

Massachusetts



Strategic Highway Safety Plan

2018



Executive Summary



Introduction

For the Commonwealth of Massachusetts, one life lost on our roadways or altered by a serious injury is unacceptable. While the Federal Highway Administration requires the Massachusetts Department of Transportation (MassDOT) to submit an updated Strategic Highway Safety Plan (SHSP) every five years, it is more than just a policy document required to unlock \$34.7 million of federal funds for safety improvements. This is the Commonwealth's roadway safety Action Plan, crafted by a diverse cross section of government agencies, advocates, and other stakeholders who work tirelessly to keep all road and sidewalk users—including but not limited to motorists, pedestrians, bicyclists, roadway workers, older and younger drivers—safe on all state and municipal streets.



Since releasing the 2013 SHSP, Massachusetts has made progress toward safer roadways. Fatality rates are below the national average and have decreased since the first SHSP was released in 2006. However, challenges have emerged over the past five years such as the Commonwealth's booming economy and population growth, making it more difficult to move the needle on roadway safety. The Commonwealth's economic success has led to more motorists and other roadway users, increasing the odds for congestion and crashes. In order to sustain significant progress toward zero deaths despite the Commonwealth's unprecedented growth, the 2018 SHSP calls for stronger fatality and serious injury targets and proposes aggressive policy and legislative interventions.

The Commonwealth's long-range goal is towards zero deaths while the interim goals for 2022 are to reduce five-year average fatalities by 12% and serious injuries by 21%. This means that Massachusetts must continuously decrease annual fatalities by 17 and serious injuries by 128, so that by 2022 the five-year averages will have reduced to 320 fatalities and 2,467 serious injuries.

In order to meet these targets a multidisciplinary team of policymakers, advocates and practitioners has prioritized a set of data-driven strategies associated with 14 emphasis areas (EAs) to address the causes of crashes.

In addition to the strategies outlined in this plan and the specific actions outlined in the annually updated Action Plan, the SHSP is proposing that Massachusetts consider six high-leverage policies to reduce the frequency and severity of roadway fatalities. These legislative measures are high-leverage because they target frequently occurring types of crashes and address the interconnected nature of crashes such as speeding, driver distraction, and impaired driving.

- ◆ **Hands Free:** Would allow police to stop and issue citations to motorists using mobile electronic devices.
- ◆ **Primary Seat Belt:** Would enable law enforcement to stop motorists who appear to not be wearing seatbelts.
- ◆ **Work Zone Safety:** Would enable variable speed limits in work zones and increase penalties for motorists who strike roadway workers.
- ◆ **Ignition Interlock for All Offenders:** Would statutorily allow judges to order ignition interlock devices for first time Operating Under the Influence offenders.
- ◆ **Truck Side Guards:** Would require that trucks registered in Massachusetts, meeting certain criteria, have side guards.
- ◆ **Automated Enforcement:** Would give municipalities "opt in" authority to issue citations through the use of cameras and radar technology.



Overview of the Plan

The Massachusetts SHSP is developed in accordance with Federal Highway Administration requirements. Federal law requires that the SHSP be coordinated with the state Highway Safety Plan, Commercial Vehicle Safety Plan, and the Highway Safety Improvement Program. This coordination includes aligning performance measures and targets across the aforementioned plans, and the role of this SHSP is to support Massachusetts efforts by identifying EAs, establishing appropriate goals, and developing effective strategies and actions. This SHSP reflects the efforts of 250 engaged stakeholders from more than 50 agency partners who worked on 14 respective EAs that were developed through careful examination of statewide crash data. The outcome of their work is an implementation plan that includes 61 specific strategies, 283 direct actions and six legislative proposals to get Massachusetts closer towards zero deaths and to an interim goal of a 12% drop in five-year average fatalities and a 21% drop in five-year average serious injuries.

There are four main sections of this plan:

- **Goal and Target Development:** This section reviews the goals from the 2013 SHSP and the Commonwealth's safety performance between then and now. It describes the approaches used to analyze statewide data and to cooperatively work with diverse stakeholders to develop the plan's goals. It also highlights Massachusetts' commitment to a long-term goal of zero roadway deaths and serious injuries.
- **Policy Recommendations:** There are a number of policy proposals that support the goals and strategies outlined in the SHSP that may be addressed legislatively. This section reviews the research supporting these recommendations.
- **Process and Partners:** Per Federal Highway Administration requirements, each SHSP is developed through the collaborative efforts of a diverse cross-section of practitioners and stakeholders. This section describes the steps taken to engage stakeholders, create the 14 EAs, routinely convene stakeholders and develop recommendations for strategies and actions.
- **Implementation and Evaluation:** SHSP implementation is meant to require active participation by all stakeholders, and as such, the multi-stakeholder EA teams that formulated this plan will convene regularly to track progress and measure the efficacy of ongoing efforts to execute the plan.



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About the Strategic Highway Safety Plan



Every Life Counts

Between 2012 and 2016, 1,820 people lost their lives and 15,662 were seriously injured on Massachusetts roadways. It is imperative that we look at each of these deaths and serious injuries as more than a statistic. We must view the loss of life as unacceptable, and work toward zero deaths and serious injuries on our roadways.

By 2022 Massachusetts aims to reduce the annual five-year average fatalities and serious injuries by 12% and 21%, respectively, while working toward zero roadway fatalities.

Strategic Highway Safety Planning in Massachusetts

A Strategic Highway Safety Plan (SHSP) is a major component and requirement of the Federal Highway Safety Improvement Program (HSIP) (23 U.S.C. § 148). As a statewide-coordinated safety plan, it provides a comprehensive framework for improving safety on all public roads.

The Massachusetts SHSP was established in 2006 and updated in 2013 with the goal of reducing the frequency of fatalities and serious injuries on the Commonwealth's roadways, and a long-term vision of working toward zero roadway fatalities. The SHSP is developed through a collaboration of traffic safety professionals from many different organizations and disciplines. Each of these stakeholders has a role to play in improving safety in the Commonwealth.

The Massachusetts SHSP is making a difference. Fatality rates in the state are below the national average, some of the lowest in the country, and have decreased since the first SHSP in 2006. The annual five-year average of fatalities per 100 million vehicle miles traveled (VMT) was reduced from 0.74 in 2006 to 0.64 in 2016. Yet the message is simple - despite our recent success, work remains to get to zero deaths and serious injuries.



Our Blueprint for Improving Roadway Safety

The SHSP is a data-driven strategic plan used to identify specific areas of emphasis and opportunities for strategies and actions that move us toward our safety goals. The SHSP was developed by a wide-ranging group of stakeholders that:

- Set priorities for all traffic safety partners in the Commonwealth over the next five years.
- Identify, implement and revise as necessary, high-level strategies and specific actions to address the identified emphasis areas (EAs).
- Help guide resources and funding toward the highest priorities and most effective strategies.
- Evaluate outcomes and monitor performance towards our goals for each EA.



The Massachusetts SHSP...

...by way of its Action Plans, is a living document to be updated, reviewed, and referenced on an ongoing basis.

...helps coordinate the safety-related activities of the diverse agency partners and safety stakeholders.

...establishes a common platform for approaching traffic safety in Massachusetts.

...complies with Federal requirements, and is data-driven to identify EAs and strategies to improve safety.

Federal Requirements Related to the SHSP

Federal law requires that the SHSP be coordinated with the state's Highway Safety Plan, Commercial Vehicle Safety Plan, and the Highway Safety Improvement Program. This coordination includes the alignment of performance measures and targets. The role of our SHSP is to support the state's efforts to achieve these targets by establishing appropriate goals, identifying EAs, and developing effective strategies and actions.

Yet another reason we need the SHSP

VMT in Massachusetts is on the rise. In 2016, there was an estimated 60.5 billion VMT – an increase of nearly 8 percent since 2014, and statewide planning forecasts call for this trend to continue. With increases in VMT, there is an increased level of exposure and potential for crashes.

Vision:

A roadway system with zero roadway deaths and serious injuries.

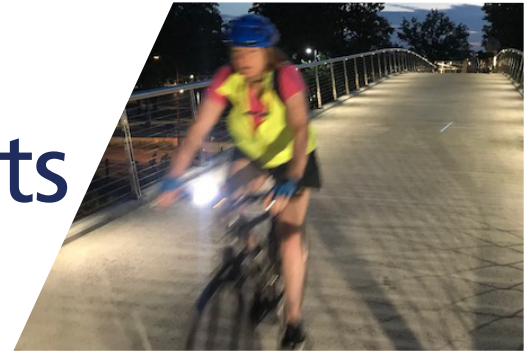
Mission:

To work collaboratively on strategies that will reduce roadway fatalities and serious injuries.

Goal:

Our long-term goal is zero roadway fatalities and serious injuries. By year 2022, the SHSP interim goal is to reduce the five-year average fatalities by 12% and serious injuries by 21%.

SHSP Goals and Targets



Reviewing the 2013 SHSP Goals

In the 2013 SHSP, Massachusetts adopted a short-term goal to reduce fatalities and hospitalizations by 20% by 2017. Specifically, the goal was to reduce annual five-year average fatalities from 372 to 298 and annual five-year average hospitalizations from 4,834 to 3,867. Using the most recent annual average from 2012 to 2016, 364 lives were lost, representing a 2% decrease. The annual average hospitalizations from Fiscal Year (FY) 2011 to FY2015 (most recent data available) was 4,189, representing a 13% decline from FY2007-FY2011.

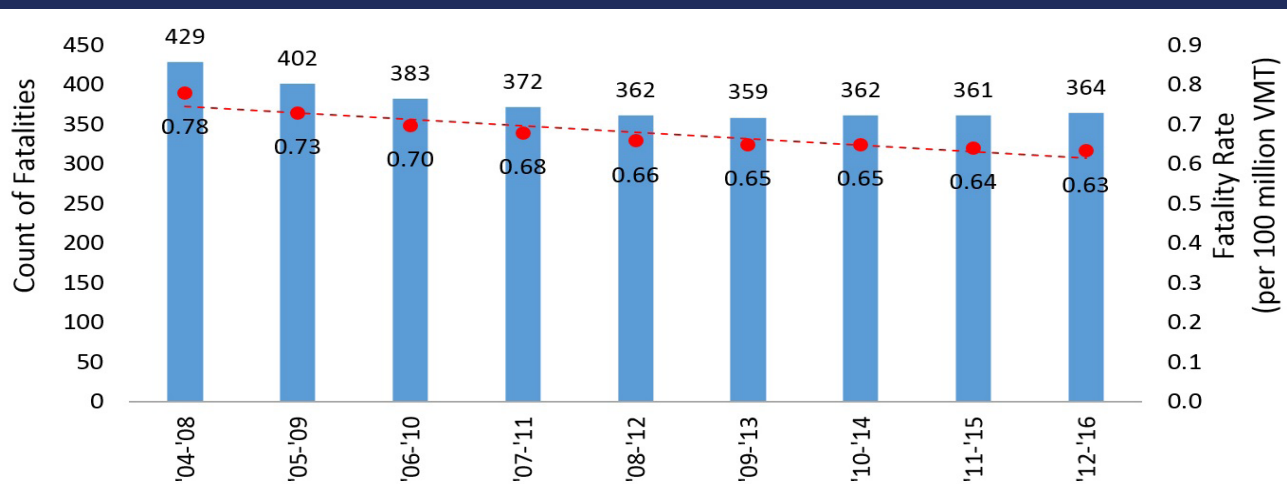
Although the 2013 SHSP goals were not normalized by VMT, when VMT is considered there were notable reductions in the annual five-year averages for both fatality and incapacitating injury rates:

- The annual average fatality rate decreased by 6% from 2007-2011 to 2012-2016.
- The annual average incapacitating injury rate decreased by 19% from 2007-2011 to 2012-2016.

A Performance Based Approach

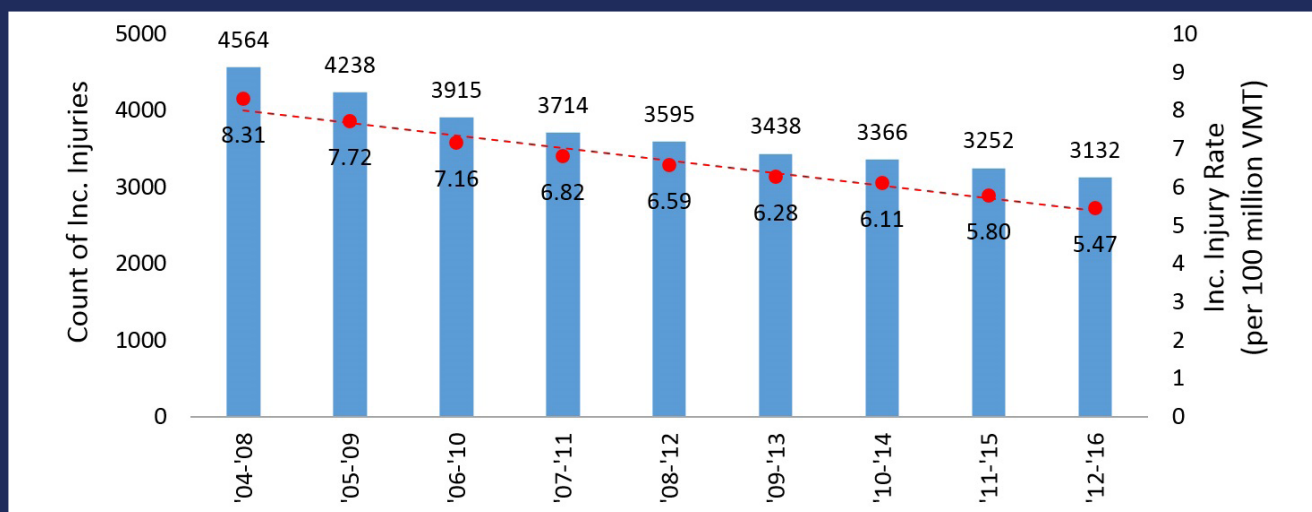
Initially, the overall trends of fatalities and serious injuries were presented to the Executive Leadership Committee (ELC) to provide a view of the state on roadway safety, and to reinforce the notion that to achieve long term goals of zero deaths and serious injuries, it will require action from every SHSP partner. Data that includes annual fatalities and serious injuries as well as fatality and serious injury rates (all calculated using five-year averages) were used to establish short-term Federally-mandated performance targets for 2015-2019.

Annual Average Fatalities & Rate from Motor Vehicle Crashes



The annual average (five-year rolling) of fatalities from motor vehicle crashes has remained relatively constant, while the annual average (five-year rolling) fatality VMT rate has decreased slightly in recent years, with the most recent average (2012-2016) resulting in 364.4 fatal injuries and 0.63 fatal injuries per 100 million VMT per year.

Annual Average Incapacitating Injuries & Rate from Motor Vehicle Crashes



The number and rate of incapacitating injuries from motor vehicle crashes have steadily decreased in recent years, with the most recent average (2012-2016) resulting in 3,132 incapacitating injuries and 5.47 incapacitating injuries per 100 million VMT per year.

Please note that in the Massachusetts crash system, injury severity is based on “incapacitating injuries” not “serious injuries.” This will change in 2019 based on the Federal rule for defining suspected serious injuries. The SHSP analyses completed as part of the update process are based upon incapacitating injuries.

The same data was also used to establish interim goals associated with the time-frame of the current SHSP with goals ending with year 2022. Similarly, all goals are based on annual five-year rolling averages, referenced to by the ending year. To identify successes since the first SHSP in 2006, and to target current safety priorities, a data trend review was conducted.

Since the first SHSP implementation, safety initiatives like strengthened enforcement of traffic laws and public education around driver behavior, along with the adoption of emerging engineering guidelines, have aligned to create a safer transportation network. Moving toward the long-term vision and 2022 goals will require a continued effort from all SHSP partners across the Commonwealth.

SHSP leadership consulted with representatives from other agencies at State, local, and regional levels to set appropriate goals and strategies. This encouraged adoption and incorporation of the goals and strategies into stakeholders’ programs - specifically Executive Office of Public Safety & Security - Highway Safety Division (EOPSS-HSD) (required to submit targets to National Highway Traffic Safety Administration [NHTSA]), the Massachusetts Department Of Transportation (MassDOT) Planning working closely with the Metropolitan Planning Organizations (MPOs), and the Office of Performance Management and Innovation (OPMI). In addition to being data-driven and measurable, the goals and strategies are both action-oriented and time-based.

Additionally the approach aligns with the Federal requirement that states set five performance targets each year for the Highway Safety Improvement Program (HSIP). The five performance targets include annual averages (five-year rolling) for the following:

1. Number of fatalities
2. Rate of fatalities per 100 million VMT
3. Number of serious injuries*
4. Rate of serious injuries per 100 million VMT*
5. Combined total number of non-motorized fatalities and non-motorized serious injuries involving a motor vehicle during a calendar year

*Injury targets are now required to be based upon crashes rather than hospitalizations. In the Massachusetts crash system, the injury severity is based upon “incapacitating injuries” not “serious injuries” This will change in 2019 based upon the Federal rule for defining suspected serious injuries.

A Commitment to Our Goals

Our long-term goal is simple – zero roadway fatalities and serious injuries. Through the SHSP and the 14 EA Action Plans, we developed a blueprint that will help guide us toward that long-term goal. However, we have also committed to five-year goals associated with the time-frame of this SHSP. Although specific goals within each EA have not been defined, we are confident that with our commitment to crash reductions, each EA will collectively help us achieve our goals.

Primary Goal: Zero roadway fatalities and serious injuries.

Fatalities

The annual number of fatalities in Massachusetts was relatively stable from 2013 to 2015. In 2016 there was a marked increase in these numbers (up from about 345 to 395). The immediate goal is to reverse this recent upward trend, while simultaneously aiming for:

- ▶ Annual average fatalities of 320 (five-year rolling) by 2022. This reflects a 12% drop and 44 additional lives saved from the 2016 annual average (five-year rolling) fatalities of 364.
- ▶ Annual average fatalities per 100 million VMT of 0.52 (five-year rolling) by 2022. This reflects a drop of approximately 14% from the 2016 annual average (five-year rolling) rate of 0.61 per 100 million VMT.

Serious Injuries

The number of incapacitating injuries decreased each calendar year between 2012 and 2016 (from 3,587 to 2,867). In 2016, the number of incapacitating injuries increased slightly to 2,980. The immediate goal is to revert the recent trend and aim for continued reductions of:

- ▶ Annual average (five-year rolling) serious injuries of 2,467 by 2022. This reflects a 21% drop and 665 fewer injuries from the 2016 annual average (five-year rolling) serious injuries of 3,132.
- ▶ Annual average (five-year rolling) serious injuries per 100 million VMT of 4.02 by 2022. This reflects a drop of approximately 23% from the 2016 annual average rate of 5.21 serious injuries per 100 million VMT.

The fatality/serious injury rates are calculated using the goal and the projected VMT; MassDOT Planning projects a 0.3% annual increase in VMT.



Achieving our goals will not be easy. To reach our 2022 targets, Massachusetts must continuously decrease annual fatalities by 17 and serious injuries by 128.

Advancing Safety Through Policy



Legislative Initiative

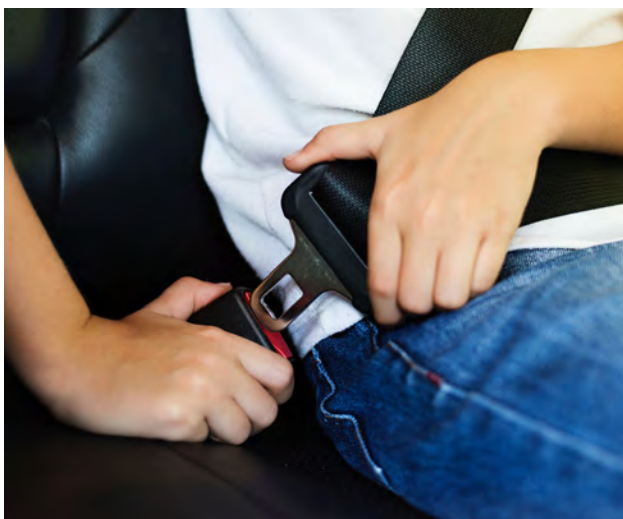
Recognizing the impact of legislation and policy on traffic safety, many of the EA teams have engaged in an organized dialogue on legislation impacting transportation safety, both in the Commonwealth and across the country. The approach is two-fold, and includes: 1) tracking traffic safety legislation and disseminating relevant information across transportation safety stakeholders, and 2) as appropriate, supporting legislation and policy changes through data and information sharing that affects and improves transportation safety.

Using the Center for Disease Control's "Motor Vehicle Prioritizing Interventions" and "Cost Calculator for States" as resources, the EA teams can estimate the effectiveness of policy-related interventions as well as the related costs. To date, the Massachusetts SHSPs have emphasized junior operator laws and graduated drivers licensing policies. As a result, the Younger Driver EA has seen a continual decrease in younger driver fatalities and incapacitating injuries. More recently, policy successes related to work zone safety and distracted driving have highlighted the potential for making policy and legislative activities a continued part of the SHSP Action Plans.

In order to further build off this momentum, the multi-agency team recommends supporting legislation that addresses six policy areas where the opportunity exists to reduce the frequency and severity of roadway fatalities. We urge both the Administration and Legislature to develop and enact appropriate legislation. Several of the agencies stand ready to support efforts to draft, file and provide support for these important policies.

Hands Free

A hands free bill would ban the use of hand held electronic devices while driving. If passed in Massachusetts, this law would bring the Commonwealth in line with 16 other states - including the neighboring states of New Hampshire, Vermont, New York, Connecticut and Rhode Island - to allow police to stop and issue citations to drivers who use electronic devices while operating a vehicle. This law would assist police with the ability to better enforce distraction laws with the goal of reducing instances of driver distraction, which remains a substantial contributing factor to crashes.



Primary Seat Belt

Massachusetts law only authorizes secondary enforcement of seat belt laws, which means that police officers cannot stop and ticket drivers for the sole offense of not wearing a seatbelt. Studies have found that front-seat safety belt use reduces the risk of fatal injury by 45%. Furthermore, states with Primary Enforcement Laws have 9% higher usage rates than states with Secondary laws. This factor is the impetus behind the push for a Primary Seat Belt law, which would enable law enforcement to stop motorists who appear to not be wearing seatbelts. States that have strengthened their seatbelt laws from Secondary to Primary have seen a decline in driver death rates by up to 7%. Nationwide, approximately 90% of front-seat occupants were observed wearing a seat belt in 2017. In Massachusetts, in 2018 seat belt usage rate was 81.6% — one of the lowest in the nation.

Work Zone Safety

A work zone safety bill would support the safety of the men and women who work to maintain and improve our roadways. A comprehensive package should include the ability to post variable speed limits that are enforceable where workers are present as well as increase the penalty for motorists who hit a roadway worker or first responder in a work zone.



Ignition Interlock for All Offenders

An ignition interlock is a device installed in a motor vehicle to prevent a driver from operating the vehicle if the driver has been drinking. Before starting the vehicle, a driver must breathe into the device and if the driver's blood alcohol concentration (BAC) is above a pre-set limit or set point, the ignition interlock will not allow the vehicle to start [NHTSA]. Studies show that ignition interlock devices can reduce re-arrest rates for impaired driving by as much as 70%, and reduce alcohol-involved crash deaths by 15%. Though existing Massachusetts law mandates the use of ignition interlock devices for 2nd and subsequent Operating Under the Influence (OUI) offenders, no law requires the use of these devices for first offenders, and courts almost never require them. While all OUI offenders receive mandatory license suspensions of varying lengths, these suspensions are usually temporary, and some motorists with impaired driving histories continue to drive even when their licenses are suspended. Expanding the use of ignition interlock devices to cover at least some first-offenders (for example, those granted hardship licenses) would enhance public safety and reduce recidivism, by keeping individuals with impaired judgement from getting behind the wheel.

Truck Side Guards

Truck side guards are vehicle-based safety devices designed to keep pedestrians, bicyclists, and motorcyclists from being run over by a large truck's rear wheels in a side-impact collision. Nearly half of bicyclists and more than one-quarter of pedestrians killed by a large truck first impact the side of a truck. Following the national side guard mandate in the UK, there was a 61 percent drop in cyclist fatalities and a 20 percent drop in pedestrian fatalities in side-impact collisions with trucks. MassDOT has committed, as part of this plan, to develop and implement a transition plan to require side guards and convex and cross-over mirrors, where appropriate, on DOT owned vehicles. In addition, legislation should be developed to address side guard requirements on other state-owned trucks as well as requirements for trucks used by private companies with municipal and/or state contracts.

Automated Enforcement

Automated enforcement is the use of cameras and radar technology to identify and cite vehicles for violating traffic laws, including speeding, running red lights, and bus and bicycle lane violations. Twenty-three states allow for red light cameras and 14 states allow for speed cameras, many of which grant communities the ability to opt-in. Over 400 U.S. communities use red light cameras and over 130 communities use cameras to enforce speed laws. In Maryland, a study showed that the proportion of drivers traveling more than 10 mph above the speed limit declined by about 70% for locations with warning signs and speed camera enforcement [Traffic Injury Prevention Journal]. Massachusetts General Law currently does not permit the use of automated enforcement. Instead a moving citation must be issued "in hand" to a motorist by an officer in person. Because many Massachusetts cities and towns are interested in the potential use of automated speed enforcement, legislation should be developed to give municipalities "opt in" authority to issue citations with the provision that such citations would not trigger points on insurance.



2018 SHSP Process and Partners



The Success of the SHSP

Despite recent successes, there is a need for a commitment to improve roadway safety in Massachusetts. Achieving the mission, vision, and goals of the 2018 SHSP will not be easy. Success of the SHSP depends on:

Process – a coordinated planning process that is data driven.

Partners – the various stakeholders and agencies associated with improving safety in Massachusetts.

Product – a compilation of 14 EAs, 61 strategies, and 283 actions providing the blueprint for improving transportation safety in the Commonwealth over the next five years.

SHSP Update Process

Massachusetts is committed to reducing the rate and frequency of fatalities and injuries along Massachusetts roadways. The SHSP is essential to this effort, as is the process and partners associated with its development and implementation over the next five years.

Identify and engage safety stakeholders

We engaged stakeholders from across Massachusetts. Participants from the 2013 SHSP update, along with new stakeholders identified by state safety leaders and others, participated in the process by offering their views and expert opinions on strategies and future action steps for the SHSP.

Recruit stakeholders to participate in ELC and EA teams

MassDOT Secretary Pollack invited leaders of stakeholder agencies to join the ELC, which was created with traffic safety leaders from a cross section of agencies to identify safety priorities in the State. The ELC's primary responsibility is to assist in overseeing the process, reviewing progress, and creating and implementing the 2018 SHSP. Each ELC agency/organization also identified staff to serve on EA teams. The EA team leaders acted as ambassadors that helped to identify EA team members and provide general direction.

Conduct stakeholder meetings

The ELC met at the beginning of the SHSP update process and then later to review and approve the draft plan. Once developed, the EA teams met either as a group or with other EA teams to review data, develop strategies, and identify actions. There were more than 20 EA team meetings in the early part of 2018.

Complete evaluations of transportation safety, crash data, and EA strategies

To ensure appropriate strategies were included in the SHSP, the ELC and EA teams reviewed the existing SHSP strategies, along with available literature on effective countermeasures. Lead agencies were identified for each strategy to ensure action steps were both identified and feasible. This lead agency buy-in was also a crucial aspect of the plan's implementation approach.

Implement the strategies and actions

Implementation of the SHSP will require active participation by all stakeholders. The majority of implementation strategies will be multi-agency in nature, with complementary tasks and programs that were identified in each of the EAs. The EA teams will monitor the plan's implementation in order to track progress and measure efficacy. In addition, safety related data will be reviewed to help identify both progress and future needs.

SHSP Leadership & Stakeholder Engagement

The 2018 SHSP was led and directed by the ELC and included active participation within the EA teams by more than 250 stakeholders representing over 50 agency partners. The ELC was made up of representatives from the following agencies/organizations:

- Executive Office of Elder Affairs
- Executive Office of Health and Human Services
- Executive Office of Public Safety and Security - Highway Safety Division
- Federal Highway Administration (FHWA)
- Federal Motor Carrier Safety Administration (FMCSA)
- Massachusetts Association of Regional Planning Agencies
- Massachusetts Bay Transportation Authority (MBTA)
- Massachusetts Chiefs of Police Association
- Massachusetts Councils on Aging (MCOA)
- Massachusetts Department of Fire Services
- Massachusetts Department of Public Health (DPH)
- Massachusetts Department of Transportation (Highway, Planning, Registry of Motor Vehicles (RMV), Rail and Transit)
- Massachusetts Municipal Association
- Massachusetts State Police (MSP)
- National Highway Traffic Safety Administration

In 2018, the SHSP update process began with a preliminary analysis of available fatal and serious injury crash data to identify trends and crash characteristics. Using the baseline data, the ELC, comprised of leadership from stakeholder agencies, reviewed current challenges and weighed potential opportunities and needs. The ELC analysis resulted in the creation of 14 EAs based on various transportation vulnerabilities that are representative of all roadway users, including pedestrians and bicyclists.



Emphasis Areas

based upon
average fatalities
(2012-2016)

Lane Departure Crashes [198]

Impaired Driving [124]

Occupant Protection [102]

Speeding and Aggressive Driving [97]

Intersection Crashes [96]

Pedestrians [80]

Older Drivers [74]

Motorcycle Crashes [49]

Younger Drivers [41]

Large Truck-Involved Crashes [34]

Driver Distraction [30]

Bicyclists [10]

Safety of Persons Working on
Roadways [2]

At-Grade Rail Crossings [1]

*Selected EAs in order of those with the
highest annual fatality average to lowest.*

Defining the SHSP Emphasis Areas

In response to the ELC analysis, 14 EAs were created for the 2018 SHSP. Narrowing in on these categories provided a foundation for targeting improvements and moving toward the long-term goals. However, to be successful, the approach must be coordinated and multidisciplinary.

For each EA team, a leader was identified to organize and coordinate activities.

The SHSP is a comprehensive effort across the transportation safety spectrum, including Federal, state, regional, local, nonprofit, and private sector stakeholders, and employs a data-driven, multidisciplinary approach to address the critical elements of safety —engineering, education, enforcement, emergency response, legislation, and policy as well as data integration and quality. As a result, a multidisciplinary team of stakeholders was created for each of the 14 EAs, and a series of in-depth data analyses were completed. The EA teams met (from 1 to 4 times) to examine the issues, combine resources, document ongoing and future programming, and create a five-year action plan made up of strategies and actions with the goal of improving safety within their EA. Yet there is a notable overlap between the EAs. Consider as an example a scenario in which a younger driver that was speeding on a motorcycle departed the lane. Understanding the interconnected nature of crashes, the EA teams worked together to address the overlap of issues from one EA to the next. Collaboration is key to SHSP success, and the 2018 SHSP included active participation within the 14 EA teams by more than 250 stakeholders representing over 50 agency partners.

The selected EAs are presented below in order of those with the highest five-year fatality average (2012-2016) to the lowest.

Emphasis Area Teams & Team Leaders

Lane Departure Crashes

Leader: Jim Danila, MassDOT - Highway Division

Impaired Driving

Leader: Colleen McGuire, Department of Public Health

Occupant Protection

Leader: Jeff Larason, Exec. Office of Public Safety and Security - Highway Safety Division

Speeding and Aggressive Driving

Leader: Sgt. Bill Robertson, Massachusetts State Police

Intersection Crashes

Leader: Jim Danila, MassDOT - Highway Division

Pedestrians

Leader: Jackie DeWolfe, MassDOT - Sustainable Mobility

Older Drivers

Leader: Michelle Ellicks, MassDOT - Registry of Motor Vehicles

Motorcycle Crashes

Leader: Gene Carabine, MassDOT - Registry of Motor Vehicles

Younger Drivers

Leader: Colleen McGuire, Department of Public Health

Truck-Involved Crashes

Leader: Lt. Thomas Fitzgerald, Massachusetts State Police - Commercial Vehicle Enforcement Section

Driver Distraction

Leader: Sgt. Bill Robertson, Massachusetts State Police

Bicyclists

Leader: Jackie DeWolfe, MassDOT - Sustainable Mobility

Safety of Persons Working on Roadways

Leader: Ed Gincauskis, MassDOT - Highway Division

At-Grade Rail Crossings

Leader: Ron Nickle, Massachusetts Bay Transportation Authority



EA team leadership was critical for organizing their participants around common goals and priorities.

Agency Stakeholders Engaged Through the 2018 SHSP Update Process

Federal Agencies

- ◆ Federal Highway Administration (FHWA)
- ◆ Federal Motor Carrier Safety Administration (FMCSA)
- ◆ National Highway Traffic Safety Administration (NHTSA)

State Agencies

- ◆ Executive Office of Elder Affairs
- ◆ Executive Office of Health and Human Services (EOHHS)
- ◆ MassMobility Initiative
- ◆ Executive Office of Public Safety and Security - Highway Safety Division (EOPSS - HSD)
- ◆ Alcoholic Beverages Control Commission (MA ABCC)
- ◆ Massachusetts Bay Transportation Authority (MBTA)
- ◆ Councils on Aging (MCOA)
- ◆ Department of Public Health (DPH)
- ◆ Department of Transportation – Registry of Motor Vehicles (MassDOT – RMV)
- ◆ Department of Transportation (MassDOT) District Offices
- ◆ Department of Transportation (MassDOT) Highway
- ◆ Department of Transportation (MassDOT) Planning
- ◆ Department of Transportation (MassDOT) Rail
- ◆ Department of Transportation (MassDOT) Sustainable Mobility
- ◆ State Police (MSP)

Health & Research Agencies

- ◆ Baystate Health
- ◆ Beth Israel Deaconess Medical Center
- ◆ Boston Children's Hospital
- ◆ Brain Injury Association of Massachusetts (BIAMA)
- ◆ Massachusetts General Hospital Division of Trauma
- ◆ Massachusetts Healthy Aging Collaborative
- ◆ Massachusetts Medical Society (MMS)
- ◆ UMass Boston Gerontology

Local Government Agencies

- ◆ Boston Emergency Medical Services (EMS)
- ◆ Boston Public Health Commission (BPHC)
- ◆ Boston Transportation Department
- ◆ Greater Lynn Senior Services
- ◆ Nantucket Government
- ◆ Northbridge Department of Public Works
- ◆ Tewksbury Department of Public Works

Regional Planning & Transit Organizations

- ◆ Boston Region Metropolitan Planning Organization/ Central Transportation Planning Staff (CTPS)
- ◆ Cape Cod Commission (CCC)
- ◆ Central Massachusetts Regional Planning Commission (CMRPC)
- ◆ Franklin Regional Council of Governments (FRCOG)
- ◆ Merrimack Valley Planning Commission (MVPC)
- ◆ Metropolitan Area Planning Council (MAPC)
- ◆ MetroWest Regional Transit Authority
- ◆ Montachusett Regional Planning Commission (MRPC)
- ◆ Northern Middlesex Council of Governments (NMCOG)
- ◆ Old Colony Planning Council (OCPC)
- ◆ Pioneer Valley Planning Commission (PVPC)
- ◆ Southeastern Regional Planning and Economic Development District (SRPEDD)

Law Enforcement Agencies

- ◆ Boston Police Department (BPD)
- ◆ Burlington Police Department
- ◆ Cambridge Police Department
- ◆ Massachusetts State Police

Additional Stakeholders

- ◆ AAA Northeast
- ◆ AECOM
- ◆ American Traffic Safety Services Association New England
- ◆ Ashland Bike Club
- ◆ Charles River Wheelers
- ◆ Harris Miller Miller & Hanson (HMMH)
- ◆ Hopkinton Upper Charles Trail
- ◆ In Control Family Foundation
- ◆ Lynch Associates
- ◆ Mass Motor Truck Association
- ◆ Massachusetts Motorcycle Association
- ◆ Massachusetts Motorcyclists Survivors Fund
- ◆ McFarland and Johnson Consulting
- ◆ National Safety Council
- ◆ Pare Corporation
- ◆ Safe Roads Alliance
- ◆ Southeastern Massachusetts Motorcyclists Survivor's Fund
- ◆ Students Against Destructive Decisions (SADD)
- ◆ Toole Design Group (TDG)
- ◆ Transportation Resources, Information, Planning & Partnership for Seniors (TRIPPS)
- ◆ Tufts Health Plan Foundation
- ◆ WalkBike Worcester
- ◆ WalkBoston
- ◆ VHB

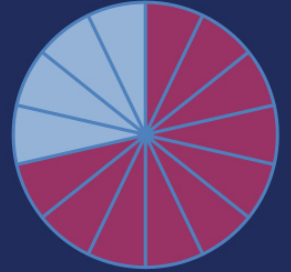
SHSP Implementation & Evaluation

Each action listed in the SHSP includes the agencies that will implement or guide the implementation of that action. Annually, starting in 2019, the ELC will meet to provide leadership and oversight for the SHSP implementation process. EA teams will meet more frequently than the ELC to review progress in their specific areas. As additional data becomes available, fatality and injury performance measures will be updated. As a living document, the SHSP will be updated as needed and reviewed in conjunction with updates to Massachusetts' State Transportation Improvement Program (STIP).

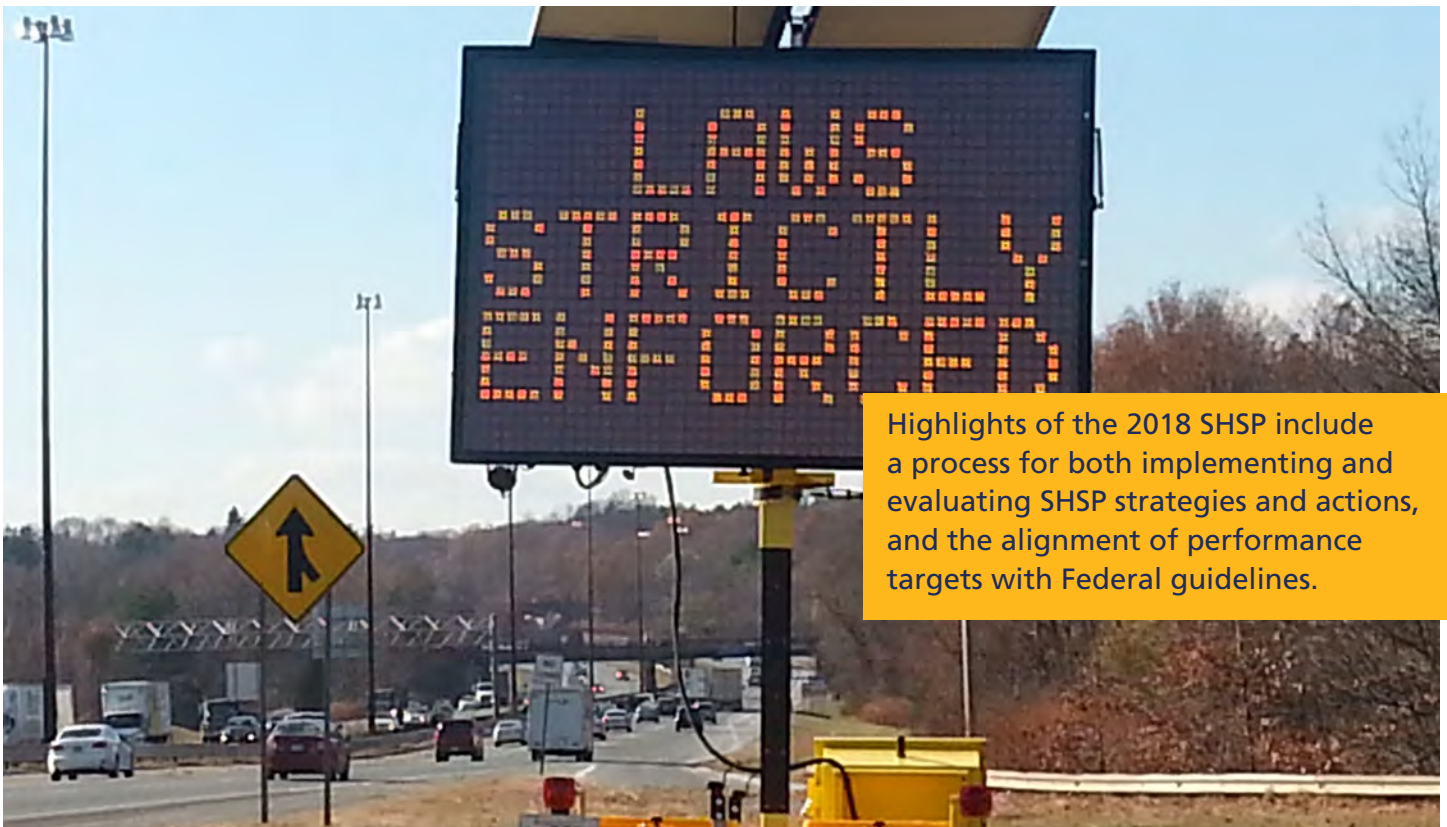
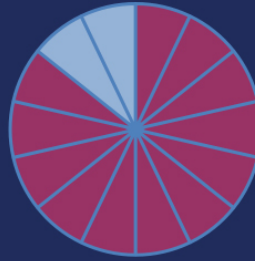
SHSP by the Numbers

- 14 multidisciplinary EA teams
- 250 engaged stakeholders from more than 50 agency partners
- 61 specific strategies and 283 direct actions
- 1 primary goal – to eliminate roadway fatalities and serious injuries in Massachusetts

10 EAs discussed legislation that MA could consider adopting



12 EAs include increased enforcement actions



Highlights of the 2018 SHSP include a process for both implementing and evaluating SHSP strategies and actions, and the alignment of performance targets with Federal guidelines.

From Problem Identification To Action Plans



To develop a strategic, data-driven safety plan for the Commonwealth, a wide range of statewide data sources must be used to identify existing problems and quantify their impact on the Commonwealth. Data is sourced from both relatively static inventories of roadways and drivers, and dynamic event repositories comprised of citations, crashes, and medical records. These rich data sources can be used in small and large-scale analyses to direct the effective use of funding for programming initiatives. More specifically, crash analysis allows for quantification of specific roadway attributes, person involvement, and potential causation, which in turn assists with the creation of targeted goals to address safety needs within each EA.

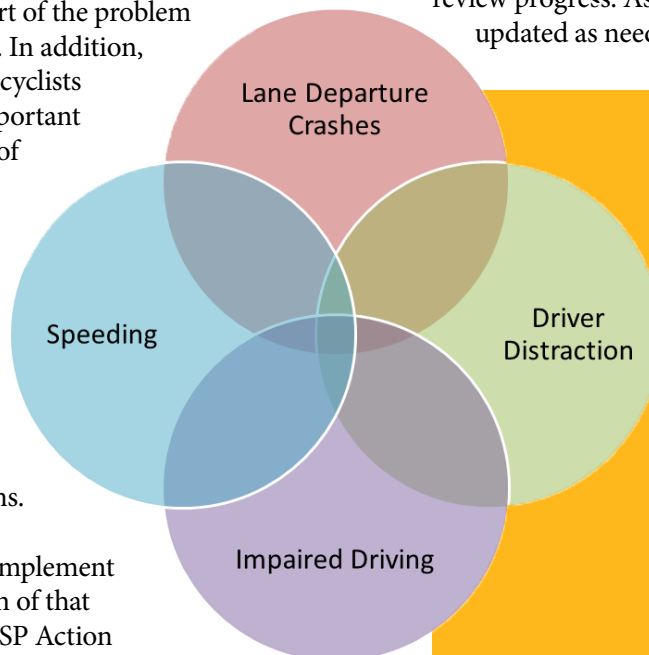
All injury-based goals are based upon injuries reported in crashes rather than after hospitalizations as was the case in previous versions of the SHSP. Some data, particularly serious injuries from some EAs, can not be quantified accurately due to limitations of the current crash form. Therefore, we must work to improve data quality.

Intersecting Efforts

Although crash data analysis is conducted for each EA individually, there is often overlap. For example, many lane departure crashes are also speeding-related, and are therefore included as part of the problem quantification in both areas. In addition, although pedestrians and bicyclists have dedicated EAs, it is important to acknowledge the impact of every strategy on all road users (including users of alternative modes) within each EA.

EA teams met to review all available data and to develop a five-year action plan made up of individual strategies and specific actions. For each action listed in the plan, the agencies that will implement or guide the implementation of that action are included. The SHSP Action Plan is presented in Appendix A and has also been published as a standalone document. Throughout the five-year implementation process, the SHSP

Action Plan will act as a collection of dynamic documents that stakeholders will update, review, and reference. The ELC will meet annually to provide leadership and oversight, and the EA teams will meet more frequently to assess needs and review progress. As a living document, the SHSP will be updated as needed.



The SHSP Action Plans are intended to be living documents that will be updated, reviewed, and referenced on an ongoing basis over the five-year SHSP time frame.

Problem Identification: Data Highlights

An essential first step of the SHSP update was to analyze the number of roadway fatalities over time and examine the various causes. To make decisions about programming, the EA teams looked at the trends, successes, and challenges of previous initiatives. Statewide, data serves as a rich resource for identification and justification of focus areas in roadway safety. Some notable EA-related findings are presented below. However, it is worth noting that the crash characteristics for many EAs are interrelated.

Lane Departure Crashes

In 2016, fatalities from lane departure crashes accounted for 50% of all motor vehicle fatalities in Massachusetts.

The most frequent contributing code in fatal crashes for lane departures was 'exceeding the authorized speed limit'.

Impaired Driving

In Massachusetts, almost one-third of all fatalities from motor vehicle crashes involved an alcohol-impaired driver.

Although not indicative of the level of impairment, nearly 25% of deceased drivers who were given a blood test had Delta 9 THC in their system. Delta 9 THC is the psychoactive component of marijuana and only remains in the blood stream for a few hours. This percentage has increased by 15 points in the last 10 years.

Occupant Protection

In 2018, the Massachusetts safety belt usage rate was 81.6% – one of the lowest in the nation.

Men were less likely to wear safety belts than women (78% vs. 87%, respectively), and occupants of pickup trucks were also less likely to wear their safety belts, as compared to passenger cars (68% vs. 84%, respectively).

Speeding & Aggressive Driving

In 2016, speeding-related crashes accounted for approximately 27% of all fatal injuries in Massachusetts.

Vehicle occupants in the 25-34 year old age group accounted for the most fatalities (24%) in speeding-related crashes, followed by 21-24 year old occupants (21%).

Intersection Crashes

In 2016, fatalities at intersections made up 22% of all motor vehicle fatalities in Massachusetts.

The most common collision type at intersections was angle, followed by rear-end. The most severe collision types were single vehicle (which may include pedestrian crashes) and angle crashes.

Pedestrians

In 2016, pedestrian fatalities comprised 21% of all crash fatalities in Massachusetts, which was significantly higher than the national average of 16%.

Among pedestrian crashes, 48% of crashes resulting in incapacitating or fatal pedestrian injuries occurred during darkness.

Older Drivers

In 2016, fatalities from crashes involving older drivers (aged 65+) made up 20.8% of all motor vehicle fatalities in Massachusetts, which was slightly higher than the national proportion of fatalities involving older drivers (19.4%).

Crashes at intersections (specifically four-way and T-intersections) were more common for drivers 65 and older.



Motorcycle Crashes

In 2016, motorcyclist fatalities constituted 10.8% of all motor vehicle fatalities in Massachusetts.

27% of operators in fatal motorcycle crashes had owned their motorcycle for less than one year.

Younger Drivers

In 2016, crash fatalities involving younger drivers between the ages of 15 and 20 made up 13% of all motor vehicle fatalities in Massachusetts, equal to the national percentage.

Younger drivers between the ages of 15 and 24 had a higher proportion of crashes between 7:00 p.m. and 11:00 p.m., accounting for 15% of their crashes as compared to 12% for adults.



Large Truck-Involved Crashes

In 2016, fatalities resulting from crashes with large trucks made up 8.5% of all motor vehicle fatalities in Massachusetts.

Crashes involving large trucks were much more severe than passenger vehicle crashes, as 7% of crashes involving a large truck or bus resulted in an incapacitating or fatal injury, as compared to only 1.8% for passenger vehicles.

Driver Distraction

In 2016, fatalities from crashes involving distraction comprised 8.1% of all motor vehicle fatalities in Massachusetts. Distraction-affected crashes were significantly underreported due to self-reporting of drivers and limitations on how law enforcement can investigate the cause of a crash.

Cell phone-specific reported distractions made up only 9% of all reported distracted driving-related fatal crashes in Massachusetts. The majority were recorded as inattention or carelessness. Boston and Worcester accounted for 21% of fatalities due to crashes involving distracted drivers.



Bicyclists

In 2016, bicycle fatalities made up 2.6% of all motor vehicle fatalities in Massachusetts.

21% of fatal and incapacitating bicyclist injuries occurred from crossing an intersection or street.

Safety of Persons Working on Roadways

Between 2012 and 2016, there was an average of 1.8 worker deaths per year – the highest of any 5-year increment in the last 10 years.



At-Grade Rail Crossings

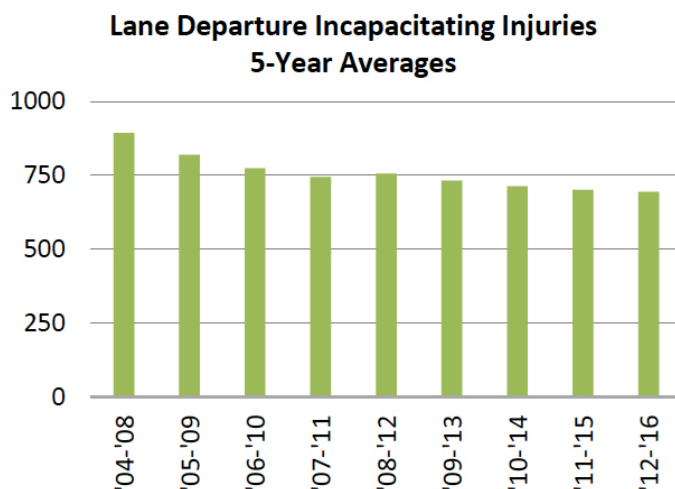
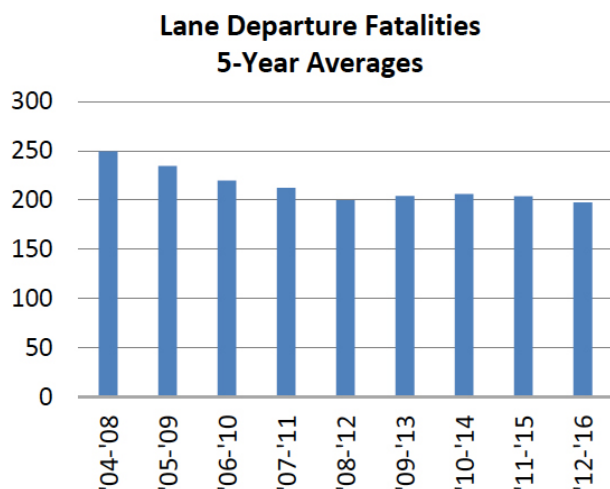
As of 2016, there are 1,431 at-grade rail-crossings in Massachusetts, with 832 active at-grade rail-crossings on public roads.

Between 2012 and 2016, there were two fatalities and 15 non-fatal injuries due to at-grade rail crossing crashes in Massachusetts.

Lane Departure Crashes

In 2016, fatalities from lane departure crashes accounted for 50% of all motor vehicle fatalities in Massachusetts. Although lane departure crashes comprise a large percentage of Massachusetts' fatalities and incapacitating injuries, annual five-year average fatalities and injuries have been declining, as shown in the figures below.

When examining the driver contributing code (the responding officer's decision regarding crash causation) for all Massachusetts lane departure crashes, the codes used most frequently were 'driving too fast for conditions', 'operating vehicle recklessly', 'failure to keep in proper lane or running off road', and 'inattention'.



Historically, roadways with curves and high speed limits, such as those within many rural areas of Massachusetts, have been prone to lane departure crashes. State participation in existing FHWA-aligned programs is warranted in order to address the risks to safety on these rural roads. High Risk Rural Roads are defined in 23 USC 148(a)(1) as “any roadway functionally classified as a rural major or minor collector or a rural local road with significant safety risks, as defined by a State in accordance with an updated State strategic highway safety plan.”

The most frequent contributing code in fatal crashes was ‘exceeding the authorized speed limit’, which illustrates the effect of vehicle speed on the severity of lane departure crashes.



The most frequent contributing code in fatal crashes for lane departures was ‘exceeding the authorized speed limit’.

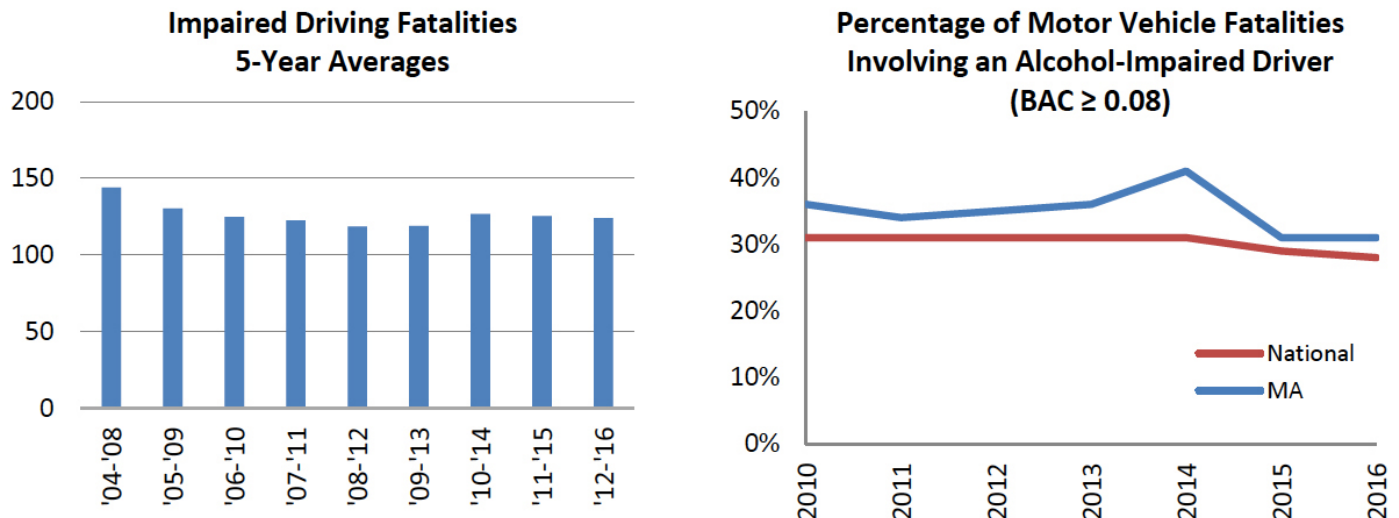
Overview of Strategies

- Identify lane departure crashes and causes
- Educate safety practitioners on best practices for roadway design
- Incorporate safety elements into roadway design and maintenance

For a complete list of the 29 actions associated with the above strategies, please refer to the Lane Departure Action Plan within the SHSP Action Plan in Appendix A.

Impaired Driving

Impaired driving due to alcohol or drug use has consistently been one of the greatest threats to traffic safety in the United States. In Massachusetts, almost one-third of all fatalities from motor vehicle crashes involve an alcohol-impaired driver. In 2016, fatalities resulting from crashes involving an alcohol-impaired driver (BAC [Blood Alcohol Content] equal to or greater than 0.08) comprised 31% of all motor vehicle fatalities in Massachusetts – 3% higher than the national rate of 28%. As shown in the figure below, the annual five-year average for fatalities involving an alcohol-impaired driver has remained relatively flat. The figure below illustrates the proportion of motor vehicle fatalities involving alcohol-impaired drivers compared to the national rate.



It is worth noting a potential data quality issue with the above information given that current crash form precludes reporting of serious injuries from impaired driving. As a result, the data presented may be an underreporting of the actual issue.

Fatal alcohol-impaired crashes occurred most often between midnight and 3:00 a.m., with an overall higher occurrence on weekends. Male drivers were responsible for over 80% of fatal crashes involving alcohol-impairment. The young adult age group of 21 to 34 accounted for 45% of drivers in alcohol-impairment related fatal crashes.

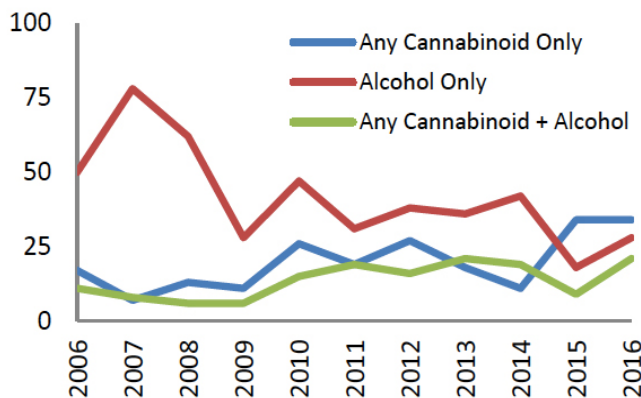
Drug-impaired driving has become a topic of increasing concern across the nation, particularly in states that have legalized medical and/or recreational-use marijuana possession, including Massachusetts. While recreational marijuana possession was legalized in Massachusetts in 2016, retail sales have not yet commenced (as of November 2018), but users can grow products for their own use and give it to others, with limitations. With this in mind, current and future trends regarding marijuana's impact on crashes need to be studied.

The number of deceased drivers testing positive for cannabinoids is increasing, as is the combined presence of cannabinoids and alcohol. In Massachusetts, over 25% of deceased drivers who were given a blood test had cannabinoids in their system, while the next most frequent drugs present were narcotics and stimulants at 13% each. Although drug test results are essential for research, it is important to note that each drug type has varying time-lines of effect duration and length of time in the system, relative to when it was used. Cannabis was the drug type found most often, followed by opioids. However, cannabis can last up to 30 days in the system, while opioids only last for several days.

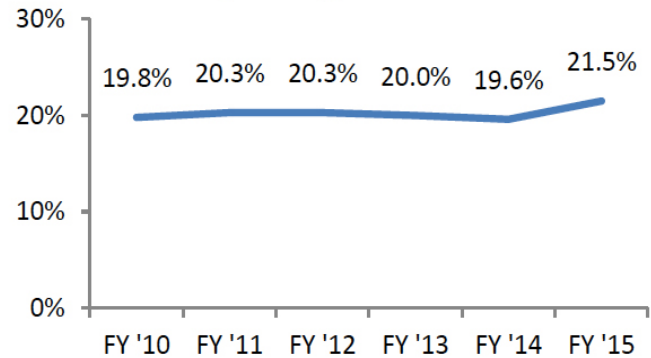


Over 25% of deceased drivers who were given a blood test had cannabinoids in their system. The next most frequent drugs present were narcotics and stimulants at 13% each.

Number of Deceased Drivers Testing Positive for Cannabinoids and/or BAC \geq 0.08



Percentage of Motor Vehicle Drivers Hospitalized for Nonfatal Crash Injuries with Diagnostic Codes for Alcohol and/or Drug Intoxication



Broadly, there is a need for improved roadside testing for marijuana impairment. Additionally, further studies are warranted to assess crash causations due to marijuana and other impairing substances.

The percentage of motor vehicle drivers hospitalized for non-fatal crash injuries related to alcohol and/or drug intoxication is also increasing. As shown in the figure above, most recently in 2015, 21.5% of hospitalized motor vehicle drivers were alcohol or drug intoxicated (15.4% and 9.8%, respectively). For motorcyclist, 15.1% were alcohol or drug intoxicated, while 17.2% of pedestrians suffering injuries were similarly intoxicated.

The percentage of adults ages 18 and over who self-reported that they had driven after excessive drinking in the past month (relative to when the survey was taken) was higher in Massachusetts (2.8%) than the rest of the U.S. (2.1%). Furthermore, the percentage of Massachusetts high school students who self-reported driving after consuming alcohol in the past month (relative to when the survey was taken) was 9.4%.

Overview of Strategies

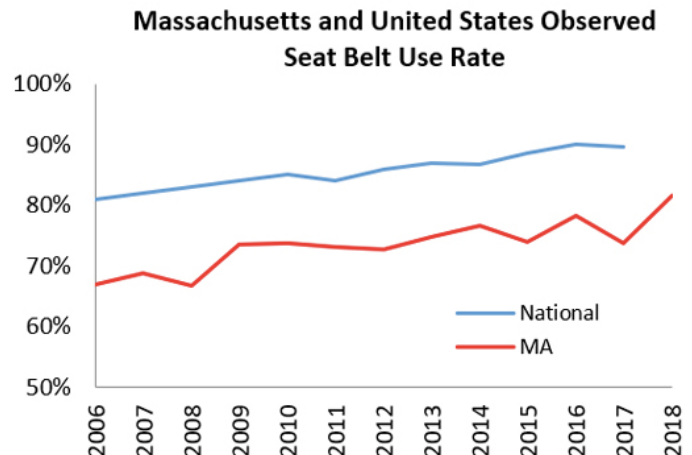
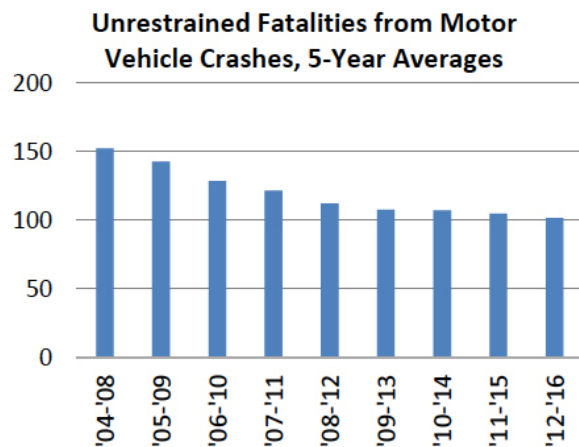
- Develop processes for collecting and analyzing data and research on impaired driving
- Enhance collaborative enforcement efforts to reduce alcohol and drug-related motor vehicle fatalities and injuries
- Prevent alcohol service to underage youth and intoxicated persons by enforcing alcohol beverage control laws
- Provide targeted information and education programs to prevent alcohol-related motor vehicle fatalities and injuries
- Continue the process of educating the public on the dangers and consequences of impaired driving (alcohol, other drugs, drowsy driving)

For a complete list of the 25 actions associated with the above strategies, please refer to the Impaired Driving Action Plan within the SHSP Action Plan in Appendix A.

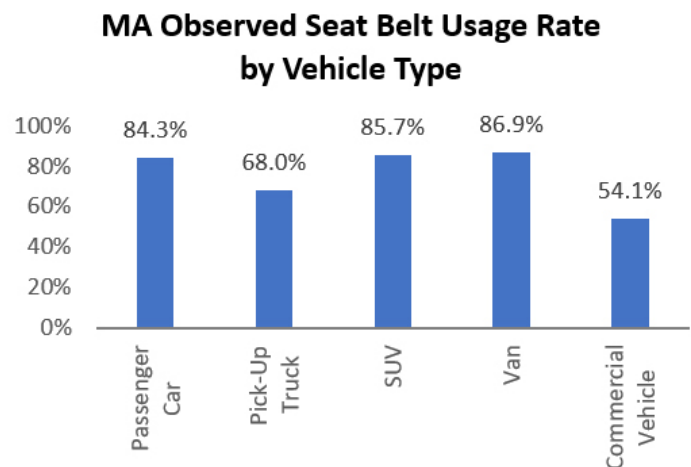
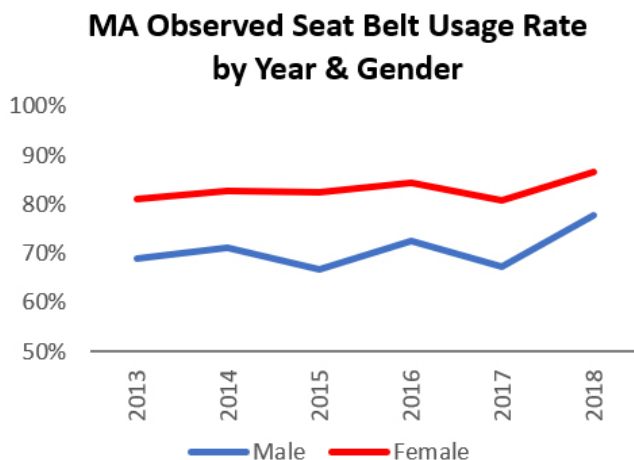


Occupant Protection

Wearing a seat belt is the single most effective strategy a person can implement to reduce their chances of a fatal or serious injury in a motor vehicle crash. Nationwide, approximately 90% of front-seat occupants were observed wearing a seat belt in 2017. In 2018, in Massachusetts, the seat belt usage rate was 81.6% — one of the lowest in the nation. In 2016, 44% of motor vehicle occupant fatalities were unrestrained, which was equal to the national rate and resulted in 106 lives lost. This represents 27% of all fatalities that resulted from Massachusetts crashes (including pedestrians & bicyclists) in 2016. The figure below illustrates the annual five-year averages for unrestrained occupant fatalities. Unrestrained refers to motor vehicle occupants not wearing a seat belt, children that are not in age-appropriate car seats, and motorcyclists without a helmet. Over the past 13 years, Massachusetts has seen a consistent decrease in these fatalities.



Although Massachusetts has had a lower observed seat belt usage rate than the country as a whole, there has been an increase from 63% in 2004 to 82% in 2018, as shown above. As shown in the figures below, men were less likely to wear safety belts than women (78% vs. 87%, respectively), and occupants of pickup trucks were also less likely to wear their safety belts, as compared to passenger cars (68% vs. 84%, respectively).



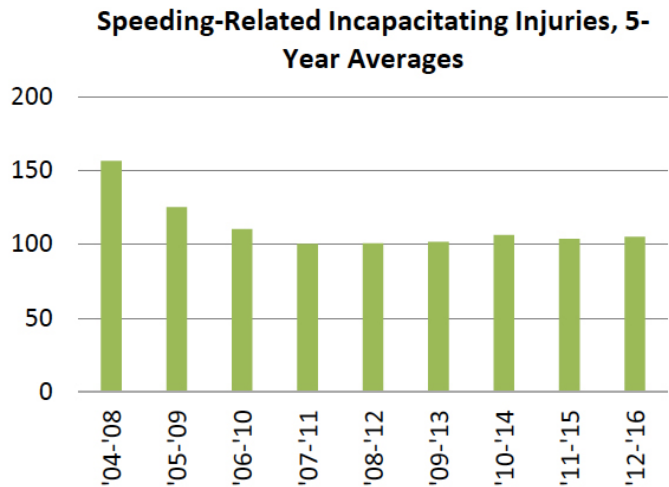
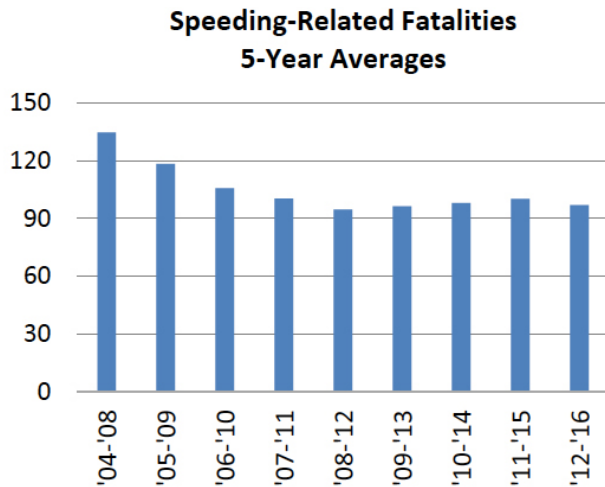
Overview of Strategies

- Enhance safety belt use enforcement in Massachusetts
- Educate the public on use of safety belts and passenger restraints

For a complete list of the 21 actions associated with the above strategies, please refer to the Occupant Protection Action Plan within the SHSP Action Plan in Appendix A.

Speeding and Aggressive Driving

NHTSA considers a crash to be speeding-related if any driver in the crash was charged with a speeding-related offense, or if a police officer indicated that racing, driving too fast for conditions, or exceeding the posted speed limit contributed to the crash. Aggressive driving is defined as “the operation of a motor vehicle in a manner that endangers or is likely to endanger persons or property.” Aggressive driving is exhibited in many different forms, including speeding excessively, changing lanes frequently without signaling, following too closely, flashing lights, driving on shoulders to pass, driving across marked barriers, shouting or gesturing at other drivers, uncontrolled anger, and stress created by traffic congestion.



It is worth mentioning this may be underreported on the crash forms so the injuries presented above may be lower than the actual number.

In 2016, speeding crashes accounted for approximately 27% of all fatal injuries in Massachusetts, which mirrored the national percentage. These crashes also accounted for 3% of incapacitating injuries. While the number of fatal injuries has remained relatively consistent since 2013, they increased from 92 in the year 2015 to 105 in 2016. Examining annual five-year averages for fatalities from crashes involving speeding, the figure above illustrates that while there was a decline between the 2004-2008 average and the 2007-2011 average, the averages have remained relatively consistent ever since. Speeding-related incapacitating injuries, as illustrated above, have remained relatively consistent from the 2007-2011 average until now.

Much like impaired driving, speeding-related crashes were more common at night and on weekends. On police-completed crash report forms, ‘speeding or driving too fast for conditions’ was indicated as a contributing code for 2.5% of drivers involved in crashes. When examining these drivers by age, the 15 to 24 year old age group was significantly overrepresented (5.5%), with the proportion of speeding as a factor steadily dropping as drivers age.

Overview of Strategies

- Enhance enforcement efforts to curb speeding and aggressive driving
- Improve the process of setting roadway speed limits by including travel speeds and roadway context
- Continue the process of educating the public on the risks associated with speeding and aggressive driving behavior

For a complete list of the 22 actions associated with the above strategies, please refer to the Speeding and Aggressive Driving Action Plan within the SHSP Action Plan in Appendix A.

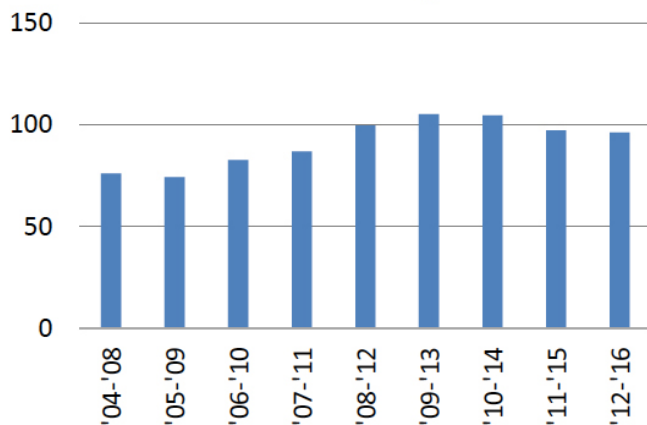
Vehicle occupants in the 25 to 34 year old age group accounted for the most fatalities in speeding-related crashes.

Intersection Crashes

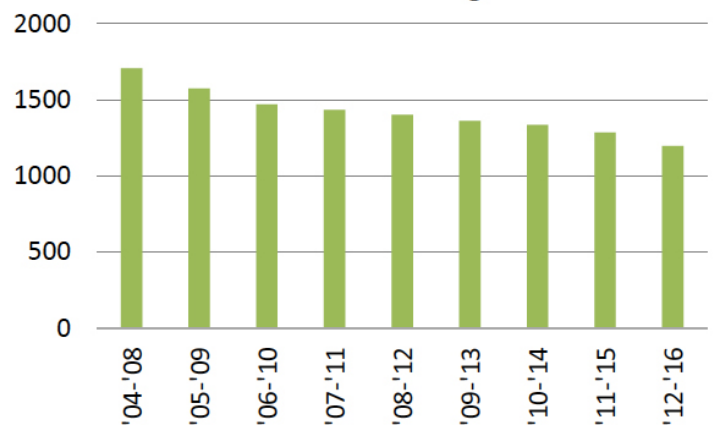
In 2016, fatalities at intersections constituted 22% of all motor vehicle fatalities in Massachusetts. As shown in the figures below, the annual average for fatalities at intersections increased from 2004-2008 to 2009-2013, but has since declined. The annual average for incapacitating injuries in crashes at intersections has been in steady decline since 2004.

The most common collision type at intersections was angle, followed by rear-end. The most severe collision types were single vehicle and angle. Interestingly, single vehicle crashes may indicate pedestrian or bicycle involvement, as many non-motorist crashes occur at intersections. Despite their frequency, rear-end crashes accounted for few fatal intersection crashes since they are generally not as severe.

**Intersection-Related Fatalities
5-Year Averages**



**Intersection-Related Incapacitating Injuries,
5-Year Averages**



Overview of Strategies

- Identify intersection crash locations and causes
- Educate safety practitioners on best practices for design
- Incorporate safety elements into intersection design and maintenance
- Educate new drivers and general population on intersection safety
- Enhance enforcement at intersections

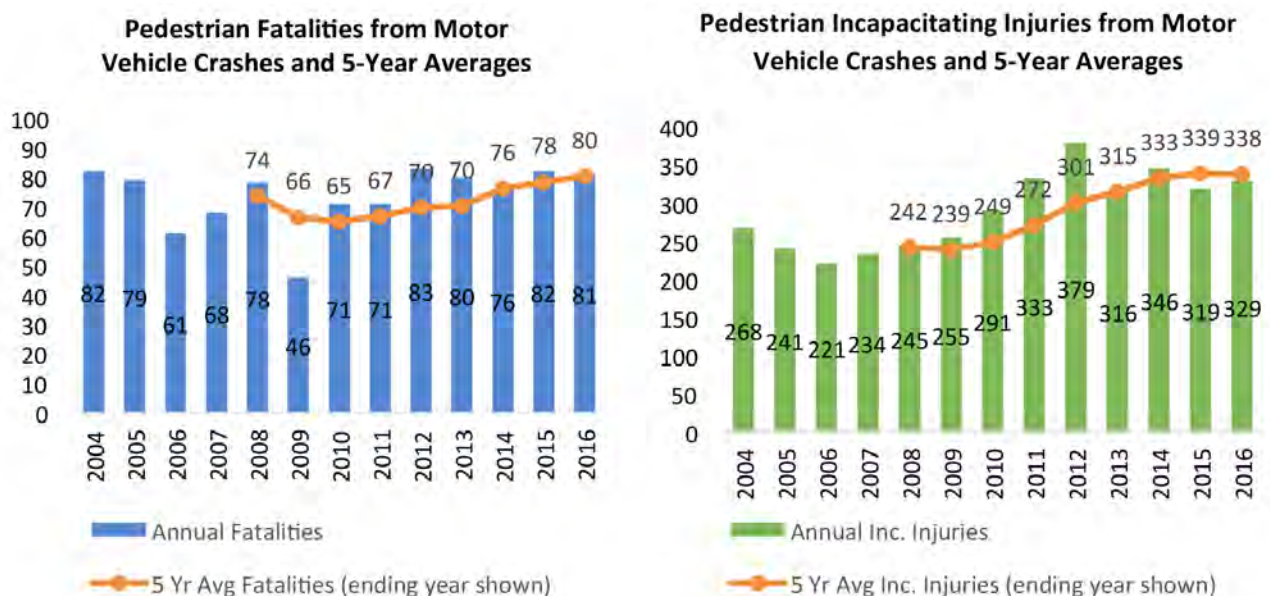
For a complete list of the 20 actions associated with the above strategies, please refer to the Intersections Action Plan within the SHSP Action Plan in Appendix A.



Pedestrians

The number of pedestrians killed due to motor vehicle crashes is on the rise nationally and in Massachusetts. Nationally, the number of pedestrian fatalities increased by 22% from 2014-2016, with Massachusetts experiencing an increase of 7% during that time period. In 2016, pedestrian fatalities comprised 21% of all crash fatalities in Massachusetts, which was significantly higher than the national average of 16%. However, when examining the annual five-year average, the number of pedestrian deaths has remained fairly consistent between 2014 and 2016, as shown in the figure below. Annually, there has been an average of 80 pedestrian fatalities since 2012. Pedestrian incapacitating injuries in the state have also increased in recent years, mirroring national trends.

A large proportion of fatal crashes involving pedestrians (21.1% for 2011-2015) occurred in the urban areas of Springfield, Boston, and Worcester. Pedestrians over 55 years old were also overrepresented in these crashes, accounting for over 50% of pedestrian fatalities. Pedestrian crashes were more likely to occur in the winter months, possibly due to fewer daylight hours and poor sidewalk and roadway conditions. Males were also overrepresented, encompassing 65% of the fatalities. From 2011-2015, pedestrian fatalities occurred most often between 6:00 p.m. and 8:59 p.m. In total, between 2014 and 2016, over 48% of fatal and incapacitating pedestrian injuries occurred in dark lighting conditions. The most locations of these serious and fatal crashes occurred in the roadway (44%) and at a marked crosswalk (27%). Intersections without marked crosswalks and mid-block crosswalks were the third and fourth most common location of pedestrian crashes, accounting for 4.1 and 2.7 percent of all fatal and serious pedestrian crashes, respectively.



There is also an established relationship between pedestrian fatalities and driver distraction. NHTSA reports that pedestrians comprised 13% of all fatalities resulting from distracted driving. The Massachusetts Safe Driving Law was enacted in 2010, prohibiting all drivers from reading, typing, or sending text messages using a hand-held electronic device capable of accessing the internet while operating a motor vehicle. Similarly, the law prohibits drivers younger than 18 from using any mobile electronic device while operating a motor vehicle. Although this is a step in the right direction, some of the challenges law enforcement encounter when trying to enforce these laws (as noted in the Distraction EA), leave pedestrians, as well as all road users, vulnerable.

Overview of Strategies

- Incorporate pedestrian safety elements into infrastructure design and engineering
- Enhance pedestrian safety expertise
- Support municipalities in their efforts to promote pedestrian safety
- Increase public awareness about pedestrian safety
- Continue to examine and improve processes for collecting pedestrian crash data to measure and quantify fatalities and injuries

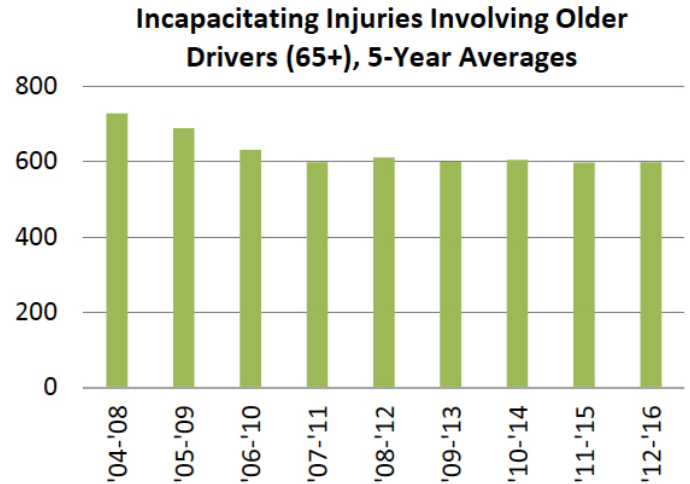
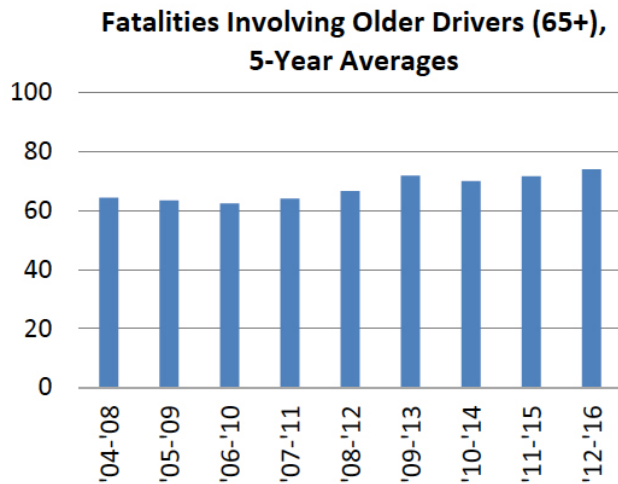
For a complete list of the 23 actions associated with the above strategies, please refer to the Pedestrian Action Plan within the SHSP Action Plan in Appendix A.

In 2016, 338 pedestrians were seriously injured and 80 were killed.

Older Drivers

Crashes involving older drivers (ages 65 years or older) were examined using both crash report injury data and hospitalizations due to the greater risk of injury. The rates described below comprise fatalities and injuries in collisions wherein one or more motorist was an older driver. In 2016, fatalities from crashes involving older drivers constituted 20.8% of all motor vehicle fatalities in Massachusetts, which was slightly higher than the national percentage of 19.4. This statistic is unable to be accurately normalized based on the high number of older people who keep their license even after they stop driving.

As shown in the figures below, when examining annual five-year averages, the number of fatalities involving older drivers has been increasing, with incapacitating injuries remaining stable.



In 2015, there were 494 hospitalizations and 3,267 emergency department visits resulting from drivers ages 65 and older in Massachusetts. Of the 494 hospitalizations of older drivers, 204 involved drivers between the ages of 65 and 74, and 290 involved drivers ages 75 and older. Of the 3,267 emergency department visits, 2,065 involved drivers ages 65 to 74 and 1,202 involved drivers ages 75 and older. This data shows that hospitalizations for motor vehicle crash injuries more frequently involved drivers ages 75 and older, whereas emergency department visits more frequently involved drivers between the ages of 65 and 74.





Crashes at intersections were more common for older drivers (65+), specifically four-way and T intersections. Additionally, a larger proportion of older driver crashes occurred at driveways.

Statewide, 17% of fatal crashes involving older drivers occurred in Worcester County, followed by Bristol and Middlesex Counties, each accounting for 13%. By day of week, older drivers were most often in fatal crashes on Fridays, while weekends had the fewest occurrences. Of the older drivers involved in fatal crashes, males were a significant majority at 65%, but this may represent the effect of self-regulation in the aging population. Importantly, 41% of all older driver fatalities were unrestrained, as compared to Massachusetts as a whole, at 43%.

A larger percentage of crashes involving older drivers occurred at intersections, as compared to other adult drivers. Specifically, older drivers were overrepresented in crashes at four-way intersections (21% of crashes involving older drivers, 18% for other adults) and T intersections (19% of crashes involving older drivers, 17% for other adults). Additionally, a larger proportion of older driver crashes occurred at driveways (3.9% of all crashes) as compared to adults (2.6% of all crashes). These findings may indicate that drivers have a more difficult time with turning maneuvers as they age. Interestingly, older drivers were underrepresented at on/off ramps, which may be attributed to self-imposed limitations on highway travel.

Overview of Strategies

- Collect and update data to improve problem identification and research to improve older driver safety programming
- Develop infrastructure improvements that accommodate the needs of older road users
- Continue updating licensing processes and procedures to address safety concerns regarding older drivers
- Provide education and technical assistance to the medical and legal communities on older road user impairment

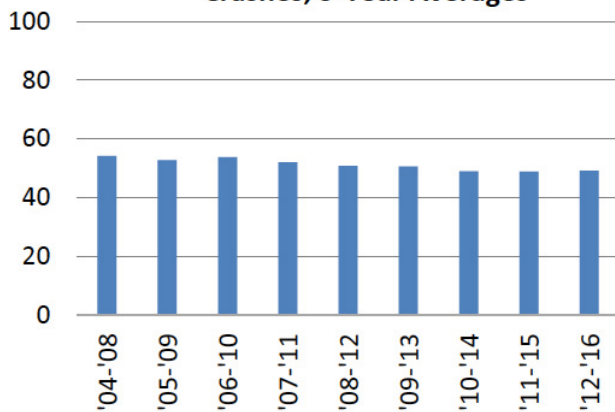
For a complete list of the 16 actions associated with the above strategies, please refer to the Older Driver Action Plan within the SHSP Action Plan in Appendix A.

Motorcycle Crashes

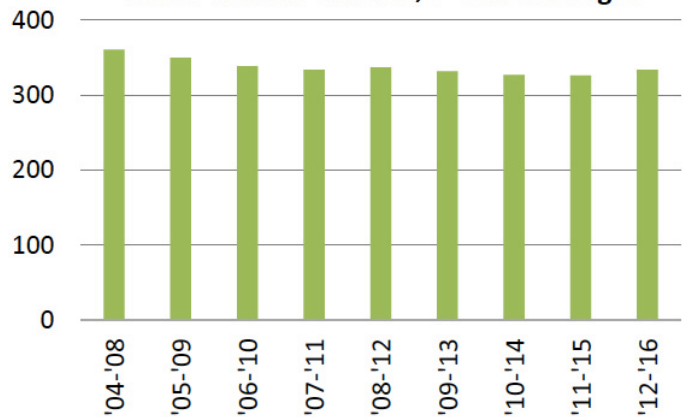
Given the intrinsic danger associated with operating motor vehicles that lack a safety cage, motorcyclists comprise a particularly high-risk group. In 2016, motorcycle fatalities constituted 10.8% of all motor vehicle fatalities in Massachusetts, which was 3.3% lower than the national percentage of 14.1%. As shown in the figures below, motorcyclist fatalities and incapacitating injuries from motor vehicle crashes have remained consistent.

Eighty-eight percent of operators involved in fatal motorcycle crashes were wearing a helmet, as compared to 53% nationwide. This high rate of helmet use can be attributed to Massachusetts' mandatory helmet law. Males accounted for 93% of all motorcyclist fatalities. Speeding was involved in 38% of motorcyclist fatalities. Examining motorcycle crashes by age can be misleading, as there is no clear way to know how many motorcycle licenses are actually in current use. Motorcyclists in the 21 to 24 year old age group constituted 18% of fatalities. Motorcyclist fatalities most commonly occurred on weekends and in the late afternoon and early evening. Twenty-seven percent of operators in fatal motorcycle crashes owned their motorcycle for less than one year. Furthermore, 25% did not own the motorcycle they were killed on. Only 58% had a motorcycle license, 19% only had a permit, and 17% had no permit or license.

Motorcyclist Fatalities from Motor Vehicle Crashes, 5-Year Averages



Motorcyclist Incapacitating Injuries from Motor Vehicle Crashes, 5-Year Averages



Overview of Strategies

- Improve analysis of motorcycle crashes
- Increase motorcycle safety awareness
- Improve and enhance motorcycle safety training and communications opportunities
- Enhance motorcycle enforcement

For a complete list of the 21 actions associated with the above strategies, please refer to the Motorcyclists Action Plan within the SHSP Action Plan in Appendix A.



27% percent of operators in fatal motorcycle crashes owned their motorcycle for less than one year.

Younger Drivers

Fatalities and incapacitating injuries from crashes involving younger drivers in Massachusetts have been steadily declining. In 2016, crash fatalities involving younger drivers between the ages of 15 and 20 comprised 13% of all statewide motor vehicle fatalities. From 2011 to 2016, fatalities in which a younger driver was involved declined by 3.9%. Whereas, the number of younger drivers who died in motor vehicle crashes declined by 33% in the same time-frame.

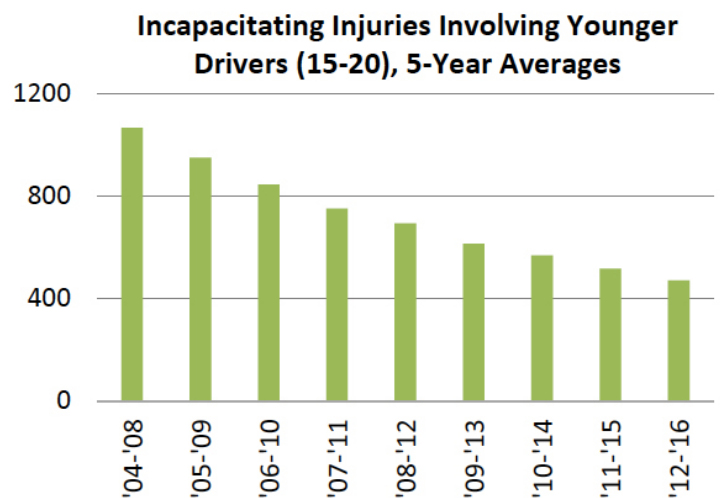
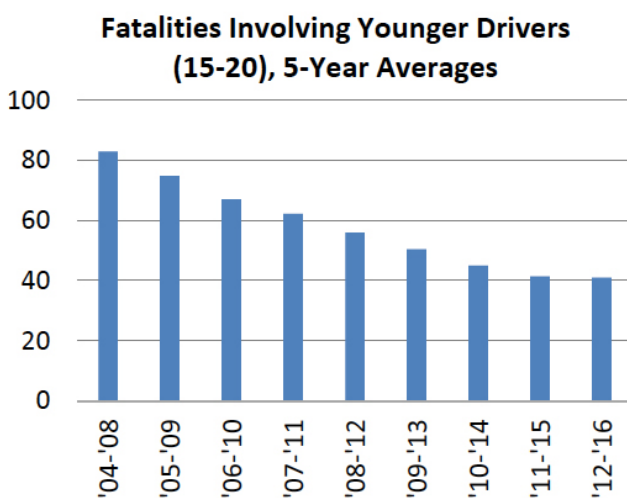
State experts on the SHSP Younger Driver EA Team have expanded the definition of younger drivers through the age of 24 based on supporting evidence and current state initiatives.

According to data from the Registry of Vital Records and Statistics at the Massachusetts Department of Public Health (DPH), there were 65 crash fatalities among Massachusetts residents ages 15 to 24 in 2014 (the most recent year available). Of those fatalities, 66% were motor vehicle occupants, 12% were pedestrians, and 12% were motorcyclists. There were also 16,981 injuries within this age group. Of those injuries, 88% were motor vehicle occupants, 5% were pedestrians, 4% were motorcyclists, and 2% were cyclists. Young adult occupants between the ages of 18 and 24 were nearly twice as likely as teenagers between the ages of 15 and 17 to be injured in a motor vehicle crash.

Examining crashes involving younger drivers between the ages of 15 and 24 by the time of day, 15% occurred between 7:00 p.m. and 11:00 p.m., as compared to only 12% of adults during that time period. Conversely, younger drivers had a smaller percentage of crashes occurring in the morning commute hours between 7:00 a.m. and 11:00 a.m. (18%), as compared to 22% of adult driver crashes occurring during this time period.

While the rate of both emergency department visits and hospital stays among younger drivers between the ages of 16 and 20 in Massachusetts has decreased over time, there has been a less significant decline among those 18 and over. Young people identified as Black or Hispanic were more likely to be injured in motor vehicle crashes than others. Furthermore, 50% of non-fatal motor vehicle crash injuries among young residents of urban areas involved Black or Hispanic young people, compared to one-third for Massachusetts as a whole.

As shown in the figures below, the number of deaths and incapacitating injuries which resulted from crashes involving younger drivers between the ages of 15 and 20 has steadily declined in the past 13 years. This reflects state initiatives surrounding the Junior Operator Licensing laws and various outreach efforts. Fatalities involving unrestrained younger drivers have decreased as well, with a 38% reduction from 2011-2015.





Overview of Strategies

- Conduct research to more effectively reduce the frequency and severity of crashes involving younger drivers
- Enhance enforcement efforts to reduce the frequency and severity of traffic violations by younger drivers
- Improve education of younger drivers, parents, and the general public

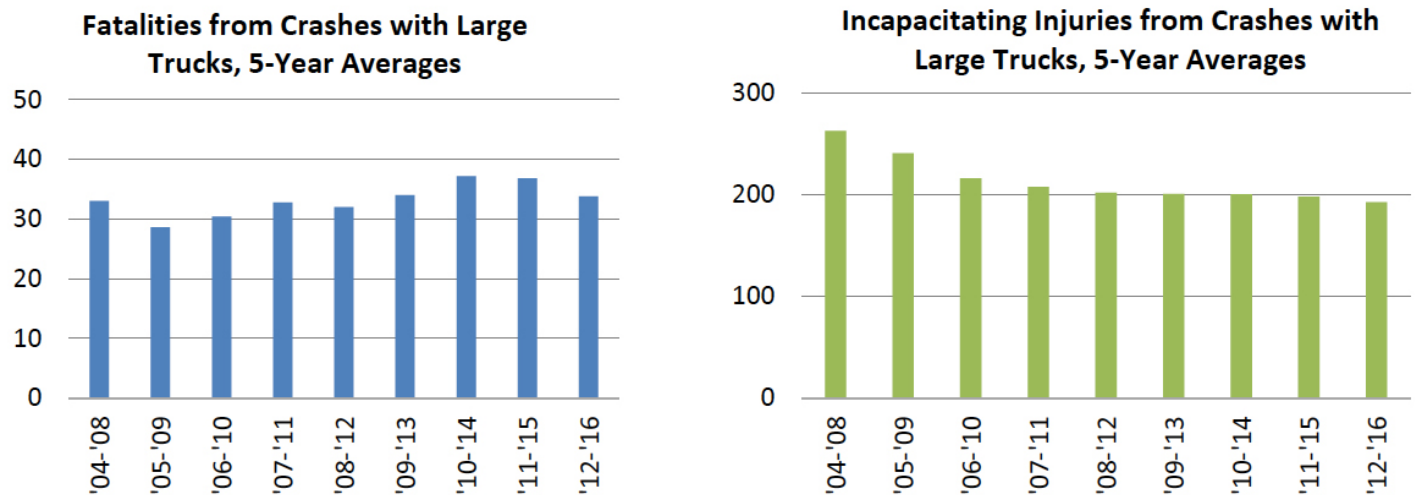
For a complete list of the 15 actions associated with the above strategies, please refer to the Younger Driver Action Plan within the SHSP Action Plan in Appendix A.

Younger drivers between the ages of 15 and 24 had a higher proportion of crashes between 7:00 p.m. and 11:00 p.m., accounting for 15% of crashes, as compared to 12% for adults.

Large Truck-Involved Crashes

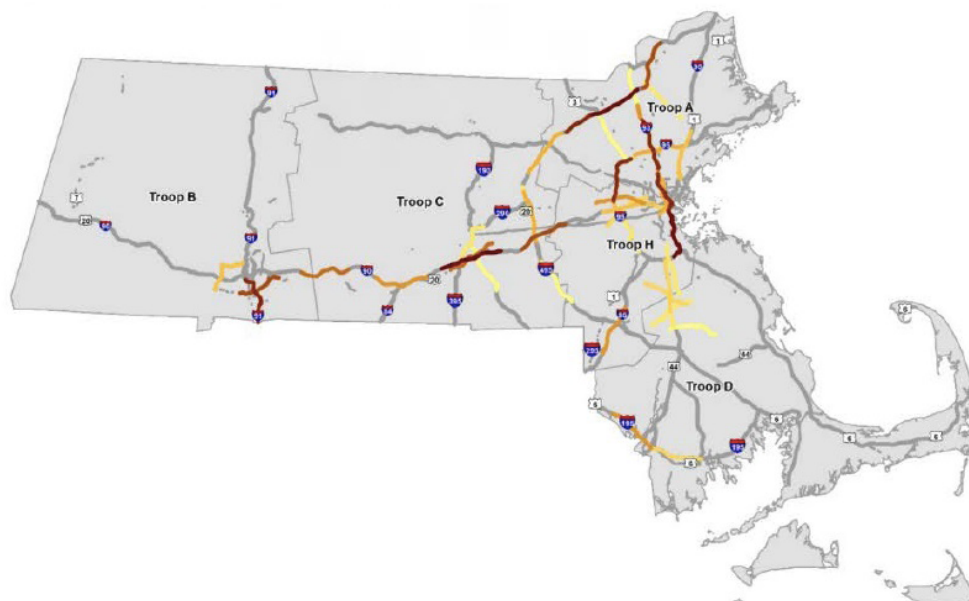
In 2016, fatalities from crashes with large trucks comprised 8.5% of all motor vehicle fatalities in Massachusetts, which is lower than the national percentage of 12.2%. A truck-involved crash is defined as “a crash on a public roadway involving a heavy truck with a gross vehicle weight rating or gross combination weight rating of more than 10,000 pounds, wherein any person in the crash was injured or died or any of the motor vehicles involved were towed from the crash scene”.

The figure below illustrates the annual five-year average of fatalities for crashes involving large trucks, which has declined from 37.2 for the 2014 period, to 33.8 for the 2016 period. Incapacitating injuries from crashes involving large trucks have remained relatively consistent since 2012, at approximately 200 per year.



The Massachusetts State Police Commercial Vehicle Enforcement Section (MSP CVES), tasked with reducing crashes involving large trucks and implementing education and enforcement initiatives, examined crash corridors for an equivalent property damage only (EPDO) crash analysis to target resources to problem areas. The map below depicts the Massachusetts commercial motor vehicle (CMVs)/large trucks and buses) crash corridors by EPDO for 2014 through 2017.

Massachusetts Commercial Motor Vehicle Crash Corridors by Equivalent Property Damage Only, 2014-2017





Large truck-involved crashes, while infrequent, are often more severe than passenger vehicle crashes. In 2017, 7.2% of crashes involving a large truck or bus resulted in an incapacitating or fatal injury, as compared to only 1.8% for passenger vehicles. While nearly all collision types resulted in more severe injuries when a large truck was involved, the biggest differences were noticed in fatal/incapacitating injury rates of Head-on (22% for truck vs. 7.1% for non-truck), Angle (9.5% vs. 1.5%) and Rear-End (6.8% vs. 1%). Crashes involving large trucks were more frequent on two-way, non-divided highways on the weekdays, between the daylight hours of 7:00 a.m. and 10:59 a.m., and 11:00 a.m. and 2:59 p.m. In addition, large truck drivers between the ages of 40 and 51 were more likely to be involved in these crashes. Furthermore, the large-scale effects of a truck crash greatly impair roadway network performance. In 2016, associated costs due to delay time were in excess of \$22M, in addition to the emissions and excess fuel burn cost of \$1.7M.

Truck-involved crashes, while infrequent, are much more severe than passenger vehicle crashes. Slightly more than 7% of crashes involving a large truck or bus resulted in an incapacitating or fatal injury, as compared to only 1.8% for passenger vehicles.

Overview of Strategies

- Enhance motor carrier safety enforcement
- Improve data quality and collection
- Provide engineering roadway improvements
- Collaborate with the trucking and bus industry on programs and initiatives to improve safety and reduce crashes specific to impaired/drugged driving and possession
- Improve Massachusetts motor carrier systems in order to assist the MSP and RMV with enforcement and licensing issues

For a complete list of the 23 actions associated with the above strategies, please refer to the Large-Truck Involved Action Plan within the SHSP Action Plan in Appendix A.

Driver Distraction

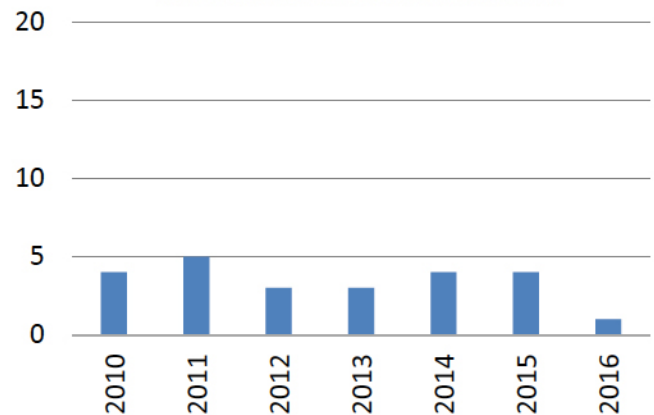
According to various studies, glancing away from the roadway for longer than two seconds increases the risk of crashing by over 70%. In 2016, fatalities from crashes involving distraction comprised 8.1% of all motor vehicle fatalities in Massachusetts, which is lower than the national rate of 10%. There are, however, inherent limitations to the identification of distraction-affected crashes and their resulting injuries and fatalities. It is likely that distraction-affected crashes are significantly underreported due to the reliance on drivers' self-reported prior actions, as well as law enforcement investigative limitations. The results below may not fully capture crash trends.

Nationally, in 2015, there were 3,477 reported distraction-affected fatalities (10% of overall fatalities), of those 476 fatalities that involved a hand-held cell-phone (14% of all distraction-affected fatalities). In Massachusetts, from 2010 (when the data was first recorded) to 2016, there were 221 fatalities caused by motor vehicle crashes with a recorded distracted driver (8.7% of overall fatalities), with 24 of those specifically indicating 'driver hand-held cell phone use' (10.9% of all distraction-affected fatalities) as shown in the figures below. Though media attention has focused on cell phone use in particular, a large portion of distracted driving fatalities are recorded as driver inattention or carelessness. Distraction was first captured in Fatality Analysis Reporting System (FARS) starting in 2010; therefore, the data below is limited to individual years rather than five-year averages.

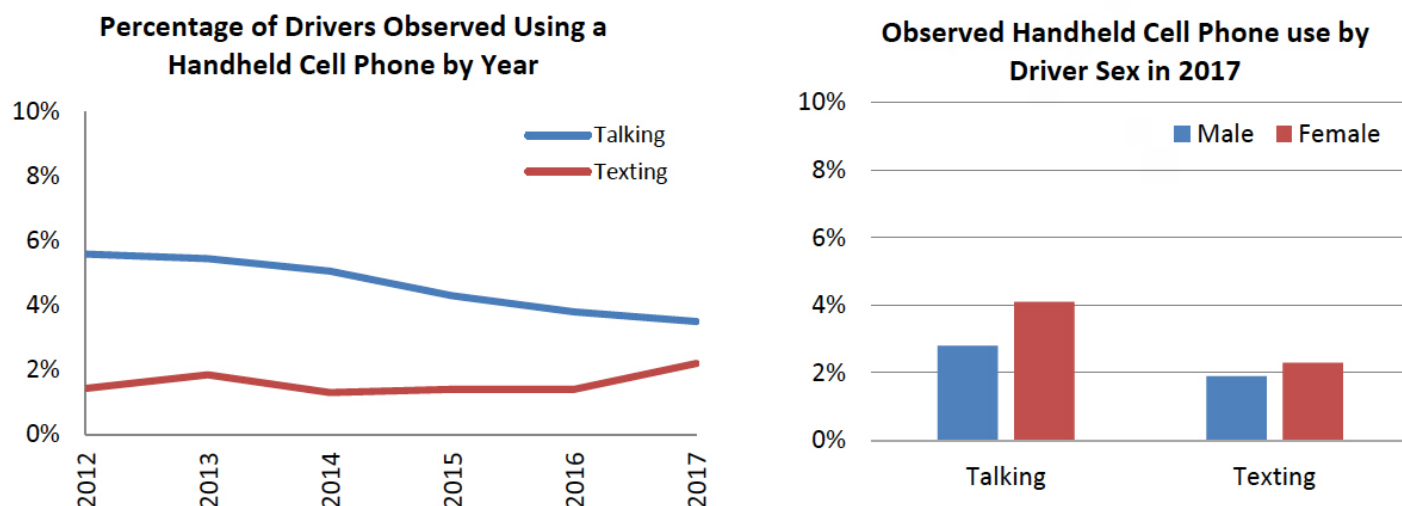
Fatalities from Crashes with Distracted Drivers



Fatalities from Crashes with Handheld Cell Phone Distracted Drivers



According to FARS, 65% of drivers involved in distraction-affected fatal crashes were male and 35% were female. This finding is counter-intuitive to the data collected in the statewide observation survey, as shown in the figure below. The observational survey found that women were more likely than men to be talking on or manipulating (i.e. texting) their hand-held cell phone while driving. This conundrum can be accepted knowing that, statistically, males are still riskier drivers and are represented in more crashes as a whole. When examining age demographics, drivers between the ages of 21 and 29 had the most frequent involvement in distraction-affected fatal crashes, followed by the 20 years and younger age group.



Overview of Strategies

- Educate the public on the risks associated with driver distraction
- Develop and deliver targeted training and education on the dangers of inattentive driving
- Enhance enforcement programs to reduce inattentive driving
- Develop processes to collect data to measure/quantify fatalities and injuries to better understand driver inattention
- Incorporate design elements into roadway engineering to combat inattentive and drowsy driving

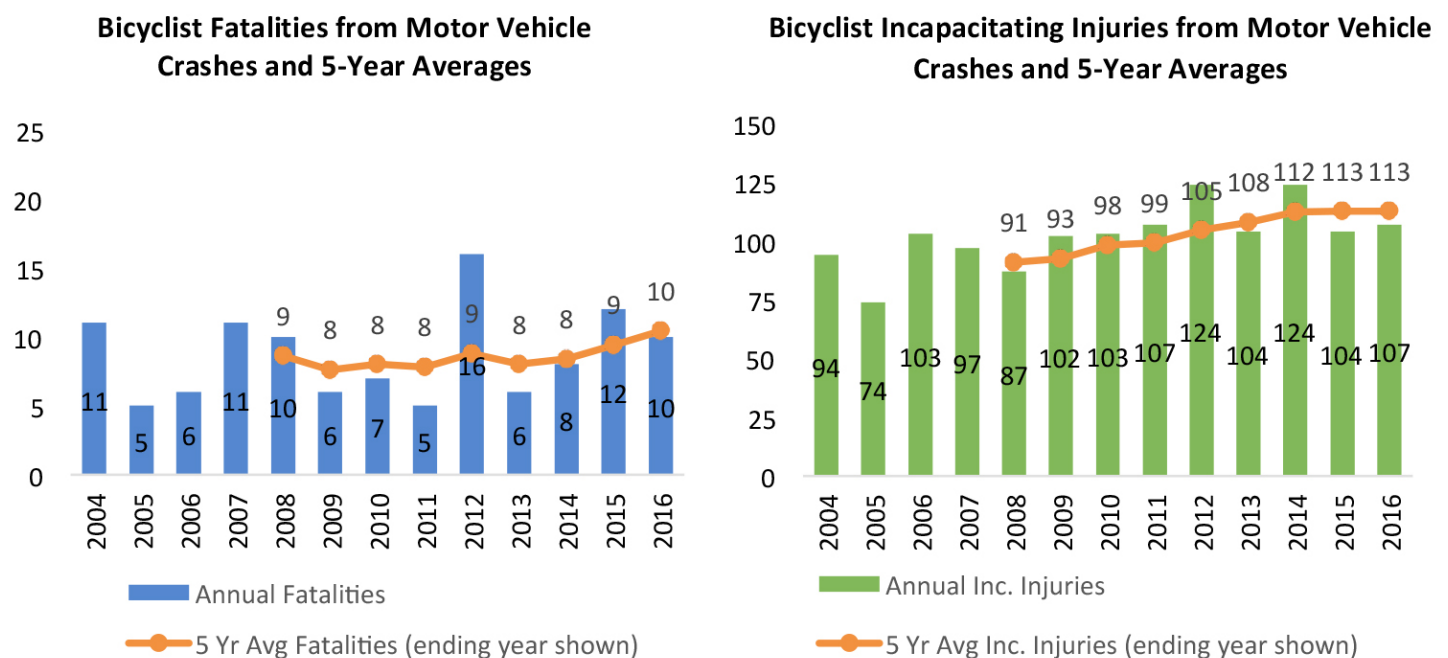
For a complete list of the 20 actions associated with the above strategies, please refer to the Driver Distraction Action Plan within the SHSP Action Plan in Appendix A.

It is likely that distraction-affected crashes are significantly underreported due to the reliance on drivers' self-reported prior actions.

Bicyclists

Bicycling as a means of transportation is gaining popularity in Massachusetts. The addition of bike lanes and paths to extend travel networks, as well as bike share programs, has increased the number of people using this mode of transportation. In 2016, bicycle fatalities comprised 2.6% of all motor vehicle fatalities in Massachusetts, which is slightly higher than the national percentage of 2.2.

With commuter and multi-mode bicycle usage rapidly increasing, safety and planning enhancements are central to improving roadway culture and supporting bicycling for everyday trips. While bicyclist fatalities and incapacitating injuries from motor vehicle crashes constitute only a small portion of overall statewide crashes, the physical vulnerability of bicyclists on roadways reinforces this area as a principal priority. Therefore, ensuring the safety of bicyclists is imperative not only for the mitigation of bicycle-automobile conflicts, but also to encourage bicycling for transport and recreation. Massachusetts has already made significant progress toward these goals, as shown in the prioritization of “Complete Streets,” as well as further efforts to provide safer accommodations for bicyclists and all other roadway users. The majority of fatal and incapacitating bicyclist injuries occurred on the roadway (49%), and more occurred at intersections without a crosswalk (19%) than with a crosswalk (13%), highlighting the importance of intersection design inclusive of all roadway users. 21% of fatal and serious cyclist injuries occurred while crossing an intersection or street. Serious cyclist crashes occurred primarily during daylight hours (79%). Of the 58 serious cyclist crashes occurring in darkness, the vast majority (49/58) occurred on lighted roadways.



When examining annual five-year averages, bicyclist fatalities increased with each increment since 2013, including the most recent in 2016, as shown above. The annual five-year average of cyclist incapacitating injuries due to motor vehicle crashes has also increased every year since 2008. This trend is shown in the figure above.

Overview of Strategies

- Improve design and engineering of bicycle facilities on and off roadways
- Enhance bicycle safety expertise
- Support municipalities in their efforts to promote bicycle safety
- Increase public awareness about bicycle safety
- Integrate bicycle safety activities with other plans
- Incorporate changes precipitated by new directives related to healthy transportation
- Develop processes for collecting data to measure and quantify fatalities and injuries to better understand crashes involving bicyclists and regular crash data analysis

For a complete list of the 21 actions associated with the above strategies, please refer to the Bicyclists Action Plan within the SHSP Action Plan in Appendix A.

Safety of Persons Working on Roadways

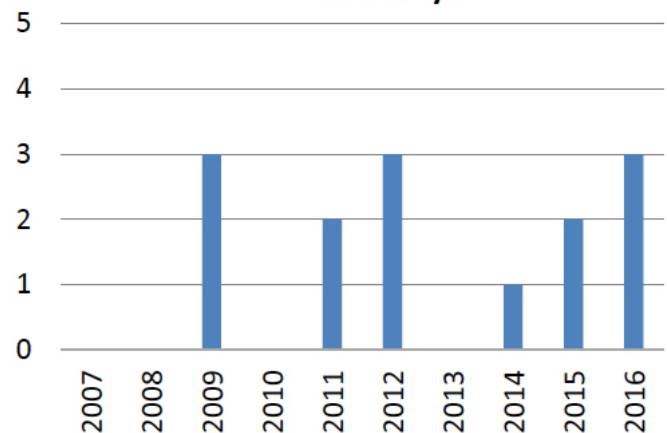
Worker safety is of great concern due to the common occurrence of work-zones in high-speed traffic areas. According to the National Work Zone Safety Information Clearinghouse, there were nine worker fatalities on Massachusetts roadways between 2012 and 2016. When examining individual years, worker fatalities have fluctuated between zero and three worker deaths per year, as shown in the figure below. The 2012 to 2016 average of 1.8 worker deaths per year is the highest of any five-year increment in the past 10 years. However, due to small overall numbers, these data can be easily skewed by one or two crashes, and there is a greater risk of underreporting. Furthermore, data on workers injured as a result of a work zone crash is not sufficiently collected.

The safety of workers and the traveling public is a significant priority when executing construction and related activities on roadways. The Massachusetts Traffic Incident Management (TIM) Task Force, comprised of representatives of numerous state and private agencies, has implemented many countermeasures and trainings to promote worker safety on roadways while improving methods for identifying and quantifying the problem.

Overview of Strategies

- Continue developing and implementing practices, policies, and procedures to improve work zone and traffic incident set-ups to maximize safety
- Educate drivers on work zone safety issues, using unified themes across multiple agencies, in order to improve compliance with work-zone traffic controls
- Develop and/or improve processes for collecting data related to measuring and quantifying fatalities and injuries in order to better understand crashes involving roadway workers
- Educate workers on safety practices in work zones

Fatalities of Workers on Massachusetts Roadways

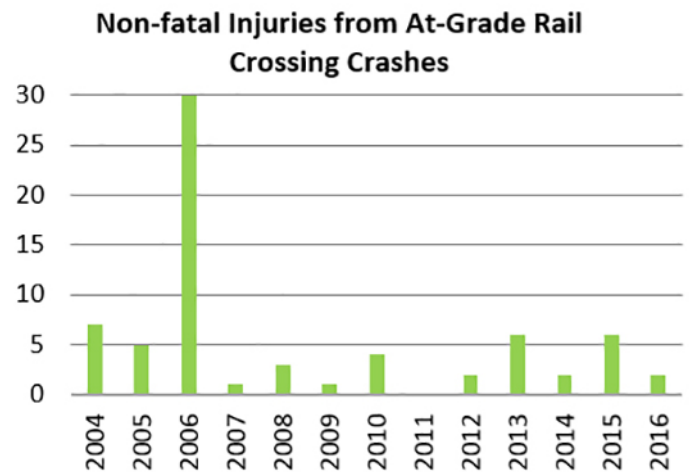
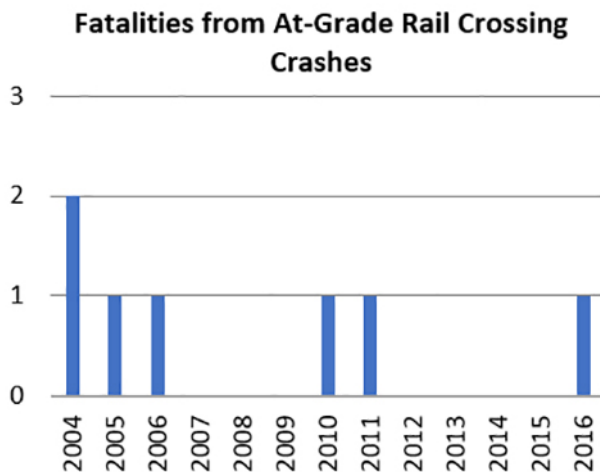


For a complete list of the 17 actions associated with the above strategies, please refer to the Safety of Persons Working on Roadways Action Plan within the SHSP Action Plan in Appendix A.

Between 2012 and 2016 there was an annual average of 1.8 worker deaths per year, the highest average in the past 10 years.

At-Grade Rail Crossings

At-grade rail crossings are intersections combining multiple modes of transportation with different sizes and speeds (which may include railway vehicles, automobiles, bicycles, and pedestrians), creating a particularly vulnerable location. Although the number of crashes at at-grade rail crossings are far fewer than traditional vehicular crashes, the consequences are more severe due to the weight and speed of rail equipment. At-grade rail crossing crashes jeopardize the safety of many groups of people, including vehicle occupants, pedestrians, bicyclists, rail passengers, and train crews. According to the Federal Railroad Administration, there were a total of 46 at-grade rail crossing crashes involving vehicles from 2012 to 2016. Of those crashes, there was one fatality and 18 non-fatal injuries, as shown in the figures below. One of the reasons for this impressive safety record is the safety-focused work by the Massachusetts Bay Transportation Authority (MBTA) and MassDOT Rail Division.



The MassDOT Highway Division administers Federal funds under Section 130 of the Federal Surface Transportation Law to improve safety at existing public at-grade rail crossings. The purpose of the Section 130 Program is to reduce the potential for crashes, number of occurrences, and severity of hazards to motorists, bicyclists, and pedestrians at at-grade rail crossings. The MassDOT At-Grade Crossing Program focuses on improving safety at existing crossings through the installation of warning devices. The Massachusetts policy is to reduce the number of highway-rail grade crossings on public thoroughfares wherever possible.

Overview of Strategies

- Enhance at-grade rail crossing safety
- Educate general public about safe crossing practices
- Improve data collection and analysis capabilities
- Improve communication and collaboration among those responsible for at-grade rail crossing safety

For a complete list of the 10 actions associated with the above strategies, please refer to the At-Grade Rail Crossings Action Plan within the SHSP Action Plan in Appendix A.

Between 2012 and 2016 there was one fatality and 18 non-fatal injuries due to at-grade rail crossing crashes in Massachusetts.



Data Sources



1. Federal Motor Carrier Safety Administration, Analysis and Information Online, 2016, <https://www.ai.fmcsa.dot.gov/default.aspx>
2. Federal Highway Administration Research and Technology, Interactive Highway Safety Design Model: Accident Predictive Module, 1995, <https://www.fhwa.dot.gov/publications/publicroads/95winter/p95wi14.cfm>
3. Federal Railroad Administration, Office of Safety Analysis, <http://safetydata.fra.dot.gov/OfficeofSafety/publicsite/query/query.aspx>
4. Governors Highway Safety Association, Pedestrian Traffic Fatalities by State: 2016 Preliminary Data, https://www.ghsa.org/sites/default/files/2017-03/2017ped_FINAL_4.pdf
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11. Massachusetts Department of Transportation, 2016 Merit Rating Board data
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17. National Highway Traffic Safety Administration, Traffic Safety Facts 2015, 2016, <https://crashstats.nhtsa.dot.gov/Api/Public/Publication/812384>
18. National Work Zone Safety Information Clearinghouse – Source Data from FARS and Bureau of Labor Statistics, 2016, <https://www.workzonesafety.org/crash-information/work-zone-fatal-crashes-fatalities/#massachusetts>
19. USDOT Volpe Center, Truck Side Guards Resource Page, 2018, <https://www.volpe.dot.gov/our-work/truck-side-guards-resource-page>

Glossary



Advanced Roadside Impaired Driving Enforcement (ARIDE). A 2 day course offered to provide law enforcement personnel and other criminal justice professionals information in the area of drug impairment in the context of traffic safety.

Aggressive Driving. A behavior in which a driver exceeded the speed limit, drove too fast for conditions, or followed too closely.

At-Grade Rail Crossing. A crossing of railroad tracks with highways, pedestrian walkways, bike paths or combinations of these on the same level.

ATLAS. A transformation effort underway at the RMV, replacing ALRS, focused on improving the customer service experience of residents and businesses across the Commonwealth

Automated License and Registration System (ALRS). The RMV's database used to store and manage the records of all drivers and registered vehicles in Massachusetts

Autonomous Vehicle. Technology installed on a motor vehicle that has the capability to drive the vehicle without the active control or monitoring by a human operator.

Bicyclist. A roadway user operating a two-wheel, non-motorized vehicle.

Blood Alcohol Concentration (BAC). The amount of alcohol that is present in a person's blood when tested by a law enforcement authority.

CarFit. An educational program sponsored by AAA, AARP, and AOTA that offers older adults the opportunity to check how well their personal vehicles fit them.

Click It or Ticket. A national campaign advocating seat belt use.

Commercial Motor Vehicle. Medium or heavy trucks more than 10,000 pounds, trucks carrying hazardous material and marked with a hazardous materials placard, or those operated by a driver with an interstate carrier or an intrastate carrier commercial driver's license. Commercial vehicles include buses that carry nine or more passengers or are designed and used for the transportation of persons for compensation.

Commercial Vehicle Safety Plan (CVSP). Statewide plan required by the Federal Motor Carrier Safety Administration that outlines strategies and countermeasures specifically targeting commercial vehicle safety.

Complete Streets. Streets that are planned, designed, and operated consistent with surrounding community characteristics and roadway functions so that multiple modes of transportation and customers, regardless of age or ability, easily, comfortably, and safely can access and use the street.

Driver Distraction. Behaviors in which the driver is distracted by an electronic communication device, such as cell phones or other electronic devices, or other external distractions; passengers in the vehicle; texting; or where the driver is inattentive.

Drug Impairment Training for Educational Professionals (DITEP). Course for enabling secondary educational professionals to recognize the signs and symptoms of drug and/or alcohol impairment.

Drug Recognition Expert (DRE). A police officer trained to recognize impairment in drivers under the influence of drugs other than, or in addition to, alcohol.

Emphasis Area (EA). One of 14 areas of focus identified in the SHSP.

Equivalent Property Damage Only (EPDO). A specific crash analysis method which weights a crash's severity and societal impacts based on injury to allow for problem identification and comparison.

Executive Leadership Committee (ELC). A committee comprised of traffic safety leaders from a cross section of agencies responsible for identifying safety priorities in Massachusetts.

Fatality Analysis Reporting System (FARS). A nationwide census providing NHTSA, Congress and the American public yearly data regarding fatal injuries suffered in motor vehicle traffic crashes.

Federal Highway Administration (FHWA). The Federal agency within the U.S. Department of Transportation that supports state and local governments in the design, construction, and maintenance of the nation's highway system.

Federal Motor Carrier Safety Administration (FMCSA). The Federal agency within the U.S. Department of Transportation responsible for regulating and providing safety oversight of commercial motor vehicles.

Graduated Driver's Licensing (GDL). A multi-staged process for issuing driver's licenses to young, novice drivers to ensure that they gain valuable driving experience under controlled circumstances and demonstrate responsible driving behavior and proficiency.

Health Impact Assessments. A tool that can help communities, decision makers, and practitioners make choices that improve public health through community design.

Healthy Transportation Policy. The directive issued to ensure all MassDOT projects are designed and implemented in a way that all consumers have access to safe, comfortable, and healthy transportation at all MassDOT facilities.

Highway Safety Improvement Program (HSIP). The core Federal-aid program designed to achieve a significant reduction in traffic fatalities and serious injuries on all public roads, including non-State-owned public roads and roads on tribal lands. The HSIP requires a data-driven, strategic approach to improving highway safety on all public roads that focuses on performance.

Highway Safety Plan (HSP). Yearly statewide plan required by NHTSA outlining the highway safety programs and projects that will be undertaken by a state's highway safety office to reduce traffic crashes and the resulting deaths, injuries, and property damage.

Impaired Driving. The act of driving or being in physical control of a vehicle when under the influence of alcoholic beverages or legal or illegal drugs.

Incapacitating Injury. Any injury other than fatal which results in one or more of the following: Severe laceration resulting in exposure of underlying tissues/muscle/organs or resulting in significant loss of blood; broken or distorted extremity (arm or leg); crush injuries; suspected skull, chest or abdominal injury other than bruises or minor lacerations; significant burns (second and third degree burns over 10% or more of the body); unconsciousness when taken from the crash scene; paralysis.

Intersection. Consists of two or more roadways that intersect at the same level.

Junior Operator Laws. Any motor vehicle operator or motorcyclist between the ages of 16 1/2 and 18 is considered a Junior Operator. The Junior Operator Law has several requirements and restrictions that significantly affect the operation of a motor vehicle by a person who has a Junior Operator's License (JOL).

Junior Operator Licensing. A license for a motor vehicle operator or motorcyclist between the ages of 16 1/2 and 18.

Lane Departure. Occurs when a vehicle runs off the road or crosses the center median into an oncoming lane of traffic.

Large Truck. Medium or heavy trucks more than 10,000 pounds, trucks carrying hazardous material and marked with a hazardous materials placard, or those operated by a driver with an interstate carrier or an intrastate carrier commercial driver's license.

Law Enforcement Liaisons (LELs). An entity responsible for offering technical assistance to and maintaining mutual understanding and cooperation between law enforcement entities.

Maintenance. Activities undertaken to keep the state's transportation infrastructure and equipment operating as intended, to eliminate deficiencies, and to extend or achieve the expected life of facilities before reconstruction is needed.

MASH Crash Standards. Presents uniform guidelines for crash testing permanent and temporary highway safety features and recommends evaluation criteria to assess test results.

Mass In Motion. A statewide movement to prevent obesity in Massachusetts by increasing opportunities for healthy eating and active living.

Massachusetts Rider Education Program. A program enacted to reduce the number of motorcycle related fatalities and injuries in the Commonwealth through increasing the number of approved rider training courses for motorcycle riders to and to increase awareness and education for both riders and other drivers.

Massachusetts Youth Health Survey. The Massachusetts Department of Public Health's surveillance project to assess the health of young and young adults in grades 6-12.

MassDOT At-Grade Crossing Program. Program focusing on improving safety at existing crossings through the installation of warning devices.

Metropolitan Planning Organization (MPO). Transportation policy-making organization at a regional level that is made up of representatives from local government and governmental transportation authorities. These organizations may also be referred to as Transportation Planning Organizations or TPOs.

Motor Vehicle National Peer Learning Team. Connects partners across the country to learn about motor vehicle-related injury and violence prevention and identify areas for high-leverage solutions.

Motorcyclist. Operator or passenger on a motorcycle.

Municipal Resource Guide for Walkability. Provides an introduction to the core concepts of walkability and outlines additional resources that are available on each topic - https://www.mass.gov/files/documents/2018/09/17/MunicipalResourcesGuideForWalkability_2018-08-24.pdf.

National Work Zone Safety Information Clearinghouse. A web-based library of resources for improving roadway work zone safety for all roadway users.

Occupant Protection. Any protective device--seat belt, air bag, child safety seat, booster seat--that helps decrease injuries and deaths in motor vehicle crashes.

Older Roadway User. A driver, passenger, pedestrian, bicyclist, transit- rider, motorcyclist, or operator of a non-motorized vehicle who is 65 years of age or older.

Pedestrian. Non-motorists who are walking, in a wheelchair, skating, inside a building, using a pedestrian conveyance, etc.

Retroreflectivity. The phenomenon of light rays striking a surface and being redirected back to the source of light, applied to signs to improve roadway visibility.

Road Safety Audit. A formal safety performance examination of an existing or future road or intersection by an independent, multidisciplinary team.

Safety Cage. A framework of reinforced struts protecting a car's passenger cabin against crash damage.

Safety Performance Functions. An equation used to predict the average number of crashes per year at a location as a function of exposure and, in some cases, roadway or intersection characteristics.

Separated Bike Lane Planning and Design Guide. A guide to support separated planning and design for bike lanes - https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/separated_bikelane_pdg/page00.cfm

Serious Injury. Injury to a person, including the driver, which consists of a physical condition that creates a substantial risk of death, serious personal disfigurement, or protracted loss or impairment of the function of a bodily member or organ.

Shifting Gears Presentation. A program discussing key issues facing senior drivers.

Signal Phase and Timing. Communications associated with the operations of signalized intersections.

Speed Limit Traffic Control Program. A program for providing appropriate and enforceable speed limits on all paved streets and highways within the Commonwealth.

Speeding and Aggressive Driving. Speeding refers to driving too fast for conditions and exceeding the posted speed limit. Aggressive driving requires at least two of the following contributing causes: speeding, unsafe, or improper lane change, following too closely, failure to yield the right-of way, improper passing, and failure to obey traffic control devices.

Speeding-Related Crash. All persons in a crash where at least one driver in the crash was reported to be speeding, defined by having values of either 'exceeded speed limit' or 'too fast for conditions' in the first or second contributing circumstance fields.

Stakeholders. Individuals and groups with an interest in the outcomes of policy decisions and actions.

Standardized Field Sobriety Test (SFST). Consists of the three tests performed during a traffic stop in order to determine if a driver is impaired by alcohol or drugs.

State Courts Against Road Rage Program (SCARR). A program developed to educate younger drivers charged with serious motor vehicle violations.

State Transportation Improvement Program (STIP). A staged, multi-year, statewide intermodal program of transportation projects, consistent with the statewide transportation plan and planning processes as well as metropolitan plans, transportation improvement programs (TIPs), and planning processes.

Statewide Pedestrian Plan. Recommends policies, programs, and projects for MassDOT to guide decision making and capital investments, as well as develop guidance for municipalities to improve walkability in local communities.

Sustained Traffic Enforcement Program (STEP). Grant program providing additional funding to traffic enforcement.

Traffic Incident Management (TIM) Task Force. A multidisciplinary team that plans and coordinates processes to detect, respond to, and clear traffic incidents so that traffic flow may be restored as safely and quickly as possible.

Traffic Records Coordinating Committee (TRCC). A multidisciplinary group that works to improve the collection, management, and analysis of traffic safety data.

Truck. A heavy vehicle engaged primarily in the transport of goods and materials.

Unrestrained. Any person who is not using an appropriate safety belt, child safety seat, or booster seat.

Vehicle Miles Traveled (VMT). The total number of miles traveled by vehicles using a roadway system.

Vision Zero. A multi-national road traffic safety project that aims to achieve a highway system with no fatalities or serious injuries involving road traffic.

Vulnerable Road Users. Road users who have the potential for a disproportionately high fatality rate, including pedestrians, bicyclists, and motorcyclists.

Work Zone. A marked section of roadway for construction, maintenance or utility work.

Wrong Way Crash. A crash where the driver of any vehicle is on the wrong side or traveling the wrong direction on the roadway.

Younger Driver. Drivers between the ages of 15 and 20.

Appendix A: Five-Year Action Plan (Updated Annually)



The Massachusetts SHSP incorporates 14 emphasis areas (EAs) based upon the identified priorities. The selected EAs are presented below in order of those with the highest annual fatality average (2012-2016) to the lowest.

1. Lane Departure Crashes [198]
2. Impaired Driving [124]
3. Occupant Protection [102]
4. Speeding and Aggressive Driving [97]
5. Intersection Crashes [96]
6. Pedestrians [80]
7. Older Drivers [74]
8. Motorcycles [49]
9. Younger Drivers [41]
10. Large Truck-Involved Crashes [34]
11. Driver Distraction [30]
12. Bicyclists [10]
13. Safety of Persons Working on Road [2]
14. At-Grade Crossing [1]

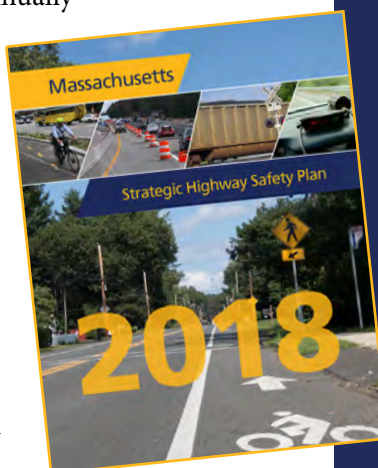
A multidisciplinary team of stakeholders was created for each of the 14 EAs, followed by a series of in-depth data analyses, and creation of data-driven strategies and actions for improving transportation safety in the Commonwealth over the next five years. As this is an evolving document, future iterations will include a strategy/action date of implementation to better facilitate tracking and initiatives over time. Furthermore, EA teams will continually compile and examine additional crash data to deepen the understanding of relevant crash characteristics.

Realizing the importance of data-driven decisions, all EA teams will review the data needs for ongoing problem identification and evaluation. These data needs will be presented for discussion to the Traffic Records Coordinating Committee (TRCC), a multidisciplinary team representing core traffic records systems as well as other data collectors and users. The data needs and any traffic records systems and/or data quality challenges will be reviewed by the TRCC to

determine how best to support the EA teams. Additionally, traffic records needs or related TRCC administration resources arising from this process will be examined to determine how the SHSP may support traffic records improvements.

Massachusetts' TRCC is continuing to improve the State's data systems. The SHSP supports the following strategies to continue ongoing traffic records systems improvements:

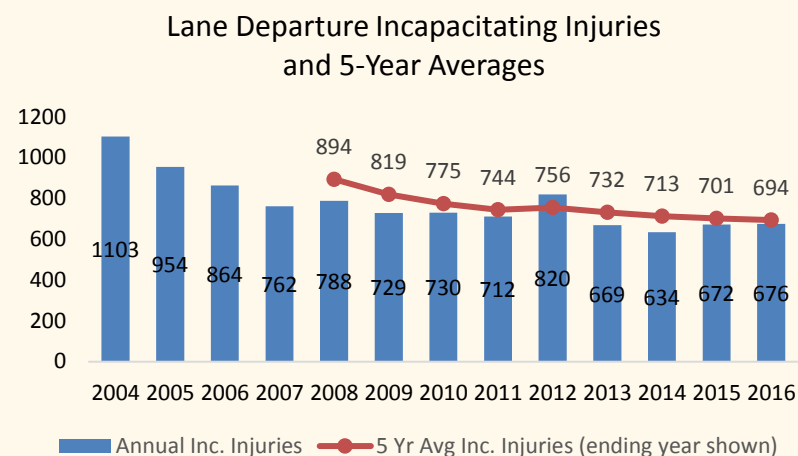
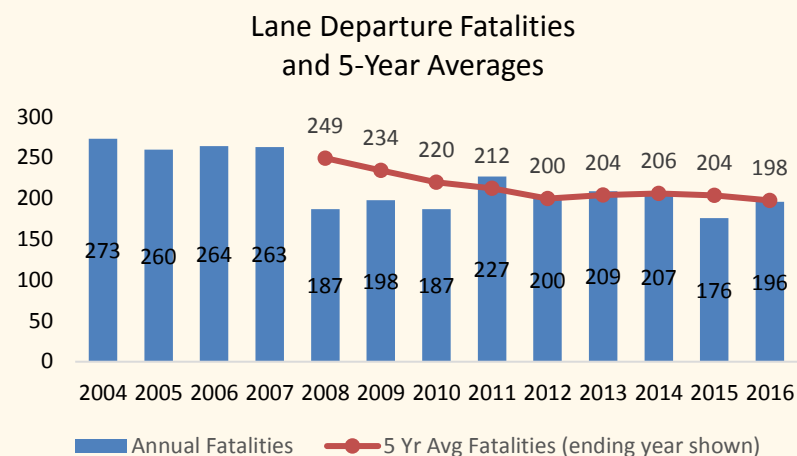
- Provide an active forum for the collection, implementation, management, and dissemination of traffic records data.
- Improve statewide, regional, and local problem identification, countermeasure development and implementation, and evaluation through better access to and use of traffic records.
- Make well-coordinated enhancements to the infrastructure of the data systems for citation/adjudication, ambulance/injury surveillance, roadway, crash, vehicle, and driver records.
- Expand cross-agency data sharing.
- Ensure consistent collaboration on traffic records projects.



As a living document the SHSP's Action Plan will be a dynamic document that stakeholders update, review, and reference as needed throughout the five-year implementation time-frame between 2018 and 2022.

Lane Departure Crashes

Data Trends



Performance Measure

- Number of lane departure fatalities and incapacitating injuries.

Current Strategies and Actions

- Identify lane departure crashes and causes
 - Conduct Road Safety Audits at high-crash locations, implement low-cost countermeasures, and review/consider other medium and high-cost countermeasures (MassDOT Highway, RPAs/MPOs).
 - Continue collecting and analyzing roadway contributing factors on crash reports (MassDOT RMV, RPAs/MPOs).
 - Focus improvements by identifying top lane departure locations (MassDOT Highway, RPAs/MPOs).
 - Collect Fundamental Data Elements for roadway segments across Massachusetts so that a data driven safety analysis can be performed for lane departures (MassDOT Planning).
 - Conduct crash data analysis utilizing various DPH datasets to better understand the causes and consequences of crashes involving lane departures (DPH).
- Educate safety practitioners on best practices for roadway design
 - Train MassDOT engineering staff in best practices for safety in design (MassDOT Highway and Planning).
 - Train and inform municipalities about proper use of signage and lane markings to combat lane departures (MassDOT Planning).

(continued)

- 3. Enhance enforcement of some driver contributing factors in lane departure crashes, e.g., driver inattention and speeding

 - Create recommended maintenance and inspection policies for cable guardrail (MassDOT Highway).
 - Convene participants in a series of virtual meetings to learn about current technologies that prevent or mitigate crashes, including those involving lane departures (DPH via Motor Vehicle National Peer Learning Team [MV-NPLT]).
 - Coordinate with other emphasis area teams as appropriate, that address factors contributing to lane departure crashes, including inattention and speeding (MSP, HSD, Local Law Enforcement).
 - Focus enforcement and education efforts on driver risk factors such as speeding, distracted driving, and impaired driving, as they can cause lane departure crashes (MSP, HSD, Local Law Enforcement).
- 4. Incorporate safety elements into roadway design and maintenance

 - Create a systematic approach for implementing low-cost fixes (MassDOT Highway).
 - Integrate safety countermeasures and elements into maintenance improvements and roadway project designs (MassDOT Highway, RPAs/MPOs).
 - Test wet-reflective elements to ensure pavement markings stay bright in wet conditions, and then implement the markings at all interstate highways and other limited access facilities. Pilot test in District 4, and then install these markings in all MassDOT Districts (MassDOT Highway).
 - Continue installing recessed pavement markings in grooves to extend their life on major roads and some secondary roads (MassDOT Highway).
 - Utilize cold weather paint to extend the painting season and refresh faded paint in the winter. This paint may also be used in work zones (MassDOT Highway).
 - Implement Manual for Assessing Safety Hardware (MASH) crash standards—new roadway hardware standards for guardrails, temporary concrete barriers, light posts, bridge rails, and work zone devices (MassDOT Highway).
 - Begin changing curves from artificial speed change to curve warning signs and chevrons, writing to districts for replacement in towns and on local roads (MassDOT Highway, RPAs/MPOs).
 - Develop policy for when centerline delineation on undivided arterial roadways can be utilized (MassDOT Highway).
 - Install cable barriers for high cross-over-median crashes (MassDOT Highway).
 - Consider changes to rumble strips in noise sensitive areas, potentially modeled after the “mumble” strip in Minnesota, which produces the same noise inside the vehicle, but is muffled outside (MassDOT Highway).
 - Install pavement markings and signs along highway curves as appropriate (MassDOT Highway).
 - Install highway lighting (MassDOT Highway).
 - Minimize lane departure crashes at night by upgrading signs to improve retroreflectivity (MassDOT Highway, RPAs/MPOs).

(continued)

- Install and evaluate high-friction course treatments at various locations around the State (MassDOT Highway).
- Protect or remove roadside hazards within the clear zone and improve sight lines by clearing obstacles such as brush, unnecessary signs, etc. Utilize maintenance work orders (MassDOT Highway, Local DPWs).
- Test and use new crash-prevention technology and other advances to combat lane departure crashes (MassDOT Highway, RPAs/MPOs).
- Utilize variable message sign public service announcement: Take a Break, Stay Awake, as an example (MassDOT Highway).
- Include lane departure messages in broader outreach and media efforts (MassDOT Highway, RMV).

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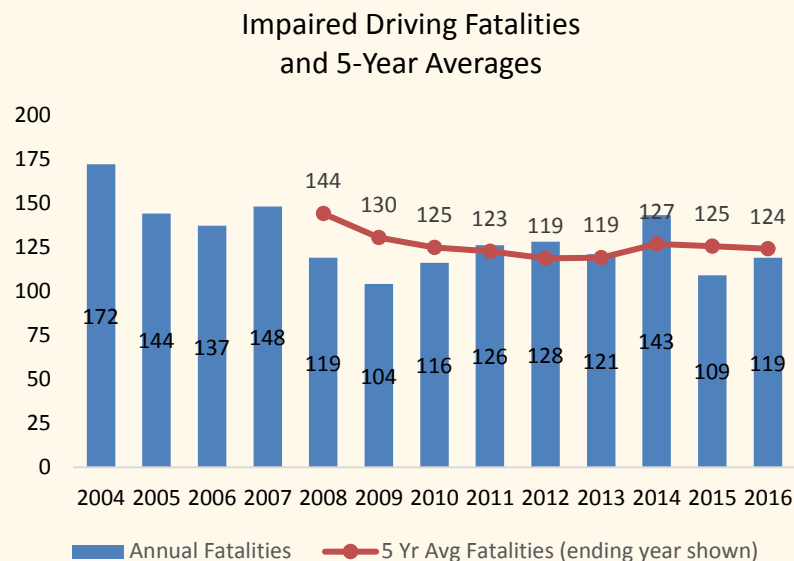
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Impaired Driving

Data Trends



Performance Measure

- Number of alcohol related motor vehicle fatalities and monitoring of drug related crash data.

Current Strategies and Actions

1. Develop processes for collecting and analyzing data and research on impaired driving
 - Develop task force to define data and programming gaps, and examine various data analysis findings as well as best practices in order to plan effective impaired driving prevention programming (SHSP Impaired Driving EA Team).
 - Examine possibility of conducting MA Roadside Study of Alcohol and Drug Use by Drivers (HSD).
 - Utilize findings of Marijuana Attitude and Behavior Phone Survey results to guide impaired driving prevention programming (DPH, HSD).
 - Continue examining impaired driving crashes, as well as the impact of mixing illicit and licit drugs and alcohol, by utilizing a variety of data sources to better understand the magnitude and characteristics of such crashes (DPH).
 - Continue utilizing findings of the Massachusetts Youth Health Survey to plan underage drinking and impaired driving prevention programming (DPH).



(continued)	<ul style="list-style-type: none"> • Present findings of all analysis/ research to SHSP Impaired Driving EA team for review and use in program planning (DPH). • Utilize Law Enforcement Liaisons (LELs) to improve police departments' impaired driving data collection (HSD, RMV). • Work with NHTSA to conduct an Impaired Driving Program Assessment (HSD).
2. Enhance collaborative enforcement efforts to reduce alcohol and drug-related motor vehicle fatalities and injuries	<ul style="list-style-type: none"> • Conduct sustained enforcement activities, including Drive Sober or Get Pulled Over mobilizations and sobriety checkpoints (HSD, MSP, Local Law Enforcement). • Address recommendations from the NHTSA Standardized Field Sobriety Test (SFST) Assessment (HSD, MSP). • Conduct Advanced Roadside Impaired Driving Enforcement (ARIDE) and Drug Impairment Training for Educational Professionals (DITE) (MPTC, HSD, Local Law Enforcement). • Conduct State and local DRE training programs to assist in identifying driver drug use and to provide expert testimony in court (HSD, MPTC, Local Law Enforcement). • Support a Traffic Safety Resource Prosecutor (TSRP) and a Law Enforcement Liaison (LEL) to provide training and technical assistance to the enforcement community (HSD). • Educate the judicial community on the importance of consistent application of the law regarding impaired driving offenses (HSD). • Support law enforcement with training and technical assistance aimed at increasing their effectiveness to combat impaired driving and underage drinking (MPTC, HSD, BIA, MSP, Local Law Enforcement).
3. Prevent alcohol service to underage youth and intoxicated persons by enforcing alcohol beverage control laws	<ul style="list-style-type: none"> • Train officers on liquor laws designed to prevent alcohol consumption by underage youth and intoxicated persons (ABCC, MPTC, HSD, Local Law Enforcement). • Conduct underage drinking compliance checks program (HSD, ABCC, Local Law Enforcement). • Conduct enforcement to prevent the sale of alcohol to intoxicated persons (HSD, ABCC, Local Law Enforcement). • Utilize enforcement actions against alcohol purveyors who flagrantly violate the alcohol beverage control laws by serving underage youth and intoxicated persons (ABCC, Local Law Enforcement).
4. Provide targeted information and education programs to prevent alcohol-related motor vehicle fatalities and injuries	<ul style="list-style-type: none"> • Seek information on successful countermeasures from NHTSA, Governor's Highway Safety Association, etc. (HSD). • Conduct Impaired Driving Prevention Summit (AAA Northeast). • Conduct impaired driving education programming in schools and communities (HSD, DPH, BIA, Others).

5. Further educate the public on the dangers and consequences of impaired driving (alcohol, other drugs, drowsy driving)
 - Conduct paid and earned media for impaired driving prevention programs (HSD).
 - Conduct educational outreach aimed at younger drivers (HSD, BIA, Others).
 - Develop an impaired driving prevention public education and social media campaign geared toward younger drivers, regarding the dangers of drowsy driving (HSD, AAA Northeast, Harvard School of Public Health).

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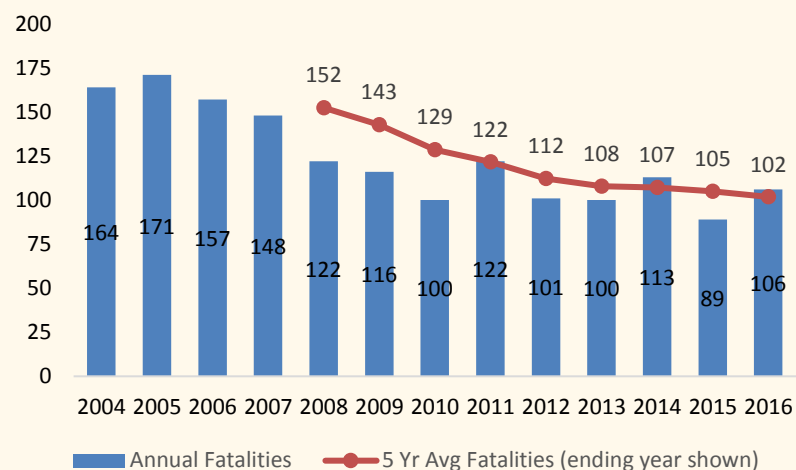
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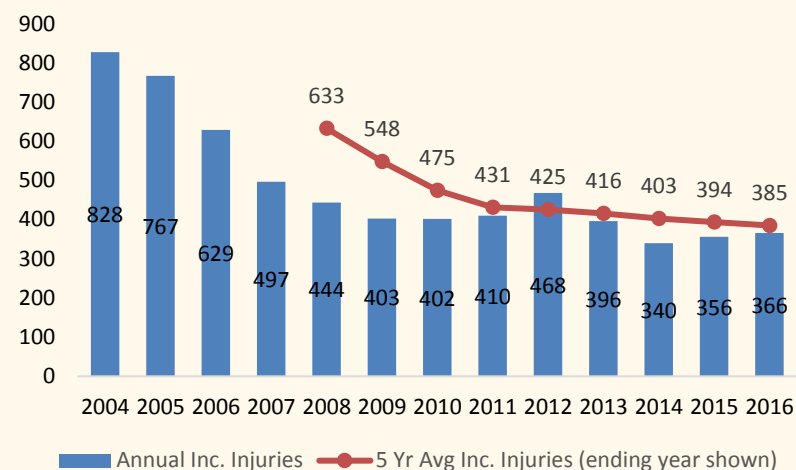
Occupant Protection

Data Trends

Unrestrained Fatalities from Motor Vehicle Crashes and 5-Year Averages



Unrestrained Incapacitating Injuries from Motor Vehicle Crashes and 5-Year Averages



Performance Measure

- Number of unrestrained motor vehicle fatalities.
- Percent of restrained drivers and front seat occupants on statewide safety belt observation survey.

Current Strategies and Actions

- Enhance safety belt use enforcement in Massachusetts
 - Provide funding to State and local law enforcement for targeted 'hot spot' sustained enforcement and Click It or Ticket mobilizations (HSD).
 - Support law enforcement with training and technical assistance aimed at increasing their effectiveness regarding use of occupant protection (HSD and MPTC).
 - Conduct the Click It or Ticket campaign (HSD, MSP and Local Law Enforcement).
 - Utilize the services of the State Law Enforcement Liaison (LEL) to work with local and State Police agencies in an effort to increase safety belt use (HSD).

2. Educate the public on use of safety belts and passenger restraints

- Conduct earned and/or paid media campaigns for sustained enforcement and Click It or Ticket mobilizations (HSD).
- Install “Buckle Up” road signs in areas with demonstrated high unbelted rates (HSD).
- Conduct safety belt observation surveys and educate the public on use rates in Massachusetts, as well as on how they compare to other states and the nation as a whole (HSD).
- Provide data to the legislature/other elected officials as they consider traffic safety legislation and issues (AAA Northeast).
- Support efforts aimed at creating a primary safety belt law by nonprofit and advocacy groups (AAA Northeast).
- Conduct presentations for teens/young adults (BIA).
- Provide educational materials and resources via agency web sites (AAA Northeast), RMV).
- Conduct legislative and community outreach (AAA Northeast).
- Educate prosecutors and judges about the importance of restraint programs, enforcement, and adjudication of these violations (HSD).
- Utilize a pilot project requiring youth organizations that are funded by DPH to have a safety policy in place, and conduct an annual safety promotion activity targeting the 15-24-year-old age group (DPH).
- Habituate seatbelt use by creating and enforcing policies (state employees, companies, etc.) (HSD).
- Increase information provision on safety belt use in news stories about car crashes. Develop programming materials to promote the inclusion of this information in law enforcement press releases (HSD).
- Expand existing pediatrician-facilitated child passenger safety program to include promotion of safety belt use among teens and adults. Develop kit for physicians that will help them educate patients about how wearing a safety belt is a key behavior for maintaining one’s life. The program should promote ‘always’ wearing safety belt (AAA Northeast /American Association of Pediatrics, DPH).
- Develop multilingual PSA for seatbelt usage (HSD).
- Fund Child Passenger Safety equipment grants (HSD).
- Support and/or conduct child safety seat outreach and clinics (AAA Northeast, HSD).
- Conduct statewide child passenger safety stakeholder’s conference (HSD).

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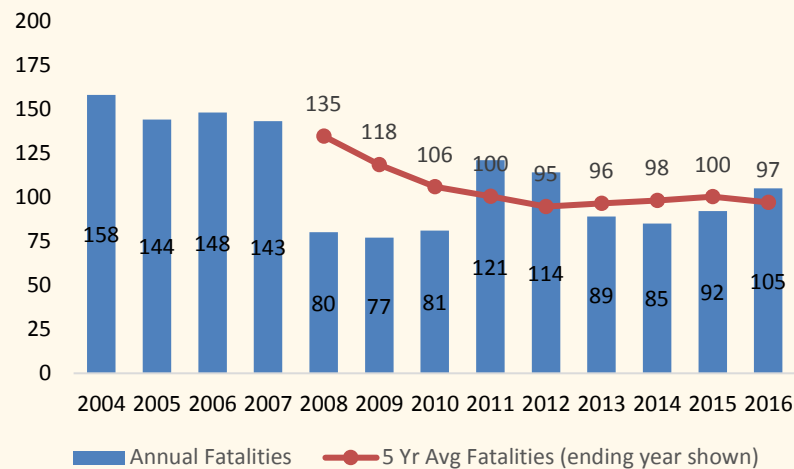
Safe Roads Alliance

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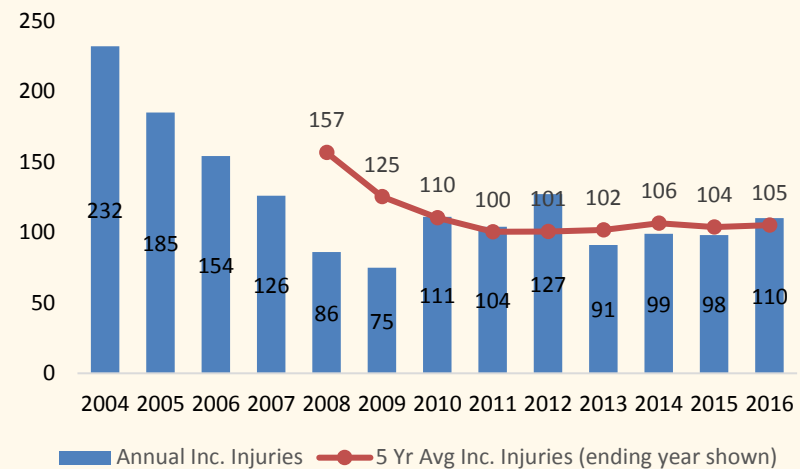
Speeding and Aggressive Driving

Data Trends

Speeding-Related Fatalities
and 5-Year Averages



Speeding-Related Incapacitating Injuries
and 5-Year Averages



Performance Measure

- Number of fatalities from speeding related crashes.

Current Strategies and Actions

- Enhance enforcement efforts to curb speeding and aggressive driving
 - Utilize speed data collection efforts to assist with focused enforcement (MassDOT Highway, MSP).
 - Continue including enforcement efforts in Click It or Ticket and Drive Sober or Get Pulled Over mobilizations, and sustained enforcement initiatives to reduce speeding and aggressive driving (HSD, MSP, Local Law Enforcement).
 - Provide crash data on new user friendly crash analytics system so that the impacts of speed limit changes can be examined by crash severity in towns/cities where speed limits have changed (MassDOT Highway)
 - Evaluate crash hot spots and implement countermeasures to control speed and reduce aggressive driving behavior (MassDOT Highway, HSD, MSP, Local Law Enforcement).

(continued)

- Implement Speed Enforcement mobilizations, including those conducted by the Sustained Traffic Enforcement Program, for local police departments and the STEP program for MSP (HSD, MSP, Local Law Enforcement).
- Conduct work zone speed enforcement initiatives (MassDOT Highway, MSP).
- Educate the judicial community on the importance of consistent application of the law on speed-related offenses (HSD).

2. Improve the process of setting roadway speed limits by including travel speeds and roadway context

- Annually recertify the posted limits on 100 miles of state highway through the Speed Limit Traffic Control Program. Coordinate with cities and towns and local and state police departments to recertify the posted limits (especially if different from existing), and explain the process (MassDOT Highway).
- Provide information and training to municipalities on setting speed limits and speed zoning (MassDOT Highway, MassDOT Planning).
- Continue training on Complete Streets and consider explaining and promoting the practice to all road users (MassDOT Planning, MassDOT Highway).
- Implement traffic mitigation strategies within road safety audits, and utilize their findings to encourage lower speeds (MassDOT Highway).
- Promote education of traffic calming efforts/measures (MassDOT Highway).
- Research and explore new technology that can be used to reduce crashes involving speeding and aggressive driving (MassDOT).

3. Educate the public on the risks associated with speeding and aggressive driving behavior

- Provide grants for educational outreach to younger drivers (EOPSS-HSD).
- Support the statewide deployment of the State Courts Against Road Rage Program (National Safety Council Massachusetts affiliates).
- Implement media efforts aimed at reducing risky driving behavior in high-risk locations and communities (HSD, MassDOT Highway).
- Conduct presentations for teens/young adults (BIA).
- Incorporate issues related to speed/aggressive driving in social media promotion (HSD, MSP, Local Law Enforcement).
- Conduct a public education and information campaign to increase awareness of the dangers of speeding (HSD).
- Post speed/aggressive driving PSAs on variable message boards (MassDOT Highway).
- Utilize press releases on high visibility speed enforcement efforts (HSD, MSP, Local Law Enforcement).
- Integrate speed enforcement into enforcement of impaired driving and occupant protection (MSP, Local Law Enforcement).



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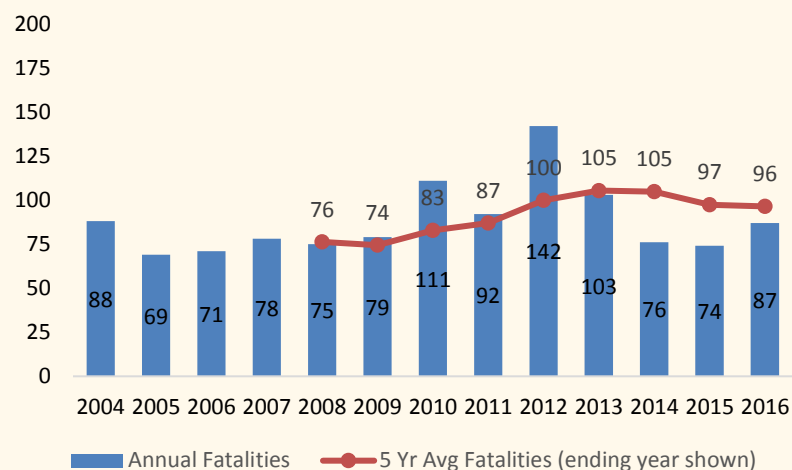
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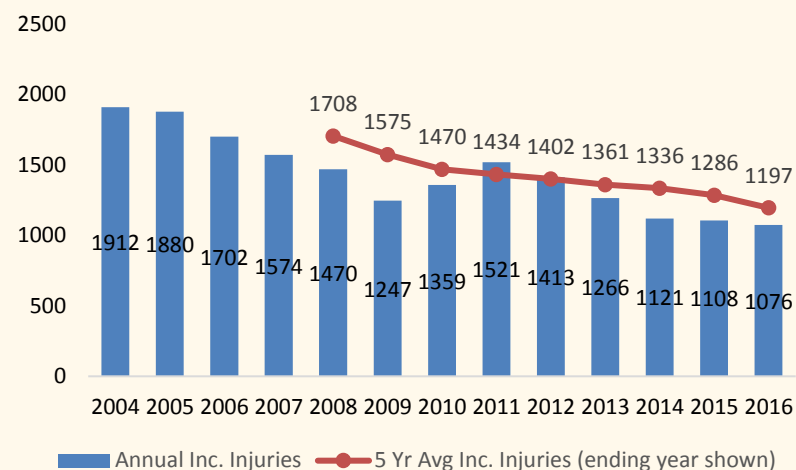
Intersection Crashes

Data Trends

Intersections-Related Fatalities
and 5-Year Averages



Intersections-Related Incapacitating Injuries
and 5-Year Averages



Performance Measure

- Number of intersection fatalities and incapacitating injuries.

Current Strategies and Actions

- Identify intersection crash locations and causes
 - Identify top intersection crash locations for roadway improvements (MassDOT Highway and RPAs/MPOs).
 - Conduct Road Safety Audits at high-crash intersections (MassDOT Highway and RPAs/MPOs).
 - Collect Fundamental Data Elements for intersections across Massachusetts, so that a data driven safety analysis can be performed for intersections (MassDOT).
 - Update Safety Performance Functions (SPFs) so that intersection network screening can be performed (MassDOT Highway).
- Educate safety practitioners on best practices for design
 - Train engineers and other staff in best practices for safety in intersection design (MassDOT Planning).
 - Provide information and training to municipalities on intersection safety elements and design improvements, as well as effective repair and redesign (MassDOT Planning).



(continued)	<ul style="list-style-type: none"> • Disseminate Separated Bike Lane Planning and Design Guide to address bicycle facility design, with the goals of increasing safety and encouraging expanded use of bicycle transportation (MassDOT Planning). • Develop planning and design guide for roundabouts (MassDOT Highway). • Develop guidance on maintenance and regulation compliance of shrubbery, trees, and mailbox placement (MassDOT Highway).
3. Incorporate safety elements into intersection design and maintenance	<ul style="list-style-type: none"> • Implement proven countermeasures for improving signage, markings, and lighting at high-crash intersections to increase driver awareness (MassDOT Highway and RPAs/MPOs). • Implement recently developed short-term work zone standards for Massachusetts' intersections (MassDOT Highway, MSP). • Implement Signal Phase and Timing, as needed, by installing Dedicated Short-Range Communications in cabinets, which will send information to the vehicle if/when the light will change (MassDOT Highway). • Install Flashing Yellow Arrow to reduce angle crashes at signalized intersections with protected plus permissive phasing (MassDOT Highway and locals). • Utilize maintenance contract work orders to improve sight lines by clearing obstacles such as brush, unnecessary signs, etc. (MassDOT, Local DPWs). • Incorporate intersection safety solutions into maintenance contracts and utilize work order processes (MassDOT Highway). • Test and use new crash prevention technology and other advances to combat intersection crashes (MassDOT Highway, RPAs/MPOs).
4. Educate new drivers and general population on intersection safety	<ul style="list-style-type: none"> • Revise driver education training to include new intersection structures, lane markings, non-signalized 4-way intersection rules, navigation of complicated intersections, and improper use of bike lanes (RMV). • Collaborate with the Driver Distraction Emphasis Area team.
5. Enhance enforcement at intersections	<ul style="list-style-type: none"> • Target high-crash intersection locations during enforcement patrols (MSP), including those with new intersection structures, high rates of right turns on red without stopping, high rates of texting at intersections, blocking of crosswalks, and blocking intersection (MSP, Local Law Enforcement). • Increase intersection enforcement for pedestrian safety, including complete stops, no turn on reds, and no parking near intersections (MSP, Local Law Enforcement)

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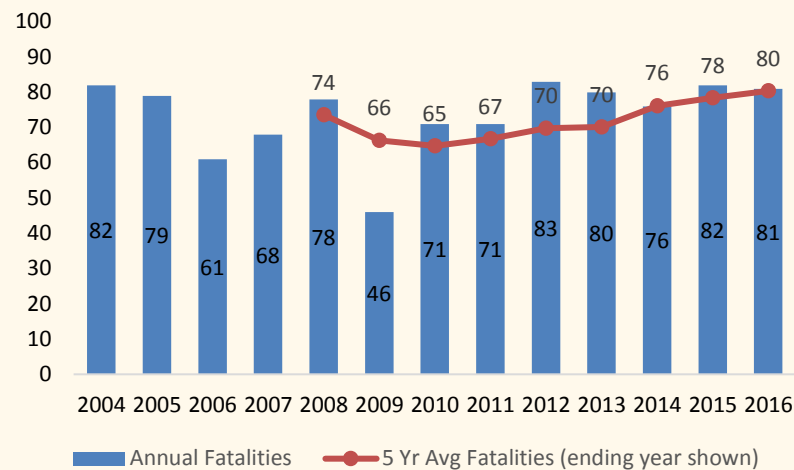
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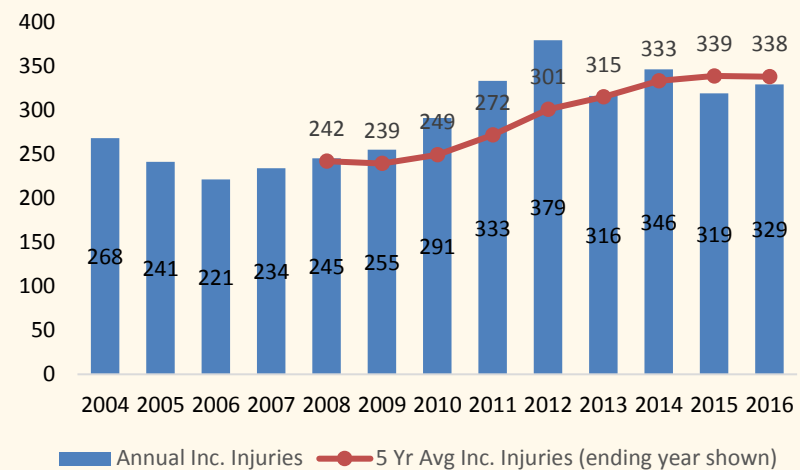
Pedestrians

Data Trends

Pedestrian Fatalities from Motor Vehicle Crashes and 5-Year Averages



Pedestrian Incapacitating Injuries from Motor Vehicle Crashes and 5-Year Averages



Performance Measure

- Number of crash related pedestrian fatalities and incapacitating injuries.

Current Strategies and Actions

1. Incorporate pedestrian safety elements into infrastructure design and engineering
 - Utilize the Statewide Pedestrian Plan as an actionable guide to increase walking and decrease crashes across the Commonwealth (MassDOT Planning).
 - Continue identifying the top pedestrian crash locations in order to develop and implement location-specific strategies for addressing safety issues at local and regional levels (MassDOT Highway, MassDOT Planning, RPAs/MPOs).
 - Promote the Municipal Resource Guide for Walkability and provide trainings to support municipalities in implementing traffic calming and improving pedestrian visibility (MassDOT Highway).
 - Implement design features, including traffic, calming, road diets, midblock crossings, and safety countermeasures that encourage and facilitate safe pedestrian travel on all state-owned roadways. (MassDOT Planning, MassDOT Highway).



(continued)	<ul style="list-style-type: none"> • Continue identifying systematic safety issues and high crash locations, in order to develop and implement strategies to address safety issues and prevent crashes at local, regional, and state levels (MassDOT Highway, MassDOT Planning, RPAs/MPOs). • Continue implementing the Healthy Transportation Policy so that pedestrian infrastructure is incorporated into all roadway projects as a means to enhance safety and mobility (MassDOT Highway). • Continue providing Complete Streets technical assistance and training to localities, regions, consultants, and others (MassDOT Planning, MassDOT Highway, RPAs/MPOs). • Research and explore new technology that can be used to reduce pedestrian crashes (MassDOT). • Continue exploring use of Health Impact Assessments and other tools to identify pedestrian safety needs where appropriate, including the Integrated Transportation and Health Impact Model (DPH – Bureau of Community Health and Prevention, MassDOT).
2. Enhance pedestrian safety expertise	<ul style="list-style-type: none"> • Bring together multiple disciplines and interest groups to address all aspects of safety via the annual Statewide Pedestrian, Bicycle, and Transit Safety “Moving Together” Conference (MassDOT Planning and Highway).
3. Support municipalities in their efforts to promote pedestrian safety	<ul style="list-style-type: none"> • Continue awarding community grants for pedestrian and bicycle enforcement, education, and equipment (HSD). • Continue providing guidance and technical assistance to municipalities regarding the implementation of pedestrian strategies focused on safety, policies, and infrastructure (MassDOT Planning, RPAs/MPOs). • Implement methods, such as walk audits, to identify and prioritize infrastructure improvements so communities can develop and implement projects and/or apply for funds for project implementation (WalkBoston, MassDOT Highway, RPAs/MPOs). • Conduct speed, driver distraction, and impaired driving enforcement (MSP, Local Law Enforcement). • Continue Vision Zero policies in municipalities that have already adopted them, and encourage municipalities in consideration of adoption (Municipalities). • Continue implementing ‘Mass in Motion’, helping communities work on policy, systems, and environmental change work, including policy adoption, infrastructure improvements, and walk audits (DPH, WalkBoston, MPOs/RPAs, Municipalities at large).
4. Increase public awareness about pedestrian safety	<ul style="list-style-type: none"> • Continue providing pedestrian safety information in comprehensive practitioner and driver education. Continue evaluating training curricula and the Driver Handbook to ensure the public understanding of safety issues remains current (RMV). • Incorporate pedestrian safety messages into media, including but not limited to, social media, message boards, video, radio, print, and transit vehicle posters (MassDOT, HSD, Traffic Safety Coalition). • Continue safety campaign to raise awareness for the safety of motorists, pedestrians, and bicyclists (HSD, MassDOT Highway).



(continued)	<ul style="list-style-type: none"> Continue conducting educational outreach to communities, schools, and senior centers on pedestrian safety. Provide information to new immigrants and/or limited English speaking residents (AAA Northeast, MassDOT Safe Routes to School, MPOs/RPAs).
5. Continue to examine and improve processes for collecting pedestrian crash data to measure and quantify fatalities and injuries	<ul style="list-style-type: none"> Evaluate crash data reporting, improve reporting, and adopt best practices (MassDOT, HSD, RMV, MSP, Local Law Enforcement, Traffic Records Coordinating Committee) Identify data needs to support and conduct statewide systemic safety analysis on MassDOT-owned roadways. Collect and organize the data and conduct analysis to investigate features that contribute to pedestrian crashes. Use the results of this action to inform project development (MassDOT Highway, MassDOT Planning). Continue examining crashes involving pedestrians, utilizing a variety of data sources to better understand the magnitude and characteristics of such crashes (DPH, MassDOT Highway).

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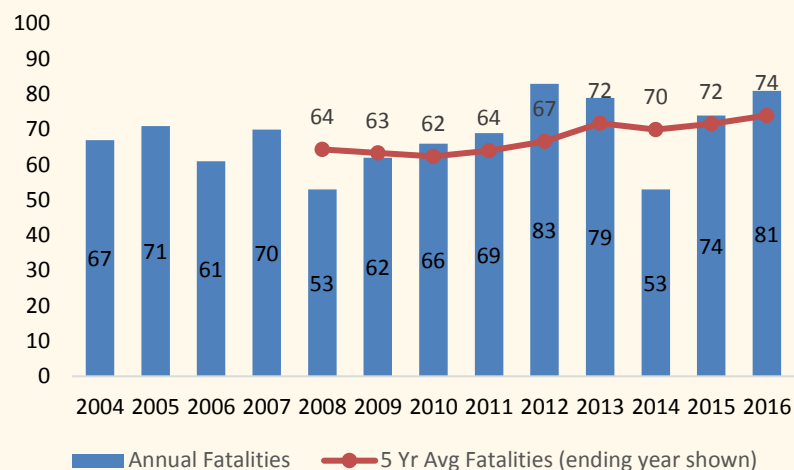
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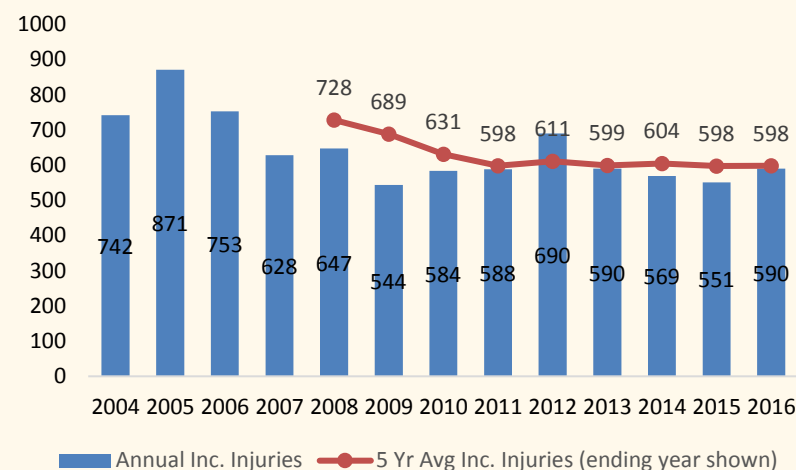
Older Drivers

Data Trends

Fatalities Involving Older Drivers (65+) and 5-Year Averages



Incapacitating Injuries Involving Older Drivers (65+) and 5-Year Averages



Performance Measure

- Number of fatalities and incapacitating injuries involving older drivers.

Current Strategies and Actions

- Collect and update data to improve problem identification and research to improve older driver safety programming
 - Catalog Massachusetts older driver safety resources and programming, and conduct ongoing analysis of older driver crash data, trip/travel survey, and other driver attributes (UMass Boston Gerontology Institute).
 - Update community-specific healthy aging data reports for all Massachusetts towns, which include transportation safety information for the 120+ indicators reported (UMass Boston Gerontology Institute).
 - Promote and sponsor research on mobility issues that affect senior safety (UMass Boston Gerontology Institute).
 - Support self-evaluation for older road users to prevent or reduce safety risks:
 - Driver Improvement Program/Workshops (AAA Northeast);
 - Shifting Gears Presentation (RMV);
 - The Driving Decision (RMV);



(continued)

- On-line driver improvement program (AAA Northeast);
- On-line resources for mature drivers (AAA Northeast, RMV); and
- CarFit events across the state (AAA Northeast).

- Educate all safety stakeholders about innovative, safety-conscious approaches to mobility for seniors by sharing best practices in community transportation, connecting organizations with potential partners, helping design and implement projects to improve safe mobility, and organizing an annual conference on best practices and innovation in community transportation (MassMobility, RMV, MCOAA).
- Provide a variety of transportation options for older adults, including fixed-route services, paratransit (including specialized paratransit for health facilities), travel training services, and volunteer driver programs (MBTA, RTAs, COAs, TRIPPS of Massachusetts, and other community-based organizations).
- Promote existing resources that help seniors access alternatives to driving, including the Senior Transportation Resource and Information Guide at www.trippsmass.org (TRIPPS of Massachusetts, MassMobility).
- Build the capacity of Councils on Aging and frontline staff at other community organizations by providing education on how to help seniors find transportation services and promoting statewide tools like Ride Match at www.massridematch.org (MassMobility).

2. Develop infrastructure improvements that accommodate the needs of older road users

- Evaluate the use of dynamic wrong way crash prevention solutions to enhance the low cost systemic enhancements that were recently implemented at over 350 interchanges (MassDOT Highway).
- Conduct a systematic approach to reviewing and replacing signs in order to improve retroreflectivity (MassDOT Highway).
- Consider the FHWA older driver and pedestrian design manual for best design practices (MassDOT Highway).
- Collaborate with other New England states on research regarding the safety of older drivers turning left at traffic signals. Continue adding the flashing yellow arrow to traffic signals, as this feature has been shown to reduce crashes involving left-turning vehicles (MassDOT Highway).
- Explore technology that improves safety (particularly for older drivers) by providing communication between vehicles and infrastructure (MassDOT Highway).

3. Continue updating licensing processes and procedures to

- Provide renewal vision tests in accordance with the Safe Driving Bill of 2010—requiring individuals over the age of 75 to renew licenses in-person at RMV Service Centers, or at participating AAA offices (RMV, AAA Northeast).
- Conduct immediate threat reporting and RMV review (law enforcement and health care providers, RMV Medical Affairs Bureau).

4. Provide education and technical assistance to the medical and legal communities on older road user impairment

- Examine ways to provide guidance, training, and resources to physicians/medical personnel to better determine older road user impairment (Massachusetts Medical Society).

Team Leader

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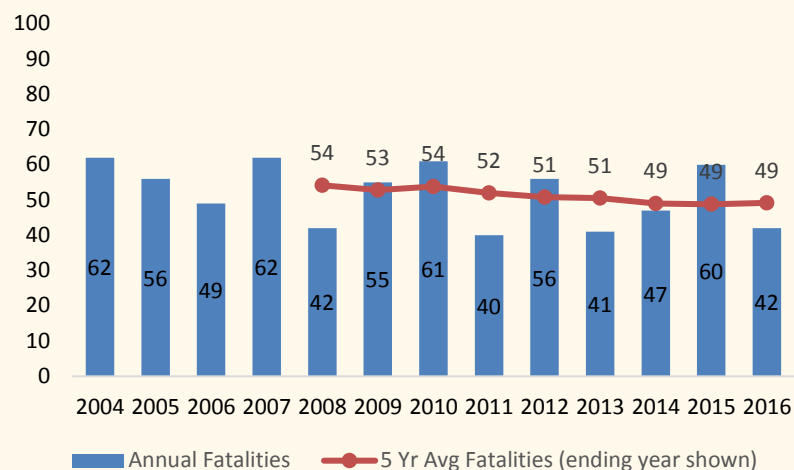
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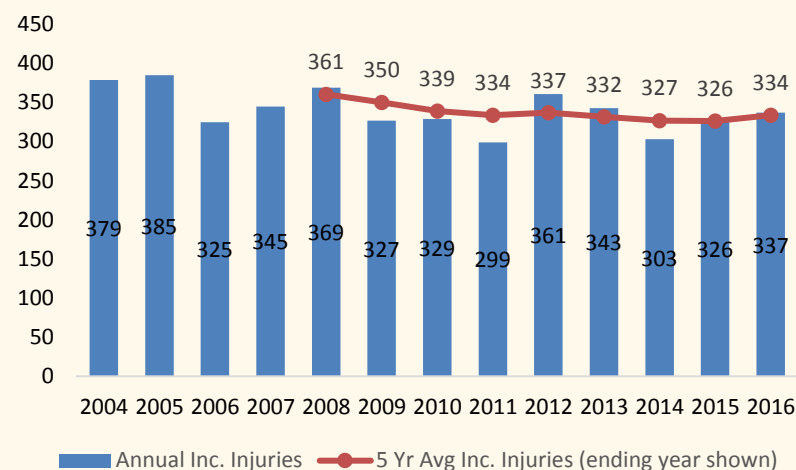
Motorcycle Crashes

Data Trends

Motorcyclist Fatalities from Motor Vehicle Crashes and 5-Year Averages



Motorcyclist Incapacitating Injuries from Motor Vehicle Crashes and 5-Year Averages



Performance Measure

- Number of motorcyclist fatalities and crash related hospitalizations.

Current Strategies and Actions

- Improve analysis of motorcycle crashes
 - Continue conducting a detailed analysis of motorcycle crashes using FARS and Massachusetts crash data, as well as EMS analysis of motorcycle injuries. Determine whether it is possible to access MSP CARS crash reconstruction data, Merit Rating Board citation data, and/or Automobile Insurance Board at-fault data for further analysis (RMV, DPH, and MassDOT Highway).
- Improve and enhance motorcycle safety training and communications opportunities
 - Improve motorcycle school licensing procedures by updating the RMV ALARS system to ATLAS (RMV).
 - Continue EOPSS-HSD funding to MassDOT RMV motorcycle program (HSD).
 - Continue expanding motorcycle rider education programs, including basic and advanced rider training, the Deaf Riders Course, Rider Coach Training, and various refresher courses (RMV).
 - Strengthen data collected on motorcycle training by implementing the Rider Education Management System (RMV).



(continued)	<ul style="list-style-type: none"> Conduct compliance/quality assurance visits with rider education schools (RMV). Conduct the Massachusetts Rider Education Program (MREP) Annual Meeting (RMV).
3. Increase motorcycle safety awareness	<ul style="list-style-type: none"> Provide safety information in comprehensive practitioner and driver education programs and campaigns (RMV). Conduct public information and education campaigns by attending motorcycle events; utilizing the motorcycle simulator; and using electronic message boards, PSA's, and other available resources to educate motorcyclists and other road users (RMV). Develop and implement communication strategies targeting high-risk populations and improving public awareness of motorcycle crash problems and programs (HSD, RMV, MA Motorcycle Association). Re-establish a social media campaign. Gather motorcycle advocacy groups together to develop messaging/imagery to be disseminated through social media groups. Consult with the Traffic Safety Coalition on their social media campaign (HSD, RMV). Continue to implement and/or attend regional motorcycle safety events with Smart Trainer (RMV). Examine possibility of developing in-service motorcycle safety enforcement training or associated materials (RMV, MSP, MPTC). Continue/expand Share the Road with motorcycle program (RMV, HSD). Develop new motorcycle awareness curriculum for driving schools and the RMV driver's manual (RMV).
4. Enhance motorcycle enforcement	<ul style="list-style-type: none"> Address high-risk motorcycle behavior, including impairment, speeding, etc. (MSP, Local Law Enforcement). Examine demographics and causation for motorcycle crashes, and target efforts in high-probability regions (RMV, MSP, Local Law Enforcement). Include motorcycle enforcement as part of any regularly scheduled high-visibility road safety enforcement campaigns, including Click It or Ticket and Drive Sober or Get Pulled Over, as well as total motor vehicle sustained enforcement (HSD, MSP, Local Law Enforcement).
5. Other	<ul style="list-style-type: none"> Consider potential implementation of motorcycle safety conference (RMV, HSD). Identify gaps in existing policies and make recommendations that would support proper motorcycle licensing, education, and insurance (RMV, HSD). Utilize countermeasures to improve motorcycle safety found in the National Highway Traffic Safety Administration's (NHTSA's) Countermeasures That Work, along with those recommended by the American Association of Motor Vehicle Administrators (AAMVA) (RMV, HSD).



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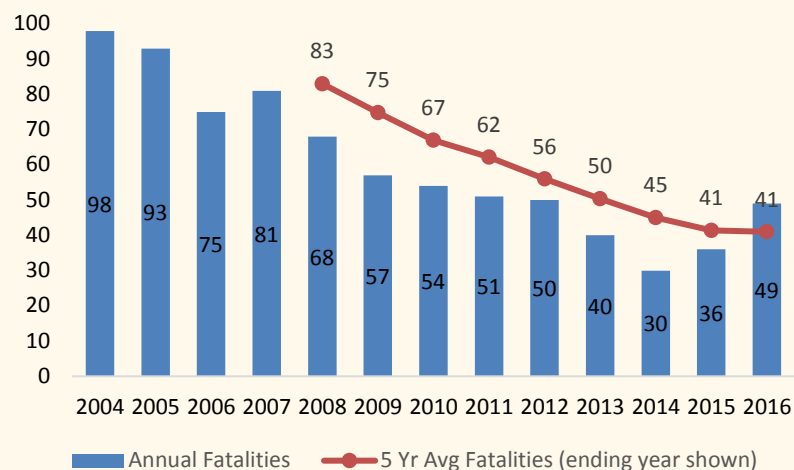
Southeastern Massachusetts Motorcyclists Survivor's Fund

Paul Almeida

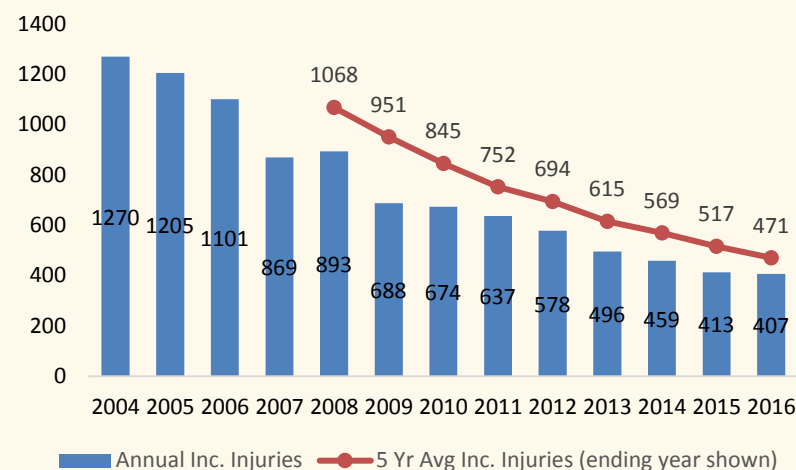
Younger Drivers

Data Trends

Fatalities Involving Younger Drivers
(15-20) and 5-Year Averages



Incapacitating Injuries Involving Younger Drivers (15-20) and 5-Year Averages



Performance Measure

- Number of fatalities and incapacitating injuries involving younger drivers.

Current Strategies and Actions

- Conduct research to more effectively reduce the frequency and severity of crashes involving younger drivers
 - Continue conducting Child Fatality Review Program to reviews all motor vehicle fatalities involving children under the age of 18, including the cause of fatality, whether it was preventable, and recommendations to prevent future crashes (DPH).
 - Create the ATLAS portal so that all driving schools can enter the names of students, curriculum, instructors, test scores, and parents who attended the parent class (RMV).
 - Conduct ongoing analysis of the 18-24 year age range so that programming can effectively target both the 15-17 year age range and the 18-24 year age range. Utilize a variety of datasets, including crash, citation, hospital, etc. (DPH).
 - Conduct ongoing review of best practices and utilize data to identify target areas in which to deliver effective educational messages (DPH, HSD, AAA Northeast, BIA, Safe Roads Alliance).



2. Enhance enforcement efforts to reduce the frequency and severity of traffic violations by younger drivers	<ul style="list-style-type: none"> • Continue the Underage Alcohol Enforcement Program (HSD, ABCC, MSP, Local Law Enforcement). • Expand the Drug Recognition Experts and Advanced Roadside Impaired Driving Enforcement programs (HSD, MSP, Local Law Enforcement). • Conduct alcohol enforcement sting operations (ABCC, HSD, Local Law Enforcement). • Provide alcohol server/seller training (ABCC).
3. Improve education of younger drivers, parents, and the general public	<ul style="list-style-type: none"> • Continue educational programming and outreach to younger drivers, as well as parents of novice drivers (HSD, Safe Roads Alliance, SADD, BIA, MSP, In Control Family Foundation). • Utilize funding from the CDC to target alcohol use and driving with the 15-24 year old age range. This program will eventually require all DPH-funded youth service organizations to have a safe-driving policy in place (DPH). • Educate parents of younger drivers and pre-drivers on the details and requirements of graduated driver licensing: <ul style="list-style-type: none"> ○ Video for driver's education parent class (HSD, RMV); and ○ Parent Driver Supervision Guide (Safe Roads Alliance, RMV, Driving Schools). • Educate the judicial community on the importance of consistent application of the laws, particularly for younger drivers (HSD). • Utilize a statewide peer-to-peer program to increase seat belt use and reduce risky behaviors that contribute to injuries and fatalities among teens, including speeding, impaired driving, distracted driving, and underage drinking (SADD). • Continue implementing media campaigns, including the Drivers for Life program, the 100 Deadliest Days of Summer, and the Impaired Driving Campaign (HSD). • Utilize crash prevention strategies from the National Highway Traffic Safety Administration's (NHTSA) Countermeasures That Work document, and other best practices (HSD, RMV, Safe Roads Alliance, MSP).

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In Control Family Foundation
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Massachusetts Department of Transportation (MassDOT) Registry of Motor Vehicles (RMV)
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Safe Roads Alliance
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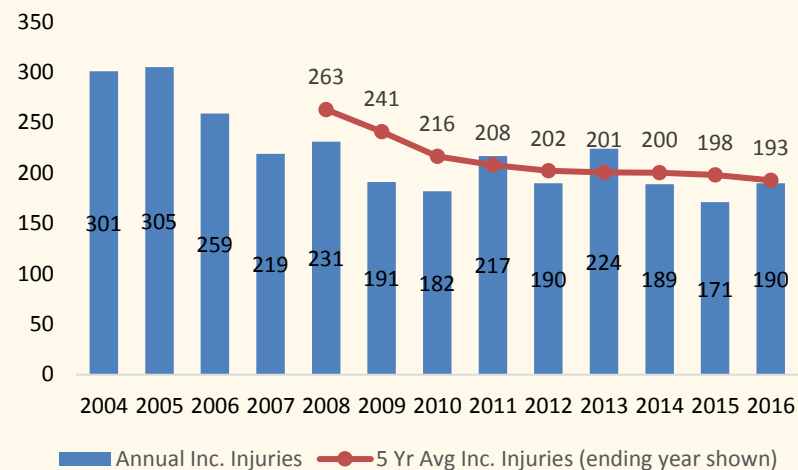
Large Truck-Involved Crashes

Data Trends

Fatalities from Motor Crashes with Large Trucks and 5-Year Averages



Incapacitating Injuries from Crashes with Large Trucks and 5-Year Averages



Performance Measure

- Number of truck involved fatalities and incapacitating injuries.

Current Strategies and Actions

- Enhance motor carrier safety enforcement
 - Conduct/focus traffic enforcement activities at high-crash locations and HazMat corridors, as well as EPDO barracks with large numbers of truck crashes (MSP-CVES).
 - Conduct driver and vehicle inspections, as well as carrier interventions/investigations (MSP-CVES).
 - Train MSP troopers and local officers who conduct traffic enforcement to expand enforcement to include unsafe CMV driving behaviors. Target this expanded enforcement by analyzing crash causation data for CMVs and passenger cars, including location, driver, behavior, day of week, time of day, and violation type (MSP-CVES).
 - Work to reduce the incidence of drowsy driving by enforcing CMV regulations related to the work hours/driving times of drivers (MSP-CVES).
 - Participate in national enforcement strike forces targeting Hazmat shippers, cargo tank repairers, and other shippers (MSP-CVES).

(continued)	<ul style="list-style-type: none"> • In work zones, enforce the Move Over law, conduct driver and vehicle inspections, and implement extensive traffic enforcement utilizing the CMV Work Zone Crash Causation Analysis to target enforcement (MSP-CVES). • Provide education and outreach regarding drowsy driving and driver distraction (MSP-CVES). • Utilize a public awareness program, outreach efforts, and social media messaging to increase motorist awareness of safe driving around CMVs (MSP-CVES).
2. Improve data quality and collection	<ul style="list-style-type: none"> • Consider developing an annual CMV Fatality Round Table, similar to the Child Injury Round Table conducted by the DA's office (MSP-CVES, DPH and MassDOT RMV). • Continue improving and enhancing truck safety data while maintaining a quality rating of 'good' (MSP-CVES and MassDOT RMV). • Review crash report backlog in the queue from RMV to MSP on a monthly basis, and adjust personnel as needed (MSP-CVES and RMV). • Continue providing data quality training for law enforcement officers in order to reduce the need for MSP to conduct extensive research when the data received is of poor quality (MSP-CVES).
3. Provide engineering roadway improvements	<ul style="list-style-type: none"> • Continue upgrading signage and markings at high truck rollover crash locations (MassDOT Highway). • Continue using flexible delineators to improve identification of travel way on ramps, in order to prevent drivers from running off the road from one ramp to an opposing ramp (MassDOT Highway). • Continue conducting Road Safety Audits (RSA) in needed areas, with an emphasis on trucks, as well as an annual Massachusetts-wide RSA on truck safety with analysis of three years of crashes involving heavy trucks. This will determine whether design practices are having an adverse effect on truck traffic (MassDOT Highway). • Research the possibility of adding virtual weight stations at roadway intersections, such as interstate ramps (MassDOT Highway, MSP-CVES). • As needed and as appropriate, add language to MassDOT official documents (like the MassDOT Project Development Guidelines) that lay out the difficulties trucks encounter at areas of concern, including different types of interchanges, roads with S Curves, etc. (MassDOT Highway). • Continue highlighting the needs of CMVs in roadway design (MassDOT Highway). • Research and explore new technology that can be used to reduce crashes involving trucks (MassDOT).
4. Collaborate with the trucking and bus industry on programs and initiatives to improve safety and reduce crashes specific to impaired/drugged driving and possession	<ul style="list-style-type: none"> • Create a guide that will help navigate the Federal DOT, the State Department of Labor, Occupational Safety and Health, and ADA's drug regulations (MSP-CVES, MMTA and SHSP Heavy Truck EA Team). • Give presentations on impaired/drugged driving to Massachusetts companies at MMTA (MSP-CVES and MMTA). • Disseminate drug regulation information to motor carriers (MSP-CVES and MMTA).

5. Improve Massachusetts motor carrier systems in order to assist the MSP and RMV with enforcement and licensing issues
 - Implement policy requiring intrastate carriers to have DOT numbers (MassDOT RMV and MSP-CVES).

Team Leader

Massachusetts State Police - Commercial Vehicle Enforcement Section (MSP - CVES)

Lt. Thomas Fitzgerald

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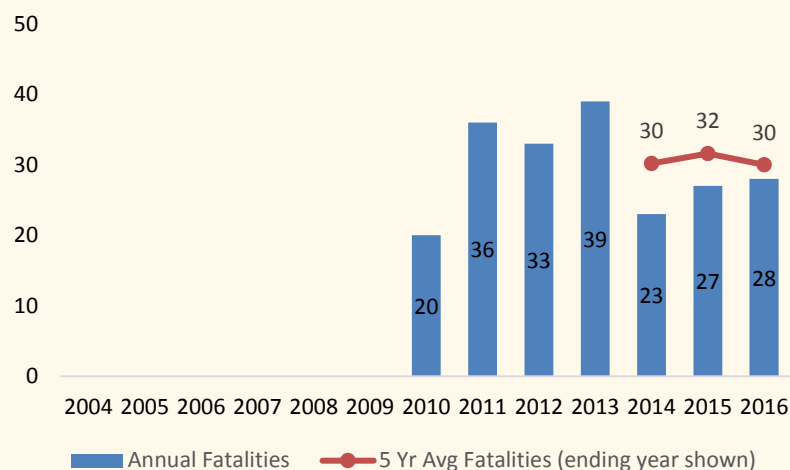
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Driver Distraction

Data Trends

Fatalities from Crashes with Distracted Drivers and 5-Year Averages



Performance Measure

- Number of distracted driver related fatalities.

Current Strategies and Actions

1. Educate the public on the risks associated with driver distraction
 - Consider creating safe-driving policies for state employees, cities/towns, companies, etc. (HSD).
 - Develop and enforce a hand held cell phone use while driving ban for state/city employees.
 - Collaborate with other public and private organizations to utilize innovative solutions, such as policies prohibiting distracted driving when using vehicles owned by the company or organization.
 - Reach out to employers of commercial drivers, Uber, etc.
 - Implement a public information and awareness campaign on the dangers of driver distraction (HSD).
 - Develop a driver distraction prevention card with a message and listing of fines and consider having law enforcement stop motorists to educate on safety, rather than ticket. The HSD could provide informational materials to be distributed by law enforcement.



(continued)

- Participate in the New England-wide driver distraction campaign for April, including a 'Just Drive' PSA, along with ongoing education and awareness programs.
- Publicize the problem of driver distraction in April, which is Driver Distraction Prevention Month.
- Create multicultural information and education programs for the public.
- Develop curriculum & programs to educate younger drivers.

- Increase provision of information on texting and cell phone use in news stories about car crashes. Develop programming materials to promote the inclusion of this information in law enforcement press releases (HSD).
- Conduct legislative and community outreach. Provide data to the legislature and other elected officials as they consider traffic safety legislation and issues (AAA Northeast).
- Seek out information on successful countermeasures from NHTSA, GHSA, etc. (HSD).

2. Develop and deliver targeted training and education on the dangers of inattentive driving

- Continue utilizing driver distraction educational materials in driver's manual and permit test (MassDOT RMV).
- Continue educational outreach and presentations for younger drivers on the dangers of texting while driving (MSP, BIA).
- Review best practices and utilize data to identify target areas for delivering effective educational messages (DPH, HSD, AAA Northeast, BIA, Safe Roads Alliance).

3. Enhance enforcement programs to reduce inattentive driving

- Provide funding to State and local law enforcement for targeted 'hot spot' sustained enforcement (HSD).
- Support law enforcement with training and technical assistance to help them enforce driver distraction effectively (HSD and MPTC).
- Continue enforcing texting while driving law (MSP, Local Law Enforcement).
- Educate the judicial community on the importance of consistently applying the texting law (HSD).

4. Develop processes to collect data to measure/quantify fatalities and injuries to better understand driver inattention

- Analyze data from secondary fields in crash reconstruction reports, including opinions on contributing crash factors (MSP).
- Review the Training Council's model law enforcement training curriculum to ensure the minimum requirements include training on the motor vehicle law (Chapter 90) and crash investigation (MPTC/MSP).
- Track cell phone use and texting while driving as part of the annual Safety Belt Observation Survey (HSD).
- Utilize the services of the State Law Enforcement Liaison (LEL) to work with local and State Police agencies in an effort to improve driver distraction-related crash data collection (HSD).



5. Incorporate design elements into roadway engineering to combat inattentive and drowsy driving
 - Continue installing rumble strips and exploring locations for the centerline rumble strip policy (MassDOT Highway). Continue training locals through LTAP (MassDOT Planning).
 - Research and explore new technology that can be used to reduce pedestrian crashes (MassDOT).
 - Identify other roadway-related countermeasures that may reduce inattentive driving crashes (MassDOT Highway).
 - Support the development of safety standards/best practices for autonomous vehicles and connected infrastructure (MassDOT Highway) as well as test and use new crash prevention technology and other advances to combat driver distraction-related crashes (MassDOT Highway, RPAs/MPOs).

Team Leader

Massachusetts State Police (MSP)

Sgt. William Robertson

Team Members

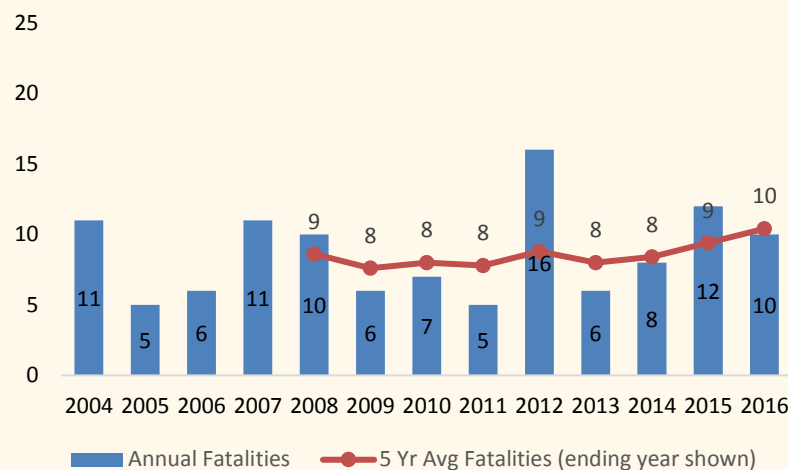
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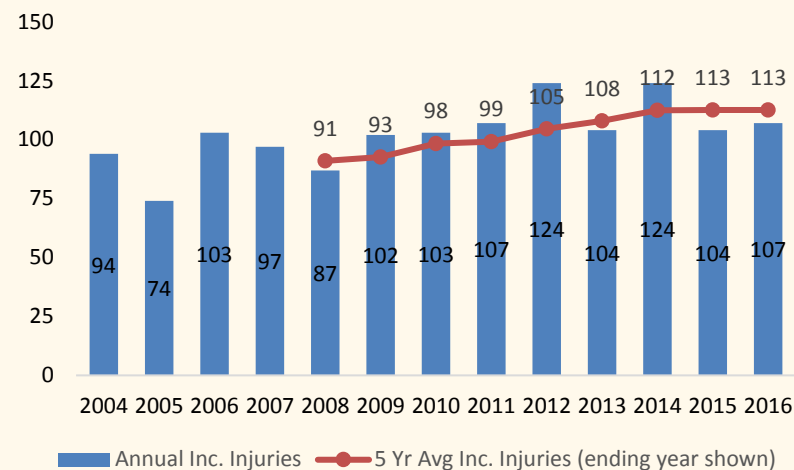
Bicyclists

Data Trends

Bicyclist Fatalities from Motor Vehicle Crashes and 5-Year Averages



Bicyclist Incapacitating Injuries from Motor Vehicle Crashes and 5-Year Averages



Performance Measure

- Bicyclist crash related incapacitating injuries and fatalities

Current Strategies and Actions

- Improve design and engineering of bicycle facilities on and off roadways
 - Utilize the statewide bicycle plan currently under development, to serve as an actionable guide to increase bicycling for everyday trips across the Commonwealth, with a focus on creating high comfort connected networks of bicycle facilities (MassDOT Planning).
 - Continue identifying the top bicycle crash locations in order to develop and implement location-specific strategies for addressing safety issues at local and regional levels (MassDOT Highway, MassDOT Planning, RPAs/MPOs).
 - Disseminate information produced by MassDOT on bicycle infrastructure to enhance safety (MassDOT Highway and Planning).
 - Continue implementing the Healthy Transportation Policy so that bicycling infrastructure is incorporated into all roadway and bridge projects as a means to enhance safety and mobility (MassDOT Highway).



(continued)	<ul style="list-style-type: none"> • Advance bicycle networks and shared use paths to assist in closing critical gaps to providing safe facilities and decreasing conflicts between bicycles and vehicles/trucks (supporting multi use paths) (MassDOT Highway, EEA, DCR). • Continue providing Complete Streets technical assistance and training to localities, regions, consultants, and others (MassDOT Planning, MassDOT Highway, RPAs/MPOs). • Continue exploring use of Health Impact Assessments and other tools to identify bicycle and pedestrian safety needs where appropriate, including the Integrated Transportation and Health Impact Model (DPH – Bureau of Community Health and Prevention, MassDOT). • Research and explore new technology that can be used to reduce bicycle crashes (MassDOT).
2. Enhance bicycle safety expertise	<ul style="list-style-type: none"> • Enhance bicycle safety expertise, and ability to measure it, among State and local enforcement, public health professionals, transportation planners, engineers, and other traffic safety advocates (MassDOT Planning, DPH – Bureau of Community Health and Prevention). • Bring together multiple disciplines and interest groups to address all aspects of safety via the annual Statewide Pedestrian, Bicycle, and Transit Safety “Moving Together” Conference (MassDOT Planning and Highway).
3. Support municipalities in their efforts to promote bicycle safety	<ul style="list-style-type: none"> • Continue to award and implement community grants for pedestrian and bicycle enforcement, education, and equipment (HSD, MSP, Local Law Enforcement). • Continue providing guidance and technical assistance to municipalities in order to implement bike strategies that touch on safety, policy, and infrastructure (MassDOT Planning).
4. Increase public awareness about bicycle safety	<ul style="list-style-type: none"> • Continue providing bike safety information in driver education, while continuing to evaluate training curricula and the Driver Handbook to ensure the public understanding of infrastructure improvements (e.g., pavement markings, such as sharrows, etc.) remains current (RMV). • Incorporate bicycle safety messages into social media (MassDOT, HSD, Traffic Safety Coalition). • Continue conducting Bike Helmet Safety Campaigns, school presentations, and bike rodeos (MassBike, RMV, AAA Northeast). • Continue to conduct outreach to J1 Visa seasonal workers on bike safety (RPAs/MPOs).
5. Integrate bicycle safety activities with other plans	<ul style="list-style-type: none"> • Continue providing bike safety data to others so that safety countermeasures can be incorporated into work by other entities (MassDOT Planning, MassDOT Highway).
6. Incorporate changes precipitated by new directives related to healthy transportation	<ul style="list-style-type: none"> • Continue implementing ‘Mass in Motion’, helping communities to work on policy, systems, and environmental change work that includes policy adoption, infrastructure improvements, land use changes, utilizing open-street initiatives, and bike-share development (DPH, MPOs/RPAs, Municipalities at large).

7. Develop processes for collecting data to measure and quantify fatalities and injuries to better understand crashes involving bicyclists and regular crash data analysis
 - Review new Model Minimum Uniform Crash Criteria crash data recommendations specific to crashes involving bicyclists (RMV, MassDOT Highway).
 - Incorporate improvements to the crash report form in order to improve the information collection necessary for tracking and making changes that reduce fatalities and injuries to bicyclists (RMV).
 - Continue examining a variety of data sources to better understand the magnitude and characteristics of crashes involving bicyclists (DPH, MassDOT Highway).

Team Leader

Massachusetts Department of Transportation (MassDOT) Sustainable Mobility

Jackie DeWolfe

Team Members

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Cape Cod Commission	Glenn Cannon
Charles River Wheelers	Joe Repole
Central Massachusetts Regional Planning Commission (CMRPC)	Dan Daniska
Charles River Wheelers, Lincoln	Bob Wolf
Central Transportation Planning Staff (CTPS)	Casey-Marie Claude
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Federal Highway Administration (FHWA)	Josh Grzegorzewski, Nelson Hoffman
Franklin Regional Council of Governments (FRCOG)	Beth Giannini
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Massachusetts Department of Transportation (MassDOT) Highway - District 1	Kate Masztal
Massachusetts Department of Transportation (MassDOT) Highway – District 6	Courtney Dwyer
Massachusetts Department of Transportation (MassDOT) Planning	Ethan Britland , Michael Clark, Pete Sutton



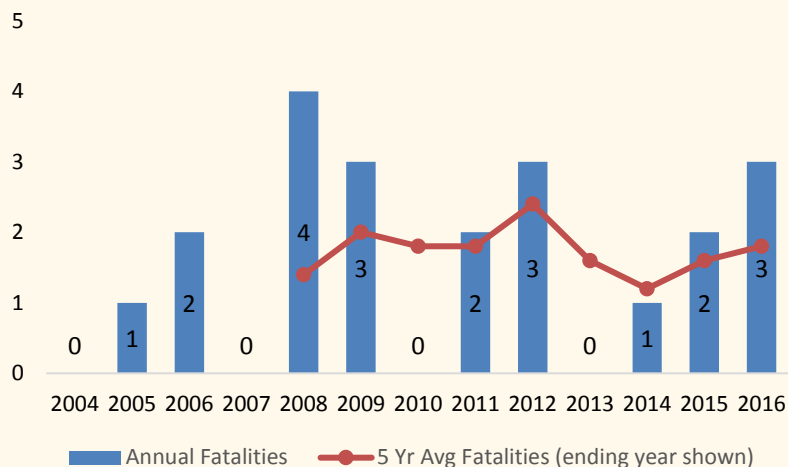
Massachusetts Department of Transportation (MassDOT) Registry of Motor Vehicles (RMV)
Massachusetts State Police (MSP)
Merrimack Valley Planning Commission (MVPC)
National Highway Traffic Safety Administration (NHTSA)

Donna DaVeiga
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Safety of Persons Working on the Roadways

Data Trends

Fatalities of Workers on Massachusetts Roadways and 5-Year Averages



Performance Measure

- Number of fatalities of workers on roadways.

Current Strategies and Actions

1. Continue developing and implementing practices, policies, and procedures to improve work zone and traffic incident set-ups to maximize safety
 - Continue interagency collaboration via the TIM Task Force (MassDOT Highway, TIM Task Force membership).
 - Continue updating the protocol for work zone and other traffic incident set-up as needed, including utilization of the Commonwealth of Massachusetts Unified Response Manual, completing annual work zone safety reviews, and implementing recommendations (MassDOT Highway, TIM Task Force).
 - Evaluate and promote strategies for best work zone and incident response practices (MassDOT Highway, TIM Task Force).
 - Continue providing guidance and training on temporary traffic control in work zones, mobile operations, and incident scenes in a work zone and TIM training (MassDOT Highway).
 - Continue performing work zone inspections (MassDOT Highway, MSP, Local Law Enforcement).

(continued)	<ul style="list-style-type: none"> Expand the use of crash attenuators in work zones to protect the workers inside the construction or maintenance area (MassDOT Highway).
<p>2. Educate drivers on work zone safety issues, using unified themes across multiple agencies, in order to improve compliance with work-zone traffic controls</p>	<ul style="list-style-type: none"> Utilize digital message boards to promote the Move Over Law, Work Zone Safety, and Safety for Traffic Incident Management Personnel (MassDOT Highway, MSP). Conduct Massachusetts Work Zone Safety Awareness (WZSA) campaign in conjunction with National WZSA Week (MassDOT Highway). Utilize public outreach/education and best practices from other states (MassDOT Highway). Develop and implement plan to more fully promote the Move Over Law. Consider additional static signs strategically placed on the roadway (MassDOT Highway, MSP). Conduct work zone enforcement campaigns to reduce speeding, distracted driving, and aggressive driving behavior (MSP, MassDOT Highway).
<p>3. Develop and/or improve processes for collecting data related to measuring and quantifying fatalities and injuries in order to better understand crashes involving roadway workers</p>	<ul style="list-style-type: none"> Incorporate new Model Minimum Uniform Crash Criteria recommended work zone crash fields into the Massachusetts Crash Report form (RMV). Conduct surveillance of all deaths for individuals working on the roadway, including the review of multiple data sources (DPH).
<p>4. Educate workers on safety practices in work zones</p>	<ul style="list-style-type: none"> Continue conducting work zone, first responder, and traffic incident management training for MPTC and MSP academies, as well as Communications (operators, dispatchers), Emergency Management, EMS, Fire/Rescue, Towing and Recovery, Transportation/Public Works (state and local), hazmat contractors, and others (MassDOT Highway, MPTC, Statewide Towing Academy, Statewide Towing Association). Participate in work zone safety training (MSP, Local Law Enforcement). Develop a state website to provide an instructor's portal, training materials, and other information as needed (TIM Task Force). Utilize TIM Responder Training booths at various safety conferences to provide education regarding worker safety (MassDOT Highway, TIM Task Force).



Team Leader

Massachusetts Department of Transportation (MassDOT) Highway, Emergency Preparedness Edward Gincauskis

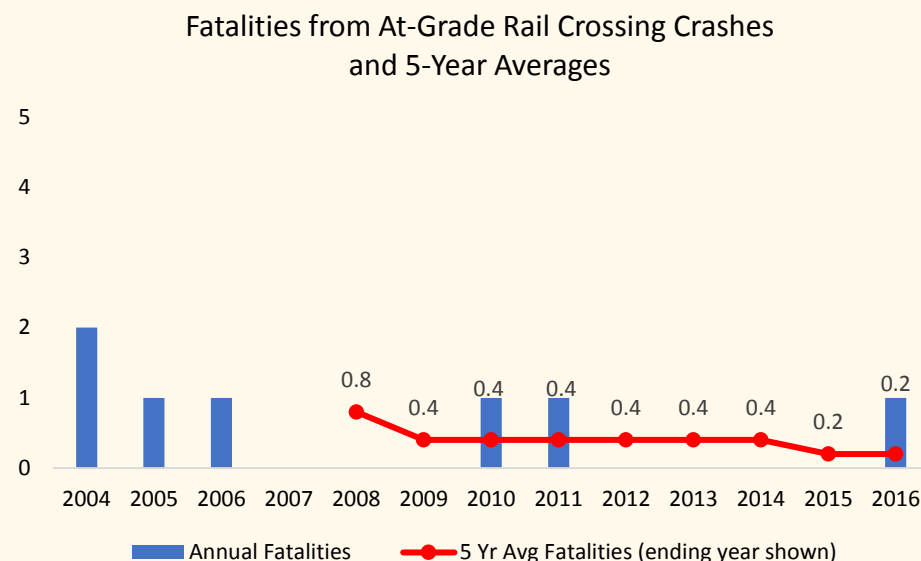
Team Member Agencies

Massachusetts Department of Transportation (MassDOT)
Chief Medical Examiner's Office
Department of Public Health (DPH)
Federal Highway Administration (FHWA)
Hampshire Towing
Massachusetts Department of Environmental Protection
Massachusetts Department of Fire Services
Massachusetts Bay Transportation Authority (MBTA)
Massachusetts Highway Association (MHA)
Massachusetts Port Authority
Massachusetts State Police (MSP)
Statewide Towing Association
United Road Towing

Note: The Massachusetts Traffic Incident Management (TIM) Task Force acted as the emphasis area team for Safety of Workers on Roadways.

At-Grade Rail Crossings

Data Trends



Performance Measure

- Number of fatalities and incapacitating injuries from at-grade rail crossing crashes.

Current Strategies and Actions

- Enhance at-grade rail crossing safety
 - Continue implementing Section 130 of the Rail-Highway Crossing Safety Program (MassDOT Rail and Transit).
 - Prioritize and select projects utilizing data-driven processes, including crash data analysis, site visits (similar to road safety audits), and surveys of crossings that may require improvements (MassDOT Rail and Transit, MBTA).
 - Implement measures recommended in the Highway Design Handbook for Older Drivers and Pedestrians regarding visual improvements at at-grade crossings that will enhance support for older drivers and alternative road users (MassDOT Rail and Transit, MBTA).
 - Conduct pedestrian and motor vehicle enforcement near at-grade rail crossings (Local Law Enforcement).
 - Utilize proven crash prevention methods at grade crossings, including the increase of signage and pavement markings and changing from passive to active devices (MassDOT Rail and Transit, MBTA).

2. Educate everyone about safe crossing practices	<ul style="list-style-type: none"> Develop a campaign that will educate the public and increase awareness about safety precautions needed at railroad crossings (MassDOT Rail and Transit, MassDOT Highway, MBTA). Continue implementing “Operation Lifesaver,” a public awareness campaign that includes safety blitzes, press conferences, and other community awareness events with the goal of reducing rail tragedies. In addition, expand outreach to areas surrounding new or modified Commuter Rail services such as the Foxborough Pilot program. (MBTA, MassDOT Rail and Transit). Implement Rail Safety Week activities each year (MassDOT, MBTA, Transit Police, Keolis).
3. Improve data collection and analysis capabilities	<ul style="list-style-type: none"> Collaborate with local and railroad police departments, the MBTA, and the Federal Railroad Administration to improve data collection for at-grade crossing incidents involving fatalities and serious injuries (MassDOT Highway).
4. Improve communication and collaboration among those responsible for rail-grade crossing safety	<ul style="list-style-type: none"> Continue collaborating with entities responsible for at-grade crossing safety (MassDOT Rail and Transit, MBTA, and DPH).

Team Leader

Massachusetts Bay Transportation Authority (MBTA)

Ron Nickle & John Connell

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