
Lynn	9,363	5.0%	-0.7%	9,246	237	5.9%	-39.7%	234
Quincy	8,622	4.6%	-7.2%	8,485	155	3.9%	-9.1%	153
Cambridge	6,872	3.6%	-7.3%	5,804	129	3.2%	-22.6%	109
Newton	6,016	3.2%	-14.9%	6,763	115	2.9%	33.3%	129
Revere	3,043	1.6%	-8.5%	4,892	92	2.3%	38.9%	148
Malden	4,157	2.2%	-0.7%	6,273	87	2.2%	50.0%	131
Chelsea	3,557	1.9%	7.3%	8,722	83	2.1%	91.7%	204
Framingham	6,494	3.4%	-6.4%	8,972	83	2.1%	73.3%	115
Weymouth	4,685	2.5%	4.6%	8,156	79	2.0%	90.0%	138
<b>Total</b>	<b>63,171</b>	<b>33.5%</b>	<b>-8.1%</b>	<b>4,552</b>	<b>1,380</b>	<b>34.6%</b>	<b>-25.0%</b>	<b>99</b>

<sup>1</sup> Due to crash reporting issues, the total number of crashes and fatal and serious injury crashes for the City of Boston are underreported to the Registry of Motor Vehicles (RMV). The true crash rates in the city are estimated to be higher than shown in this table. Table B-12

Source: Crashes from the MassDOT IMPACT Portal and 2020 population estimates from the US Census Bureau.

Table B-13 | Top 10 Municipalities by Fatal and Serious Injury Crash Rate (2018–22)

Municipality	Total Crashes				Fatal and Serious Injury Crashes			
	Number	Percent of Total	Percent Change (2018–22)	Per 100,000 Residents	Number	Percent of Total	Percent Change (2018–22)	Per 100,000 Residents
Sherborn	700	0.4%	-13.2%	15,902	19	0.5%	200.0%	431
Wrentham	1,148	0.6%	-11.3%	9,430	44	1.1%	55.6%	361
Dover	445	0.2%	-42.7%	7,512	16	0.4%	-33.3%	270
Millis	478	0.3%	4.7%	5,651	21	0.5%	50.0%	248
Middleton	898	0.5%	26.7%	9,182	24	0.6%	33.3%	245
Lynn	9,363	5.0%	-0.7%	9,246	237	5.9%	-39.7%	234
Rockland	1,056	0.6%	-3.8%	5,931	38	1.0%	-11.1%	213
Topsfield	388	0.2%	36.4%	5,913	14	0.4%	33.3%	213
Saugus	2,593	1.4%	22.4%	9,061	61	1.5%	-38.5%	213
Chelsea	3,557	1.9%	7.3%	8,722	83	2.1%	91.7%	203
<b>Total</b>	<b>20,626</b>	<b>10.9%</b>	<b>1.7%</b>	<b>8,748</b>	<b>557</b>	<b>14.0%</b>	<b>-18.0%</b>	<b>236.2</b>

Source: Crashes from the MassDOT IMPACT Portal and 2020 population estimates from the US Census Bureau.

## Emphasis Areas by Municipality

Table B-14 and Table B-15 show the top emphasis areas, for each municipality identified in Table B-12 and Table B-13, respectively. The top emphasis areas were identified based on the total number of fatal and serious injury crashes and the most overrepresented emphasis areas. Refer to the Emphasis Areas by Subregion portion of Section 5 for a more detailed explanation of each of these methods.

The top three emphasis areas based on the total number of fatal and serious injury crashes almost completely align with the key emphasis areas (Intersections, Lane Departure, Pedestrians/Bicyclists, Older Drivers, Speeding, and Large Vehicles) for the entire region. The only outliers include the Younger Drivers emphasis area for Chelsea, the Motorcyclists emphasis area for Framingham and Wrentham, and the Occupant Protection emphasis area for Rockland. Also of note is the Bicyclist emphasis area for Cambridge, which is the only instance of that emphasis area in the list of top 10 municipalities. This likely reflects the higher bicyclist mode share in the city's multiple college campuses.

The top three overrepresented emphasis areas vary by municipality; but in general, the most common overrepresented emphasis areas are the Intersections, Pedestrians, Impaired Driving, Speeding, and Occupant Protection emphasis areas. Other overrepresented emphasis areas include the following: The *Large Vehicles* emphasis area for Chelsea, Millis, Middleton, and Saugus

- The *Lane Departures* emphasis area for Sherborn, Dover, Millis, Middleton, and Saugus
- The *Motorcyclists* emphasis area for Framingham, Weymouth, Wrentham, and Saugus
- The *Older Drivers* emphasis area for Newton, Weymouth, and Dover
- The *Bicyclists* emphasis area for Cambridge and Newton
- The *Younger Drivers* emphasis area for Wrentham and Dover

**Table B-14 | Notable Emphasis Areas of the Top 10 Municipalities by the Number of Fatal and Serious Injury Crashes (2018–22)**

Municipality	Top 3 Emphasis Areas by Number of Fatal and Serious Injury Crashes	Top 3 Overrepresented Emphasis Areas by Fatal and Serious Injury Crashes
Boston	<ol style="list-style-type: none"> <li>1. Intersections</li> <li>2. Pedestrians</li> <li>3. Older Drivers</li> </ol>	<ol style="list-style-type: none"> <li>1. Pedestrians</li> <li>2. Intersections</li> <li>3. Speeding</li> </ol>
Lynn	<ol style="list-style-type: none"> <li>1. Intersections</li> <li>2. Pedestrians</li> <li>3. Older Drivers</li> </ol>	<ol style="list-style-type: none"> <li>1. Intersections</li> <li>2. Pedestrians</li> <li>3. Occupant Protection</li> </ol>
Quincy	<ol style="list-style-type: none"> <li>1. Intersections</li> <li>2. Pedestrians</li> <li>3. Lane Departure</li> </ol>	<ol style="list-style-type: none"> <li>1. Pedestrians</li> <li>2. Speeding</li> <li>3. Intersections</li> </ol>
Cambridge	<ol style="list-style-type: none"> <li>1. Intersections</li> <li>2. Pedestrians</li> <li>3. Bicyclists</li> </ol>	<ol style="list-style-type: none"> <li>1. Bicyclists</li> <li>2. Pedestrians</li> <li>3. Intersections</li> </ol>
Newton	<ol style="list-style-type: none"> <li>1. Intersections</li> <li>2. Older Drivers</li> <li>3. Pedestrians</li> </ol>	<ol style="list-style-type: none"> <li>1. Bicyclists</li> <li>2. Intersections</li> <li>3. Older Drivers</li> </ol>
Revere	<ol style="list-style-type: none"> <li>1. Intersections</li> <li>2. Pedestrians</li> <li>3. Lane Departure</li> </ol>	<ol style="list-style-type: none"> <li>1. Pedestrians</li> <li>2. Impaired Driving</li> <li>3. Speeding</li> </ol>
Malden	<ol style="list-style-type: none"> <li>1. Intersections</li> <li>2. Pedestrians</li> <li>3. Older Drivers</li> </ol>	<ol style="list-style-type: none"> <li>1. Intersections</li> <li>2. Occupant Protection</li> <li>3. Pedestrians</li> </ol>
Chelsea	<ol style="list-style-type: none"> <li>1. Intersections</li> <li>2. Pedestrians</li> <li>3. Younger Drivers</li> </ol>	<ol style="list-style-type: none"> <li>1. Pedestrians</li> <li>2. Large Vehicles</li> <li>3. Intersections</li> </ol>
Framingham	<ol style="list-style-type: none"> <li>1. Intersections</li> <li>2. Pedestrians</li> <li>3. Motorcyclists</li> </ol>	<ol style="list-style-type: none"> <li>1. Speeding</li> <li>2. Motorcyclists</li> <li>3. Intersections</li> </ol>
Weymouth	<ol style="list-style-type: none"> <li>1. Intersections</li> <li>2. Older Drivers</li> <li>3. Lane Departures</li> </ol>	<ol style="list-style-type: none"> <li>1. Older Drivers</li> <li>2. Impaired Driving</li> <li>3. Motorcyclists</li> </ol>

Source: MassDOT IMPACT Portal.

**Table B-15 | Notable Emphasis Areas of the Top 10 Municipalities by Fatal and Serious Injury Crash Rate (2018–22)**

Municipality	Top 3 Emphasis Areas by Number of Fatal and Serious Injury Crashes	Top 3 Overrepresented Emphasis Areas by Fatal and Serious Injury Crashes
Sherborn	<ol style="list-style-type: none"> <li>1. Lane Departures</li> <li>2. Older Drivers</li> <li>3. Intersections</li> </ol>	<ol style="list-style-type: none"> <li>1. Lane Departures</li> <li>2. Impaired Driving</li> <li>3. Speeding</li> </ol>
Wrentham	<ol style="list-style-type: none"> <li>1. Intersections</li> <li>2. Motorcyclists</li> <li>3. Older Drivers</li> </ol>	<ol style="list-style-type: none"> <li>1. Occupant Protection</li> <li>2. Motorcyclists</li> <li>3. Younger Drivers</li> </ol>
Dover	<ol style="list-style-type: none"> <li>1. Lane Departures</li> <li>2. Older Drivers</li> <li>3. Intersections</li> </ol>	<ol style="list-style-type: none"> <li>1. Lane Departures</li> <li>2. Older Drivers</li> <li>3. Younger Drivers</li> </ol>
Millis	<ol style="list-style-type: none"> <li>1. Lane Departures</li> <li>2. Intersections</li> <li>3. Older Drivers</li> </ol>	<ol style="list-style-type: none"> <li>1. Lane Departures</li> <li>2. Impaired Driving</li> <li>3. Large Vehicles</li> </ol>
Middleton	<ol style="list-style-type: none"> <li>1. Lane Departures</li> <li>2. Older Drivers</li> <li>3. Intersections</li> </ol>	<ol style="list-style-type: none"> <li>1. Lane Departures</li> <li>2. Impaired Driving</li> <li>3. Large Vehicles</li> </ol>
Lynn	<ol style="list-style-type: none"> <li>1. Intersections</li> <li>2. Pedestrians</li> <li>3. Older Drivers</li> </ol>	<ol style="list-style-type: none"> <li>1. Intersections</li> <li>2. Pedestrians</li> <li>3. Occupant Protection</li> </ol>
Rockland	<ol style="list-style-type: none"> <li>1. Intersections</li> <li>2. Lane Departures</li> <li>3. Occupant Protection</li> </ol>	<ol style="list-style-type: none"> <li>1. Occupant Protection</li> <li>2. Impaired Driving</li> <li>3. Intersections</li> </ol>
Topsfield	<ol style="list-style-type: none"> <li>1. Intersections</li> <li>2. Lane Departures</li> <li>3. Older Drivers</li> </ol>	<ol style="list-style-type: none"> <li>1. Occupant Protection</li> <li>2. Impaired Driving</li> <li>3. Speeding</li> </ol>
Saugus	<ol style="list-style-type: none"> <li>1. Lane Departures</li> <li>2. Older Drivers</li> <li>3. Intersections</li> </ol>	<ol style="list-style-type: none"> <li>1. Large Vehicles</li> <li>2. Lane Departures</li> <li>3. Motorcyclists</li> </ol>
Chelsea	<ol style="list-style-type: none"> <li>1. Intersections</li> <li>2. Pedestrians</li> <li>3. Younger Drivers</li> </ol>	<ol style="list-style-type: none"> <li>1. Pedestrians</li> <li>2. Large Vehicles</li> <li>3. Intersections</li> </ol>

Source: MassDOT IMPACT Portal

# 7 | Next Steps

This existing conditions analysis provides the foundation for future data analysis, policy evaluation, strategy development, and project selection. Findings offer a snapshot of roadway safety in the region, which may be used in public and stakeholder engagement, such as task force meetings, MPO board meetings, and virtual municipal roundtables.

A systemic safety analysis will build upon these findings and may identify additional emphasis areas for the *Vision Zero Action Plan*. This task will identify specific factors that may be overrepresented across the region and highlight the most common roadway safety challenges in each subregion by characteristics of crash, roadway types, and contributing factors to crashes. The systemic safety task will also draw upon key takeaways and safety challenges identified by state and local government stakeholders and the public. Knowledge of existing conditions will help inform the development of safety profiles for subregions that describe the common infrastructure, behavioral, operational, and modal safety problems in the region. By considering existing conditions, the High-Injury Network (HIN) and high-risk networks, and stakeholder and public engagement findings, a prioritized list of locations will be identified for use in developing strategies and selecting projects.

Strategies will span roadway design, policy and process changes, education and stakeholder coordination, and emergency response recommendations to address the top identified safety challenges. The existing conditions analysis will directly feed into the prioritization of policy recommendations, and changes or improvements that municipalities, the Boston Region MPO, and the Commonwealth can pursue to support roadway safety. The data analysis can also inform the development of location-specific projects, as well as regionwide systemic solutions to address the region's top safety problems.