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## CRASH TRENDS AND LOCATIONS: 2000 – 2016

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## CONTACT

This report is intended to highlight the initial findings from analysis of the Police Department's crash data. Our analysis is ongoing, and we expect to release additional reports in the future. We welcome feedback and questions on this and future analyses. Please contact:

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## EXECUTIVE SUMMARY

The Crime Analysis Unit at the Cambridge Police Department (CPD) has conducted analysis of the traffic crashes occurring within the CPD jurisdiction over the past 15 years. The available data includes crash calls for service (any call requesting police assistance related to a traffic collision), crash reports (any collision that is severe enough to require a police report), and incidents requiring transport to the hospital by Emergency Medical Services (EMS). The Unit's primary goal has been to understand trends in crash incidents in the context of population growth and changes in ridership (i.e., increasing numbers of bicyclists). This analysis resulted in the following conclusions:

- **The total number of crashes occurring in the city has declined since the early 2000s, even as population and number of road users have increased.**
- While total crashes have declined, crashes involving cyclists increased by 28% from 2000 to 2015, corresponding with an increase in bike ridership. Normalizing for increases in bike ridership, the bike crash rate has declined since 2010, with more variability prior to 2010.
- A small portion of crashes required an EMS transport to the hospital – about 20% of crashes since 2010. Approximately half of crashes requiring EMS transport involved non-motorists.
- Crashes are distributed broadly across the city, with notable hotspots along Massachusetts Avenue from MIT to Central Square, the Harvard Square area, Massachusetts Avenue near Porter Square, and the Inman Square area.
- Two locations have had a particularly high incidence of crashes requiring EMS transport to the Hospital: Hampshire Street from Inman Square to Tremont Street, and Massachusetts Avenue from Vassar Street to Bigelow Street. These two locations accounted for 22% of all crashes requiring EMS transport in 2015 and 2016. These areas are heavily trafficked by cyclists and pedestrians, the road users most vulnerable to injury in the event of a crash. Other notable locations include the Kendall Square area near Broadway and Hampshire Street, along John F. Kennedy Street and Massachusetts Avenue near Harvard Square, and on Cambridge Street near 5<sup>th</sup> and 6<sup>th</sup> Streets.



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DATA AVAILABLE AT  
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# CRASH OVERVIEW

## 10-YEAR AVERAGES



### 3,000 CALLS

The Police Department receives around 3,000 Calls for Service to respond to motor vehicle crashes each year.

### 1,500 REPORTS

Of these Calls for Service, around 1,500 result in a police crash report. A crash report is taken when there is injury or the officer estimates over \$1,000 in property damage.



### 1 in 5 NEED EMS

About 300 crashes -- 1 in 5 reported crashes -- result in an injury serious enough to require EMS transport to the hospital.

### 17% NON-MOTORISTS

Around 160 reported crashes involve cyclists, and around 100 involve pedestrians. That means 17.3% of reported crashes involve non-motorists.



### 90 BIKE/PED INJURIES

Of the reported cyclist and pedestrian crashes, 90 require EMS transport to the hospital: 28% of bicycle crashes and 38% of pedestrian crashes (based on 2015-2016 only).

### 1-2 FATALITIES

While some years have had more, the 10-year average falls between 1 and 2 fatalities per year



## CRASH TRENDS

### POPULATION

According to census estimates conducted in 2000, 2010, and 2015, the population of Cambridge has risen consistently in the past two decades. In terms of motor vehicle traffic trends, the growth of population is balanced by decreases in the portion of households owning cars and the number of residents reporting that their primary mode of transportation is a motor vehicle: annual traffic counts demonstrate little change in average daily motor vehicles driven in the city in recent years. However, bicycle counts conducted at 16 locations since 2002 show a marked increase in bike ridership in Cambridge.

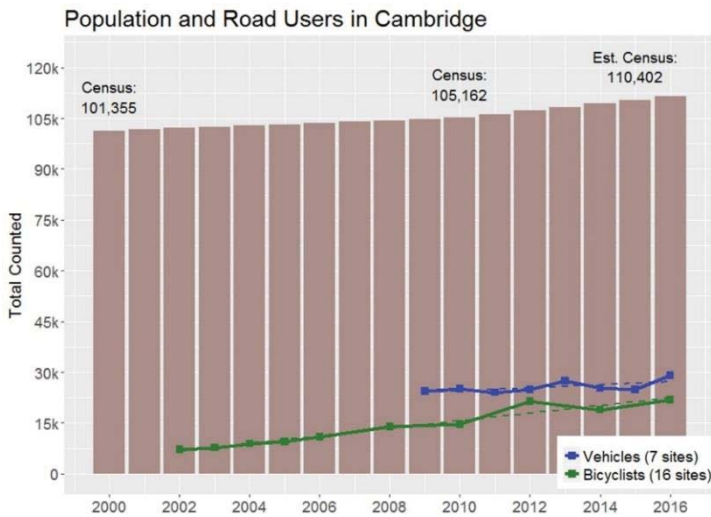


Figure 1. Growth of Population and Number of Road Users (Estimates of Average Daily Vehicles and Bicyclists, summed across all count locations).

Understanding the changes in population and road users provides important context for crash statistics. As the population continues to grow, the number of

road users are expected to increase, likely resulting in an increase in the absolute number of crashes occurring within the city. Therefore, to better understand crash trends, it is necessary to normalize the number of crashes by population, evaluating more meaningful crash metrics in the form of *crash rates* in addition to numbers of crashes in order to account for growing numbers of road users.

### CRASH CALLS FOR SERVICE

A crash Call for Service (CFS) consists of any dispatch of police in response to a request for assistance relating to a traffic collision, whether a police report is ultimately filed or not. While detailed information about the nature of a collision is not always available from a CFS, the number of CFS is a good

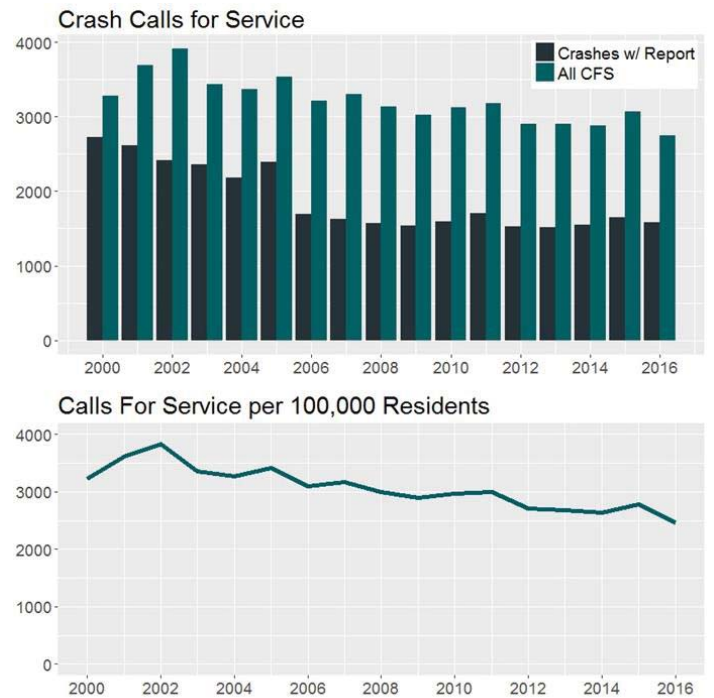


Figure 2. Trends in Crash Calls for Service.

approximation of the total number of collisions that occur in the city. The total number of crash-related CFS is fairly steady year-over-year, with a slight decline since the early 2000s. When normalized for population growth, the decline in CFS is notable, decreasing from nearly 4,000 CFS per 100,000 residents in 2002 to around 2,500 CFS per 100,000 residents in 2016.

### REPORTABLE CRASHES

According to Massachusetts general law, an officer responding to a crash CFS is required to file a report for any crash that results in injury or a minimum of \$1,000 of property damage, and falls within the Cambridge Police Department’s jurisdiction. (Note: some major roadways, such as Memorial Drive, Monsignor O’Brien Highway, Fresh Pond Parkway, and Route 2, fall within State Police jurisdiction, and are excluded from Cambridge Police reporting.) The

number of reportable crashes has generally declined since 2000. The sharp decline in total reportable crashes in the mid-2000s can be explained in part by a change in the state-wide crash data collection form, but the overall downward trend in reportable crashes continued into the 2010s.

The police reporting requirement by Massachusetts General Law (c. 90, § 26) provides important context for crash report trends over time. For a crash without injury, a report is filed if the officer estimates that \$1,000 of property damage occurred. This dollar amount has not changed since 1985. According to U.S. Bureau of Labor Statistics, \$1,000 in 1985 has the same buying power as more than \$2,200 in 2016 when adjusted for inflation. Additionally, the average price of a new car in 1985 was \$11,838 (not adjusted for inflation), while the average price of a new car in 2016 was \$25,449 (according to the U.S. Bureau of Economic Analysis). This indicates that \$1,000 worth of property damage is more likely to occur in a minor crash today than when the statute was amended in 1985. As such, given an equivalent distribution of severity of crashes, a greater portion are likely to require a crash report. Furthermore, the estimation of the dollar value of damages is subjective to the officer responding to the incident, and officers typically err on the side of writing a report for a minor crash rather than failing to report a more serious one.

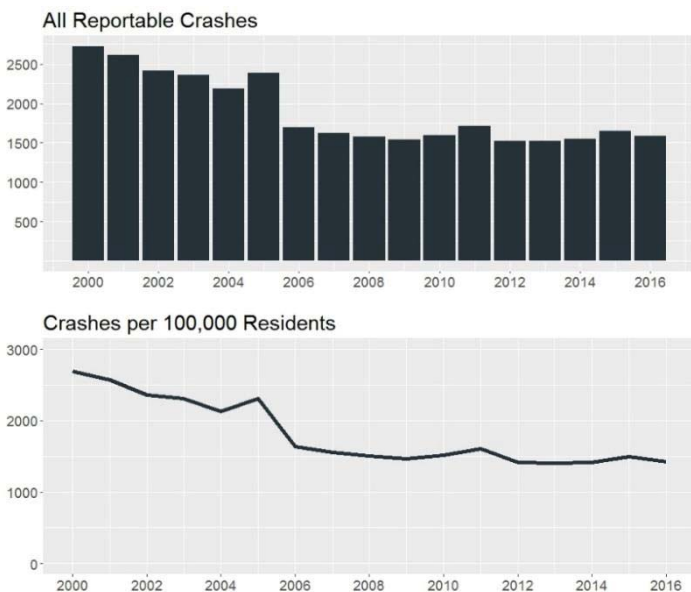


Figure 3. Total Number of Crashes Resulting in MA Police Crash Report.

## CRASHES BY TYPE

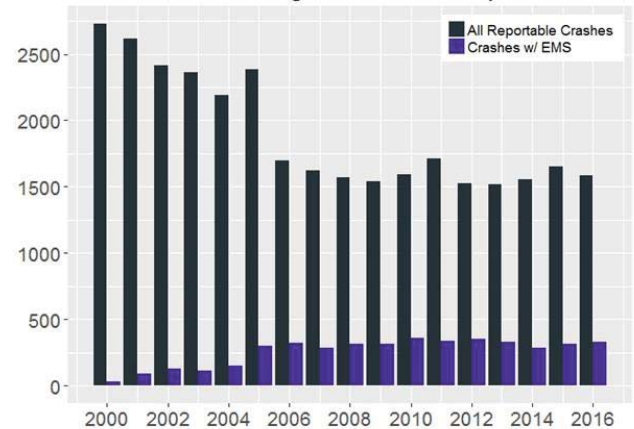
The majority of traffic crashes involved exclusively motor vehicles; only 17% of reportable crashes involved cyclists or pedestrians on average per year. Motor vehicle crashes have fallen since the early 2000s, and crashes involving pedestrians have been generally consistent over time. In contrast, crashes involving cyclists have exhibited much more variability. Bicycle crashes increased from the mid-2000s to the early 2010s, corresponding with the increase in bike ridership across the city. However, in spite of continued increases in ridership, bicycle crashes have generally trended downward since 2012. Normalizing the crash data for increases in bike ridership, the bike crash rate has generally trended

downward in recent years. Studies show that cyclists and pedestrians benefit from safety in numbers; with more non-motorists on the road, motorists are more likely to be wary of cyclists and pedestrians. As a result, a cyclist or pedestrian is less likely to be involved in a collision.

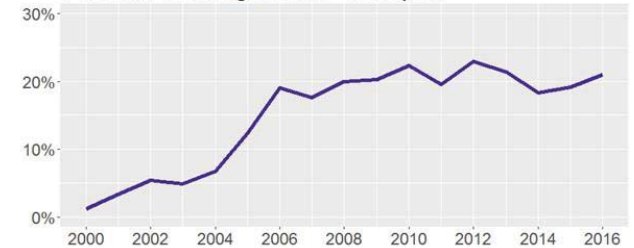
## CRASHES BY INJURY

A useful metric to evaluate the severity of a crash incident is whether the crash results in injuries

### Crashes Resulting in EMS Transport



### Percent Resulting in EMS Transport



### Percent of 2015-2016 Crashes with EMS

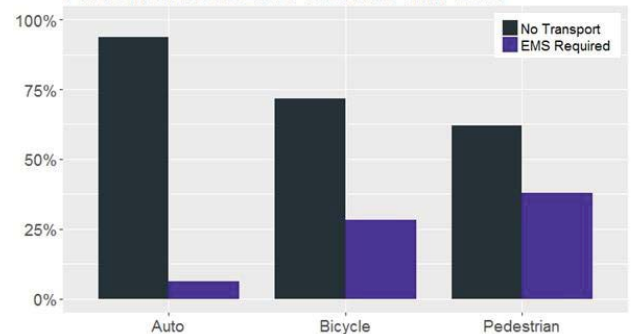
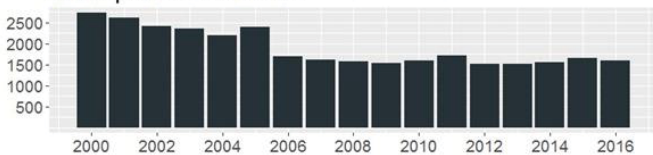
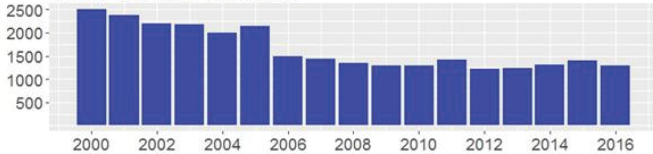


Figure 5. Reportable Crashes Requiring EMS Transport to the Hospital.

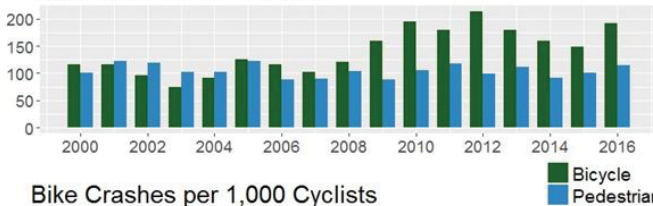
### All Reportable Crashes



### Motor Vehicle Crashes



### Non-Motor Vehicle Crashes



### Bike Crashes per 1,000 Cyclists

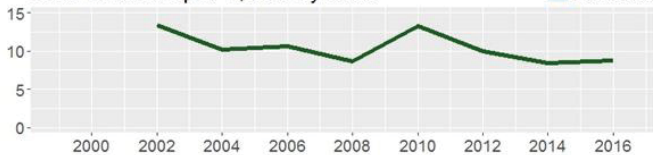


Figure 4. Counts of Reportable Crashes by Type.

requiring transport to the hospital by (EMS). While the number of reportable crashes has declined since 2000, the number of crashes resulting in EMS transports to the hospital has increased 16% in the past 10 years. This rise is likely attributed to the increase in bike ridership and pedestrian activity. These road users are more vulnerable to injury if involved in a crash. In fact, of the 343 reportable crashes requiring EMS transport in 2015 and 2016, approximately half involved a non-motorist. While only 6.4% of crashes involving only motor vehicles required EMS transport in 2015 and 2016, crashes involving cyclists required EMS 28% of the time, and crashes involving pedestrians required EMS 37.8% of the time.

## LOCATIONS

### HOTSPOTS FOR CRASHES WITH INJURY

Reportable crashes are broadly distributed across the city. Crashes of all types occurred most frequently along Massachusetts Avenue near Central Square, Harvard Square, and Porter Square, as well as along Cambridge and Hampshire Streets near Inman Square. In 2015 and 2016, these four areas together accounted for 21% of all crashes, 30% of all bicycle crashes, and 27% of all crashes with EMS transports.

The areas with highest occurrence of crashes requiring EMS transports as reported by the responding officer are circled on the density map in Figure 6. These constituted the areas with the highest

potential for a crash to occur, regardless of the number of road users in the area. Understanding areas with high incidence of EMS transports, rather than a normalized rate, is important for reaching the Vision Zero goal of eliminating all fatalities and serious injuries. The two highest frequency locations are Massachusetts Avenue from Vassar Street to Bigelow Street (the MIT and Central Square area), and the Inman Square area including Hampshire Street from the Somerville city line to Tremont Street and Cambridge Street from Fayette Street to Evereteze Way. These two areas accounted for 22% of all crashes resulting in EMS transports and 24% of bicycle crashes in 2015 and 2016. Additionally, EMS transports occurred frequently in the Kendall Square area near Broadway and Hampshire Street, along John F. Kennedy Street and Massachusetts Avenue near Harvard Square, and on Cambridge Street near 5<sup>th</sup> and 6<sup>th</sup> Streets.

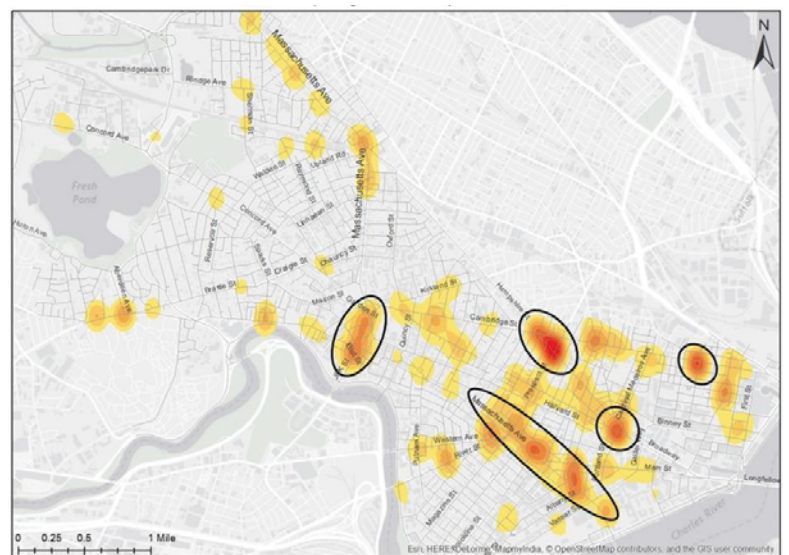
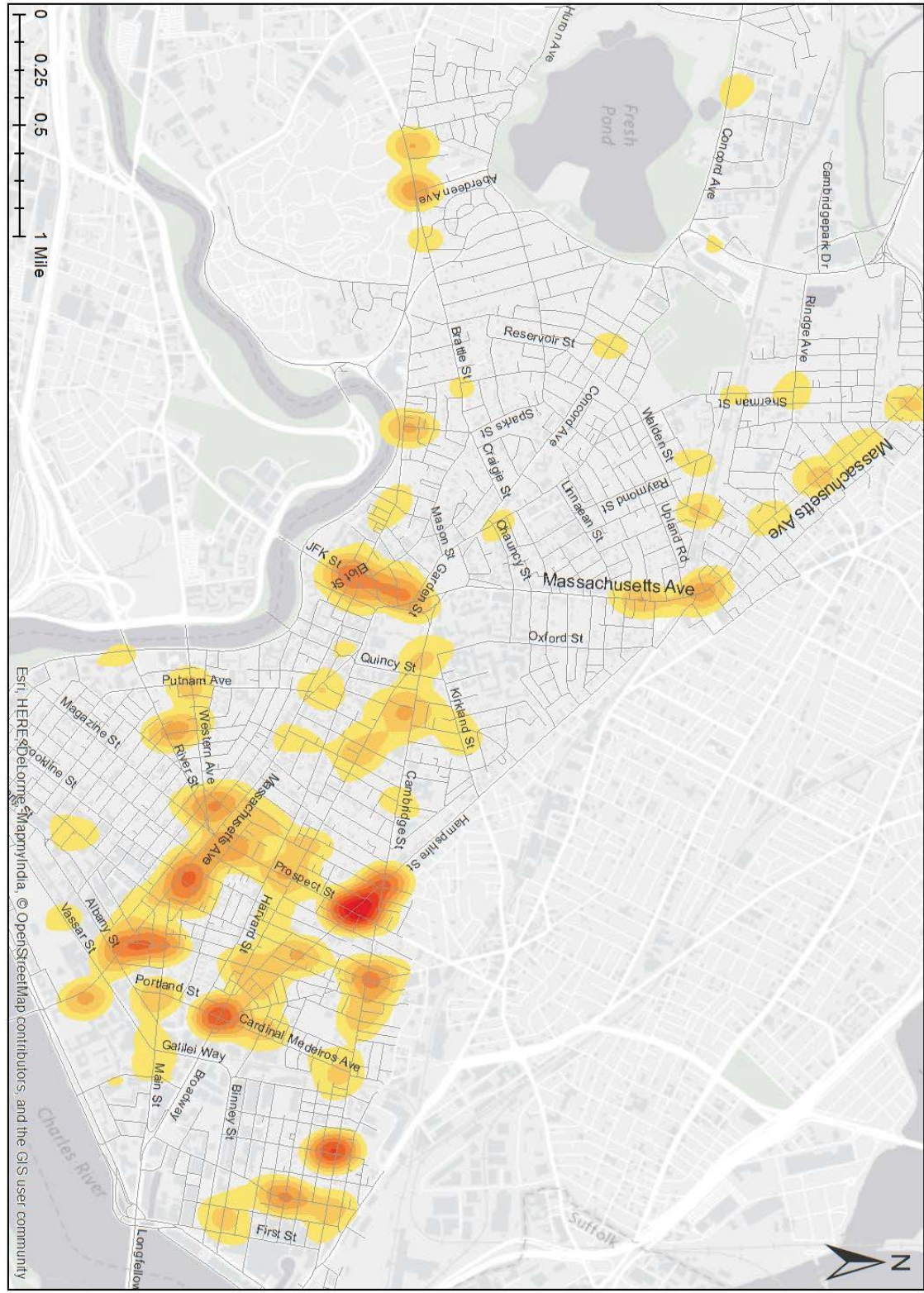


Figure 6. Density Map of Crashes Requiring EMS Transport to the Hospital, as reported by responding officer, for the years 2015 and 2016. (Larger next page.)



Crashes Requiring EMS Transports 2015-2016



Density Map of Crashes Requiring EMS Transport to the Hospital, as reported by responding officer, for 2015 and 2016.

## GLOSSARY OF TERMS

### **Crash Call for Service**

A Crash Call for Service (CFS) is recorded any time a civilian calls the police to report a crash incident or request assistance for a crash incident, and an officer is dispatched to respond to the incident. A CFS does not always result in a police report filed for the crash.

### **Reportable Crash**

A police crash report is filed when a crash results in any injury or a minimum of \$1,000 of property damage. Officers are required to file a report in these instances in accordance with Massachusetts General Law Chapter 90, Section 26 (<https://malegislature.gov/Laws/GeneralLaws/PartI/TitleXIV/Chapter90/Section26>). The \$1,000 property damage limit has not been updated since 1985, and is subjective to the judgment of the reporting officer. Officers typically take reports for more incidents than are required by law.

### **Motor Vehicle Crash**

A Motor Vehicle Crash refers to a Reportable Crash that involves only motor vehicles – no bicyclists or pedestrians involved.

### **Crash Involving Non-Motorist**

A Crash Involving a Non-Motorist is a Reportable Crash that involves a motor vehicle and a bicyclist or pedestrian.

### **EMS Transport**

An EMS Transport occurs when a crash results in injury and requires an involved party to be transported from the scene to the hospital by ambulance. These crashes are always Reportable Crashes, in which the responding officer files a crash report. EMS Transports are used as a metric to determine trends in severity of crashes and crash-related injuries.