MASSACHUSETTS

HIGHWAY SAFETY IMPROVEMENT PROGRAM

2018 ANNUAL REPORT

U.S. Department of Transportation
Federal Highway Administration

Photo source: Federal Highway Administration

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Disclaimer

Protection of Data from Discovery Admission into Evidence

23 U.S.C. 148(h)(4) states “Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for any purpose relating to this section [HSIP], shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location identified or addressed in the reports, surveys, schedules, lists, or other data.”

23 U.S.C. 409 states “Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or railway-highway crossings, pursuant to sections 130, 144, and 148 of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.”

Executive Summary

In 2009, under Safetea-LU, Massachusetts began obligating funds from the HSIP funding category, only after an HSIP Task Force was developed and HSIP guidelines were implemented. Through MAP-21 and now, through FAST Act, this program continues. HSIP projects and programs were, and continue to be, identified through our Strategic Highway Safety Plan (SHSP) and, where possible, consist of a combination of high crash locations, systemic projects and programs identified through the various emphasis areas of the SHSP. The program funds projects on all public roadways, not just State Highways, and it uses a data driven process to identify and select the projects and programs. The SHSP is currently being revised and new strategies will help guide the future years of HSIP. The HSIP is a much needed program to bring down our fatalities and injuries in order to achieve our Towards Zero Death goal. This report summarizes the HSIP management and structure in Massachusetts as well as describing the selected HSIP programs and projects. As was done last year for the first time, we continue to perform evaluations on the effectiveness of the projects and program.

Introduction

The Highway Safety Improvement Program (HSIP) is a core Federal-aid program with the purpose of achieving a significant reduction in fatalities and serious injuries on all public roads. As per 23 U.S.C. 148(h) and 23 CFR 924.15, States are required to report annually on the progress being made to advance HSIP implementation and evaluation efforts. The format of this report is consistent with the HSIP Reporting Guidance dated December 29, 2016 and consists of five sections: program structure, progress in implementing highway safety improvement projects, progress in achieving safety outcomes and performance targets, effectiveness of the improvements and compliance assessment.

Program Structure

Program Administration

Describe the general structure of the HSIP in the State.

A Massachusetts HSIP Task Force was established in 2009 to develop guidelines for HSIP-eligible projects and programs. The Task Force consists of FHWA, MassDOT Highway, MassDOT Planning and MARPA (Massachusetts Association of Regional Planning Agencies)/MPOs. An HSIP eligible project is one that contains a hot spot crash location (a cluster in which the total number of “equivalent property damage only” crashes in the cluster is within the top 5% of all clusters in a specific region), systemic fixes or any strategy, activity or project on a public road that is consistent with the data-driven State Strategic Highway Safety Plan (SHSP) and corrects or improves a hazardous road location or feature or addresses a highway safety problem. In the past, HSIP projects included infrastructure fixes, enhanced enforcement, awareness campaigns, data or other types. However, with FAST Act, only infrastructure fixes, enhanced enforcement in work zones and data improvements are allowed. More details can be found at http://www.massdot.state.ma.us/Portals/8/docs/traffic/HSIP/HSIP%20Criteria%20Updates.pdf . To see the HSIP eligible clusters, go to: http://services.massdot.state.ma.us/maptemplate/TopCrashLocations/.

MassDOT Federal Aid Programming and Reimbursement Office and MassDOT Planning allocate the funds into various categories for the Statewide Transportation Improvement Program (STIP), including Statewide HSIP funds and HSIP funds for each of the regions. HSIP projects are then selected based on the HSIP guidelines, the MPO processes, priority and readiness (regardless of roadway jurisdiction). Once an HSIP project has been identified on the STIP, an early requirement is a Road Safety Audit which helps to guide the recommended improvements.

Where is HSIP staff located within the State DOT?

Other-Traffic Engineering and Safety

Enter additional comments here to clarify your response for this question or add supporting information.

How are HSIP funds allocated in a State?

Other-combination

Enter additional comments here to clarify your response for this question or add supporting information.

HSIP funding is apportioned to the Commonwealth through FHWA's Fast Act through Federal Fiscal Years 2019 and 2020 – in the amounts of $34,664,070, and $35,367,782, respectively. FHWA's Cambridge office has issued guidance to assume that the apportionments shall be level funded through FFY 2023 of our Federal Aid program. Obligations against our apportionments and carryover balances are assigned to HSIP eligible projects under our various Capital Investment Plan and State Transportation Improvement Programs, namely, our Safety Improvements program; Intersection Improvements program, and our Roadway Reconstruction program. We are forecasting to obligate near the apportioned amount each Federal Fiscal Year for the next five years.

Apportionments Obligations

FFY 2019: $34,664,070 $41,257,229
FFY 2020: $35,367,782 $27,129,164
FFY 2021: $35,367,782 $30,241,516
FFY 2022: $35,367,782 $27,371,112

FFY 2023: $35,367,782 $45,658,470

5 yr. Avg: $35,227,040 $34,331,504

MassDOT has guidance on what locations are HSIP eligible (although this methodology is undergoing change to reflect more of the Highway Safety Manual methodologies and is expected to be implemented next year). The MassDOT guidance is provided on our website (http:// www.massdot.state.ma.us/Portals/8/docs/traffic/HSIP/HSIP%20Criteria%20Updates%2011_15_17.pdf) and has been developed and implemented in cooperation with FHWA the MPOs. The allocation of HSIP funds by MassDOT to projects at these locations is determined not solely by project eligibility and eligible design components, but also by fiscal constraint against our federal obligation limitation and by our perennial Capital Investment Plan (CIP) program sizing exercise.

Describe how local and tribal roads are addressed as part of HSIP.

Working with the 13 Regional Planning Agencies (RPAs) and the 13 Metropolitan Planning Organizations (MPOs) that encompass the entire geographic area of the Commonwealth of Massachusetts, HSIP funds are allocated not only to projects that are eligible within the statewide Safety Improvements program but also to eligible projects programmed by the MPOs, which may include local roads and tribal roads. Because most of the project proponents in the Commonwealth are municipalities, these projects are locally initiated, driven, and coordinated with MassDOT through the project initiation and development process. There is close coordination between our Traffic Safety division staff and RPA staff on the sharing of data and identifying crash cluster locations and prioritizing safety improvements to assist local entities and the MPOs in making sound safety investment decisions.

Identify which internal partners (e.g., State departments of transportation (DOTs) Bureaus, Divisions) are involved with HSIP planning.

Traffic Engineering/Safety
Design
Planning
Maintenance
Operations
Districts/Regions
Other-Please note that while the Governors Highway Safety Office is a partner with the HSIP, the agency is not internal to MassDOT

Enter additional comments here to clarify your response for this question or add supporting information.

Describe coordination with internal partners.

The HSIP Task Force consists of seven members: 2 FHWA representatives (one from Massachusetts Division Office in Planning and one from the Massachusetts Division Office in Safety), 2 representatives from MassDOT Highway Division (Chief Engineer and Safety Engineer), one from MassDOT Office of Transportation Planning and two representatives from the Regional Planning Agencies (RPAs), the technical arm of the Metropolitan Planning Organizations (MPOs). The initial role of the Task Force was to establish HSIP guidelines based on input and feedback from others. The continuing role of the Task Force is to meet annually or as needed, ("meetings" could be via email or in person) to review and update the HSIP guidelines. The HSIP Task Force does not select the individual projects / programs. Program and project selection occurs both in MassDOT HQ and at the regional MPO level (MassDOT District and MassDOT Planning sit on the MPOs). There is funding set aside for each MPO. The statewide HSIP, administered through MassDOT HQ, involves systemic projects and high crash locations as well as programs and strategies based on the SHSP. The programs and strategies from the SHSP are developed through the SHSP Emphasis Area teams with input from many (both internal and external). It should be noted that the HSIP guidelines (http://www.massdot.state.ma.us/Portals/8/docs/traffic/HSIP/HSIP%20Criteria%20Updates%2011_15_17.pdf) are currently being updated to reflect an approach more inline with the Highway Safety Manual methodology. It is anticipated this will be in place by next year and discussed with the HSIP Task Force.

Identify which external partners are involved with HSIP planning.

Regional Planning Organizations (e.g. MPOs, RPOs, COGs)
Governors Highway Safety Office
Local Government Agency
Law Enforcement Agency
Academia/University
FHWA
Other-SHSP Emphasis area team members
Other-Advocacy groups
Other-Public Health

Enter additional comments here to clarify your response for this question or add supporting information.

Describe coordination with external partners.

All HSIP projects must be based on strategies identified in the SHSP which has been developed with the assistance from our internal and external partners. We started updating the SHSP with over 200 participants from more than 25 agencies (including all of those external partners mentioned in the response to Question 9) and entities and the strategies identified in the SHSP are those that can be used for the HSIP eligible projects. Furthermore, all HSIP-eligible projects require Road Safety Audits which ensures coordination with external partners. Project selection has a significant amount of external input through the MPO public process. Some specific programs are based on an Ad Hoc basis, as needed. As an example of this is when we were developing the pedestrian/bicyclist safety campaign (a Statewide HSIP program), we developed a committee consisting of Governors Highway Safety Office, Public Health, MPOs, advocacy groups, local police and community officials, etc. to assist with the specifics and to guide the program.

As stated earlier, there is an HSIP Task Force that develops the HSIP guidelines and identifies eligibility of HSIP projects (but does not select the specific projects). The HSIP Task Force consists of seven members: 2 FHWA representatives (one from Massachusetts Division Office in Planning and one from the Massachusetts Division Office in Safety), 2 representatives from MassDOT Highway Division (Chief Engineer and Safety Engineer), one from MassDOT Office of Transportation Planning and two representatives from the Regional Planning Agencies (RPAs), the technical arm of the Metropolitan Planning Organizations (MPOs). The selection of the individual regional HSIP projects is done at the MPO level through the very public MPO process involving MassDOT and many external partners. The selection of the statewide HSIP projects is based on a data driven process (EPDO) using the strategies identified in the HSIP.

Have any program administration practices used to implement the HSIP changed since the last reporting period?

No

Are there any other aspects of HSIP Administration on which the State would like to elaborate?

No

Program Methodology

Does the State have an HSIP manual or similar that clearly describes HSIP planning, implementation and evaluation processes?

Yes

To upload a copy of the State processes, attach files below.

File Name:
HSIP Criteria Updates.pdf

Select the programs that are administered under the HSIP.

Median Barrier
Intersection
Bicycle Safety
HSIP (no subprograms)
Sign Replacement And Improvement

2018 Massachusetts Highway Safety Improvement Program
Pedestrian Safety
HRRR
Other-Data

Enter additional comments here to clarify your response for this question or add supporting information.

Program: Bicycle Safety

Date of Program Methodology: 10/1/2014

What is the justification for this program? [Check all that apply]

Addresses SHSP priority or emphasis area

What is the funding approach for this program? [Check one]

Competes with all projects

What data types were used in the program methodology? [Check all that apply]

Crashes	Exposure	Roadway
Fatal and serious injury crashes only	Population Other-EMS runs, % journey to work by bicycle	

What project identification methodology was used for this program? [Check all that apply]

Crash frequency
Crash rate

Are local roads (non-state owned and operated) included or addressed in this program?

Yes

Are local road projects identified using the same methodology as state roads?

Yes

Describe the methodology used to identify local road projects as part of this program.

How are projects under this program advanced for implementation?

Other-based on RSA, feedback and readiness

Select the processes used to prioritize projects for implementation. For the methods selected, indicate the relative importance of each process in project prioritization. Enter either the weights or numerical rankings. If weights are entered, the sum must equal 100. If ranks are entered, indicate ties by giving both processes the same rank and skip the next highest rank (as an example: 1, 2, 2, 4).

Relative Weight in Scoring

Other-readiness : 100

Total Relative Weight : 100

Program: HRRR

Date of Program Methodology: 2/3/2015

What is the justification for this program? [Check all that apply]

Other-subject to HRRR rule

What is the funding approach for this program? [Check one]

Funding set-aside

What data types were used in the program methodology? [Check all that apply]

Crashes	Exposure	Roadway
All crashes Fatal and serious injury crashes only Other-EPDO		Functional classification Other-rural/urban boundary

What project identification methodology was used for this program? [Check all that apply]

Crash frequency
Equivalent property damage only (EPDO Crash frequency)
Crash rate

Are local roads (non-state owned and operated) included or addressed in this program?

Yes

Are local road projects identified using the same methodology as state roads?

Yes

Describe the methodology used to identify local road projects as part of this program.

How are projects under this program advanced for implementation?

Other-HRRR eligibility

Select the processes used to prioritize projects for implementation. For the methods selected, indicate the relative importance of each process in project prioritization. Enter either the weights or numerical rankings. If weights are entered, the sum must equal 100. If ranks are entered, indicate ties by giving both processes the same rank and skip the next highest rank (as an example: 1, 2, 2, 4).

Other-readiness factor of HRRR eligible projects : 100

Program: HSIP (no subprograms)

Date of Program Methodology: 2/1/2015

What is the justification for this program? [Check all that apply]

What is the funding approach for this program? [Check one]

What data types were used in the program methodology? [Check all that apply]

Crashes **Exposure** **Roadway**

What project identification methodology was used for this program? [Check all that apply]

Are local roads (non-state owned and operated) included or addressed in this program?

Are local road projects identified using the same methodology as state roads?

Yes

Describe the methodology used to identify local road projects as part of this program.

How are projects under this program advanced for implementation?

Select the processes used to prioritize projects for implementation. For the methods selected, indicate the relative importance of each process in project prioritization. Enter either the weights or numerical rankings. If weights are entered, the sum must equal 100. If ranks are entered, indicate ties by giving both processes the same rank and skip the next highest rank (as an example: 1, 2, 2, 4).

Program: Intersection

Date of Program Methodology: 10/1/2014

What is the justification for this program? [Check all that apply]

Addresses SHSP priority or emphasis area

What is the funding approach for this program? [Check one]

Competes with all projects

What data types were used in the program methodology? [Check all that apply]

Crashes	Exposure	Roadway
Other-EPDO		

What project identification methodology was used for this program? [Check all that apply]

Equivalent property damage only (EPDO Crash frequency)

Are local roads (non-state owned and operated) included or addressed in this program?

Yes

Are local road projects identified using the same methodology as state roads?

Yes

Describe the methodology used to identify local road projects as part of this program.

How are projects under this program advanced for implementation?

Other-MPO
Other-statewide selection based on ranking and readiness

Select the processes used to prioritize projects for implementation. For the methods selected, indicate the relative importance of each process in project prioritization. Enter either the weights or numerical rankings. If weights are entered, the sum must equal 100. If ranks are entered, indicate ties by giving both processes the same rank and skip the next highest rank (as an example: 1, 2, 2, 4).

Rank of Priority Consideration

Other-PROJECT READINESS : 1

Program: Median Barrier

Date of Program Methodology: 10/1/2014

What is the justification for this program? [Check all that apply]

Addresses SHSP priority or emphasis area

What is the funding approach for this program? [Check one]

Competes with all projects

What data types were used in the program methodology? [Check all that apply]

Crashes	Exposure	Roadway
All crashes Fatal and serious injury crashes only	Traffic	

What project identification methodology was used for this program? [Check all that apply]

Crash frequency

Are local roads (non-state owned and operated) included or addressed in this program?

No

Are local road projects identified using the same methodology as state roads?

Yes

Describe the methodology used to identify local road projects as part of this program.

How are projects under this program advanced for implementation?

Other-District recommended and initiated

Select the processes used to prioritize projects for implementation. For the methods selected, indicate the relative importance of each process in project prioritization. Enter either the weights or numerical rankings. If weights are entered, the sum must equal 100. If ranks are entered, indicate ties by giving both processes the same rank and skip the next highest rank (as an example: 1, 2, 2, 4).

Relative Weight in Scoring

Available funding : 100

Total Relative Weight : 100

Program: Pedestrian Safety

Date of Program Methodology: 10/1/2014

What is the justification for this program? [Check all that apply]

Addresses SHSP priority or emphasis area

What is the funding approach for this program? [Check one]

Competes with all projects

What data types were used in the program methodology? [Check all that apply]

Crashes	Exposure	Roadway
Fatal and serious injury crashes only	Population Other-EMS runs, % journey to work by walking	

What project identification methodology was used for this program? [Check all that apply]

Crash frequency
Equivalent property damage only (EPDO Crash frequency)

Are local roads (non-state owned and operated) included or addressed in this program?

Yes

Are local road projects identified using the same methodology as state roads?

Yes

Describe the methodology used to identify local road projects as part of this program.

How are projects under this program advanced for implementation?

Other-RSA, feedback and readiness

Select the processes used to prioritize projects for implementation. For the methods selected, indicate the relative importance of each process in project prioritization. Enter either the weights or numerical rankings. If weights are entered, the sum must equal 100. If ranks are entered, indicate ties by giving both processes the same rank and skip the next highest rank (as an example: 1, 2, 2, 4).

Relative Weight in Scoring

Other-readiness : 100

Total Relative Weight : 100

Program: Sign Replacement And Improvement

Date of Program Methodology: 12/31/2014

What is the justification for this program? [Check all that apply]

Other-Specifically called out in 23 U.S.C.148(a)(6)

What is the funding approach for this program? [Check one]

Competes with all projects

What data types were used in the program methodology? [Check all that apply]

Crashes	Exposure	Roadway
		Other-cycle of sign improvements based on

What project identification methodology was used for this program? [Check all that apply]

Other-cycle of sign upgrades
Other-on secondary roads, it is systemwide per district

Are local roads (non-state owned and operated) included or addressed in this program?

No

Are local road projects identified using the same methodology as state roads?

2018 Massachusetts Highway Safety Improvement Program

Yes

Describe the methodology used to identify local road projects as part of this program.

How are projects under this program advanced for implementation?

Other-secondary roadways are systemwide and done by district
Other-interstates and principal arterials are selected by State Sign Engineer based on a cycle of replacements

Select the processes used to prioritize projects for implementation. For the methods selected, indicate the relative importance of each process in project prioritization. Enter either the weights or numerical rankings. If weights are entered, the sum must equal 100. If ranks are entered, indicate ties by giving both processes the same rank and skip the next highest rank (as an example: 1, 2, 2, 4).

Rank of Priority Consideration

Available funding : 1

Other-readiness : 2

Program: Other-Data

Date of Program Methodology: 10/1/2004

What is the justification for this program? [Check all that apply]

FHWA focused approach to safety

What is the funding approach for this program? [Check one]

Competes with all projects

What data types were used in the program methodology? [Check all that apply]

Crashes **Exposure** **Roadway**

Other-Data quality need

What project identification methodology was used for this program? [Check all that apply]

Other-Need based on outdated system and changes to roadway file

Are local roads (non-state owned and operated) included or addressed in this program?

Yes

Are local road projects identified using the same methodology as state roads?

Yes

Describe the methodology used to identify local road projects as part of this program.

How are projects under this program advanced for implementation?

Other-determined need based on changes to outdated systems

Select the processes used to prioritize projects for implementation. For the methods selected, indicate the relative importance of each process in project prioritization. Enter either the weights or numerical rankings. If weights are entered, the sum must equal 100. If ranks are entered, indicate ties by giving both processes the same rank and skip the next highest rank (as an example: 1, 2, 2, 4).

Relative Weight in Scoring

Available funding : 100

Total Relative Weight : 100

What percentage of HSIP funds address systemic improvements?

4.7

HSIP funds are used to address which of the following systemic improvements? Please check all that apply.

Install/Improve Signing
Install/Improve Pavement Marking and/or Delineation
Other-Bicyclist and pedestrian improvements

Enter additional comments here to clarify your response for this question or add supporting information.

What process is used to identify potential countermeasures? [Check all that apply]

Engineering Study
Road Safety Assessment
Crash data analysis
Data-driven safety analysis tools (HSM, CMF Clearinghouse, SafetyAnalyst, usRAP)
Stakeholder input

Enter additional comments here to clarify your response for this question or add supporting information.

Does the State HSIP consider connected vehicles and ITS technologies?

Yes

Describe how the State HSIP considers connected vehicles and ITS technologies.

MassDOT definitely considers vehicle to infrastructure technologies with regards to safety. However, no HSIP funds were spent on the V2I technologies during this Federal Fiscal Year. It should be noted that during this Fiscal year, MassDOT worked with WAZE to install beacons in our tunnel system. As drivers have become more reliant on their GPS/smart phones for directions, there are more crashes occurring in our tunnels where GPS connectivity was lost and drivers were confused. The beacon technology is providing for an open platform seamless connection to navigation systems. While this is V2I technology, the beacons are being installed with no Federal dollars. WAZE has also been used as a pilot in our highway operations center as a means to improve incident response time. Initial results proved this to be the case. Expanding the pilot has been challenging on MassDOT staffing resources and looking to modify this process. MassDOT has been implementing smart work zone technologies that are designed to provide real time feedback to drivers regarding travel times and congestion information, incidents, temporary closures and other information that will enhance the safety of road users and workers. We continue to look forward to other technologies that will enhance safety and reduce fatalities and injuries on the public roadways.

Does the State use the Highway Safety Manual to support HSIP efforts?

Yes

Please describe how the State uses the HSM to support HSIP efforts.

MassDOT uses both the predictive methodology and the empirical-Bayes method described in the Highway Safety Manual to support administrating the HSIP. MassDOT is in the process of updating the network screening process to consider the difference between expected and predicted crashes using HSM methodologies and Massachusetts-specific safety performance functions.

During RSAs (especially for HSIP projects), MassDOT uses HSM methodologies so expected crash frequency can be used for discussion, diagnosis, and countermeasure selection.

MassDOT also uses HSM methodologies to evaluate HSIP projects at the site-, project-, and countermeasure level. The empirical-Bayes method is used to estimate the number of crashes expected in the after period had no change occurred to compare with what was observed in the after period.

Have any program methodology practices used to implement the HSIP changed since the last reporting period?

Yes

Describe program methodology practices that have changed since the last reporting period.

Based on a recent white paper from FHWA, MassDOT has updated the comprehensive crash costs used for evaluation. FHWA's national costs were adjusted to Massachusetts using the state adjustment factors provided in the appendix of the paper. The new Massachusetts KABCO-level comprehensive crash costs are as follows:

K - $14,842,300

A - $860,700

B - $260,800

C - $165,000

O - $15,600

For most facility types, MassDOT calculated average comprehensive crash costs for fatal and injury crashes as well as total crashes.

As a transition to a full empirical-Bayes-based network screening process, MassDOT used these new costs for identifying HSIP intersection clusters for the year. An average EPDO was estimated for fatal and injury crashes (21).

MassDOT used the predictive methodology and empirical-Bayes for network screening to identify candidate segments for the High-Risk Rural Roads program.

MassDOT also modified the benefit:cost analyses of countermeasures reported in the 2016 HSIP report to reflect these new costs.

Are there any other aspects of the HSIP methodology on which the State would like to elaborate?

No

Project Implementation

Funds Programmed

Reporting period for HSIP funding.

Federal Fiscal Year

Enter additional comments here to clarify your response for this question or add supporting information.

This HSIP report covers Federal Fiscal Year 2017

Enter the programmed and obligated funding for each applicable funding category.

FUNDING CATEGORY	PROGRAMMED	OBLIGATED	% OBLIGATED/PROGRAMMED
HRRR Special Rule (23 U.S.C. 148(g)(1))	$1,335,616	$2,637,643	197.49%
Penalty Funds (23 U.S.C. 164)	$0	$0	0%
Other Federal-aid Funds (i.e. STBG, NHPP)	$26,158,194	$27,086,642	103.55%
Totals	$68,653,739	$73,633,982	107.25%

Enter additional comments here to clarify your response for this question or add supporting information.

How much funding is programmed to local (non-state owned and operated) or tribal safety projects?

26%

How much funding is obligated to local or tribal safety projects?

30%

Enter additional comments here to clarify your response for this question or add supporting information.

The percentages of the program spent on locally owned roadways was calculated directly from the project list that is included in Question 29 (under the field "ownership") and comparing the programmed costs to those costs form the Statewide transportation Improvement Program.

How much funding is programmed to non-infrastructure safety projects?

2%

How much funding is obligated to non-infrastructure safety projects?

8%

Enter additional comments here to clarify your response for this question or add supporting information.

The percentages of the program spent on locally owned roadways was calculated directly from the project list that is included in Question 29 (under the field "improvement category" = non-infrastructure) and comparing the programmed costs to those costs from the Statewide Transportation Improvement Program.

How much funding was transferred in to the HSIP from other core program areas during the reporting period under 23 U.S.C. 126?

0%

How much funding was transferred out of the HSIP to other core program areas during the reporting period under 23 U.S.C. 126?

0%

Enter additional comments here to clarify your response for this question or add supporting information.

Discuss impediments to obligating HSIP funds and plans to overcome this challenge in the future.

There are two main impediments to obligating HSIP funds. One is project readiness. If a programmed project is not able to advertise (for any number of reasons), it is very difficult to just swap in another HSIP project because there are limited projects that already designed and ready to advertise. This could be because projects are rarely designed unless they are already programmed on the STIP and even then, they are designed and reviewed to meet the advertising date. So if a programmed project is not able to advertise, we are often left with a hole to try and fill in a replacement project.

The second major impediment to obligating HSIP funds is that we cannot develop low cost-short term systemic projects here in Massachusetts. We are not able to have local communities self-certify that project work all occurs within the public way. This must only be done with layout plans or survey. Therefore, any simple pavement marking and/or signage project (typically the low cost/short term type systemic projects) must include a survey which adds time and expense and precludes the short term / low cost projects.

Based on the above two factors, it sometimes makes it challenging for MassDOT to obligate funds. This is especially true in cases in which we have short notice such as for High Risk Rural Roads Projects when we are informed 18 months before they must be obligated that we fall within the rule and must obligate a certain amount of money. It is too short of a time frame to develop a project (including ROW, environmental processes, etc.) so we struggle with what can be done.

There are steps we have taken to resolve these issues. With regards to readiness, we actually anticipated the need for a HRRR project and started working on one in advance of the notification. In addition, a Project Manager from the MassDOT Design Section will be providing assistance to push projects along. With regards to the difficulties we face for systemic project, MassDOT Traffic and Safety Engineering has been meeting with

FHWA ROW Section and MassDOT ROW Section to prepare a white paper and try to resolve ROW issues with regards to low cost systemic projects.

Does the State want to elaborate on any other aspects of it's progress in implementing HSIP projects?

No

General Listing of Projects

List the projects obligated using HSIP funds for the reporting period.

												RELATIONSHIP TO SHSP	
PROJECT NAME	**IMPROVEMENT CATEGORY**	**SUBCATEGORY**	**OUTPUTS**	**OUTPUT TYPE**	**HSIP PROJECT COST($)**	**TOTAL PROJECT COST($)**	**FUNDING CATEGORY**	**FUNCTIONAL CLASSIFICATION**	**AADT**	**SPEED**	**OWNERSHIP**	**METHOD FOR SITE SELECTION**	**EMPHASIS AREA**	**STRATEGY**
Signals on Rt 85 MapleSt	Roadway	Roadway narrowing (road diet, roadway reconfiguration)	1	Lanes	$2701395.72	$6157125.775	HSIP (23 U.S.C. 148)	Urban Minor Arterial	22,669	40	City of Municipal Highway Agency	Spot	Intersections	Incorporate safety elements into intersection design and maintenance.
Signals Center St-Rt 21	Roadway	Roadway - other	1	Lanes	$967918.95	$6191050.7625	Other Federal-aid Funds (i.e. STBG, NHPP)	Urban Minor Arterial	17,600	30	City of Municipal Highway Agency	Spot	Intersections	Incorporate safety elements into intersection design and maintenance.
Main St Corridor & Inters	Roadway	Roadway - other	1	streetscape and safety improvements	$433449.31	$8149812	Other Federal-aid Funds (i.e. STBG, NHPP)	Urban Principal Arterial (UPA) - Other	10,800	40	State Highway Agency	Spot	Intersections	Incorporate safety elements into intersection design and maintenance.
Sign Upgrades Var. Loc.	Roadway signs and traffic control	Roadway signs (including post) - new or updated	298	Signs	$287342.48	$319269.422222222	HSIP (23 U.S.C. 148)	Multiple	0		State Highway Agency	need	Older Drivers	Develop infrastructure improvements that accommodate older road user needs.

													RELATIONSHIP TO SHSP	
PROJECT NAME	**IMPROVEMENT CATEGORY**	**SUBCATEGORY**	**OUTPUTS**	**OUTPUT TYPE**	**HSIP PROJECT COST($)**	**TOTAL PROJECT COST($)**	**FUNDING CATEGORY**	**FUNCTIONAL CLASSIFICATION**	**AADT**	**SPEED**	**OWNERSHIP**	**METHOD FOR SITE SELECTION**	**EMPHASIS AREA**	**STRATEGY**
Signals@Granite&Squantum	Intersection geometry	Intersection geometrics - modify intersection corner radius	1	Intersections	$768731.63	$854146.255555556	HSIP (23 U.S.C. 148)	Urban Minor Arterial	20,113	30	State Highway Agency	Spot	Intersections	Incorporate safety elements into intersection design and maintenance.
Signals Rt40 @Oak Hill	Intersection traffic control	Modify traffic signal - modernization/replacement	1	Intersections	$867760.02	$3333581.0625	Other Federal-aid Funds (i.e. STBG, NHPP)	Urban Principal Arterial (UPA) - Other	12,985	40	City of Municipal Highway Agency	Spot	Intersections	Incorporate safety elements into intersection design and maintenance.
Signals Marston @ Comm Dr	Intersection traffic control	Modify traffic signal - modernization/replacement	1	Intersections	$356518.8	$1273925.525	Other Federal-aid Funds (i.e. STBG, NHPP)	Urban Minor Arterial	9,444	30	State Highway Agency	Spot	Intersections	Incorporate safety elements into intersection design and maintenance.
Bike&Ped Var Loc.	Pedestrians and bicyclists	Miscellaneous pedestrians and bicyclists	5.59	Miles	$603961.31	$671068.122222222	HSIP (23 U.S.C. 148)	Urban Minor Arterial	14,490	30	State Highway Agency	Systemic	Bicyclists	Incorporate changes precipitated by new directives related to healthy transportation.

													RELATIONSHIP TO SHSP	
PROJECT NAME	**IMPROVEMENT CATEGORY**	**SUBCATEGORY**	**OUTPUTS**	**OUTPUT TYPE**	**HSIP PROJECT COST($)**	**TOTAL PROJECT COST($)**	**FUNDING CATEGORY**	**FUNCTIONAL CLASSIFICATION**	**AADT**	**SPEED**	**OWNERSHIP**	**METHOD FOR SITE SELECTION**	**EMPHASIS AREA**	**STRATEGY**
Sign Upgrades Var. Loc.	Roadway signs and traffic control	Roadway signs (including post) - new or updated	848	Signs	$504073.49	$560081.655555555	HSIP (23 U.S.C. 148)	Multiple	0		State Highway Agency	need	Older Drivers	Develop infrastructure improvements that accommodate older road user needs.
Sign Upgrades Var. Loc.	Roadway signs and traffic control	Roadway signs (including post) - new or updated	1828	Signs	$1032590.25	$1147322.5	HSIP (23 U.S.C. 148)	Multiple	0		State Highway Agency	need	Older Drivers	Develop infrastructure improvements that accommodate older road user needs.
Bike&Ped Var Loc.	Pedestrians and bicyclists	Miscellaneous pedestrians and bicyclists	6	Locations	$464178.38	$515753.755555556	HSIP (23 U.S.C. 148)	Multiple	0		State Highway Agency	Systemic	Bicyclists	Improve design and engineering of bicycle facilities.
Geocoding System	Non-infrastructure	Data/traffic records	1	state crash improvement program	$1350000	$1837500	HSIP (23 U.S.C. 148)	statewide	0		statewide	statewide	Data	improve data
SE Region HRRR road deprt	Roadway signs and traffic control	Curve-related warning signs and flashers	8	Locations	$888335	$987039	HRRR Special Rule (23 U.S.C. 148(g)(1))	varies	0		varies	Spot	Lane Departure	Incorporate safety elements into roadway design and maintenance.

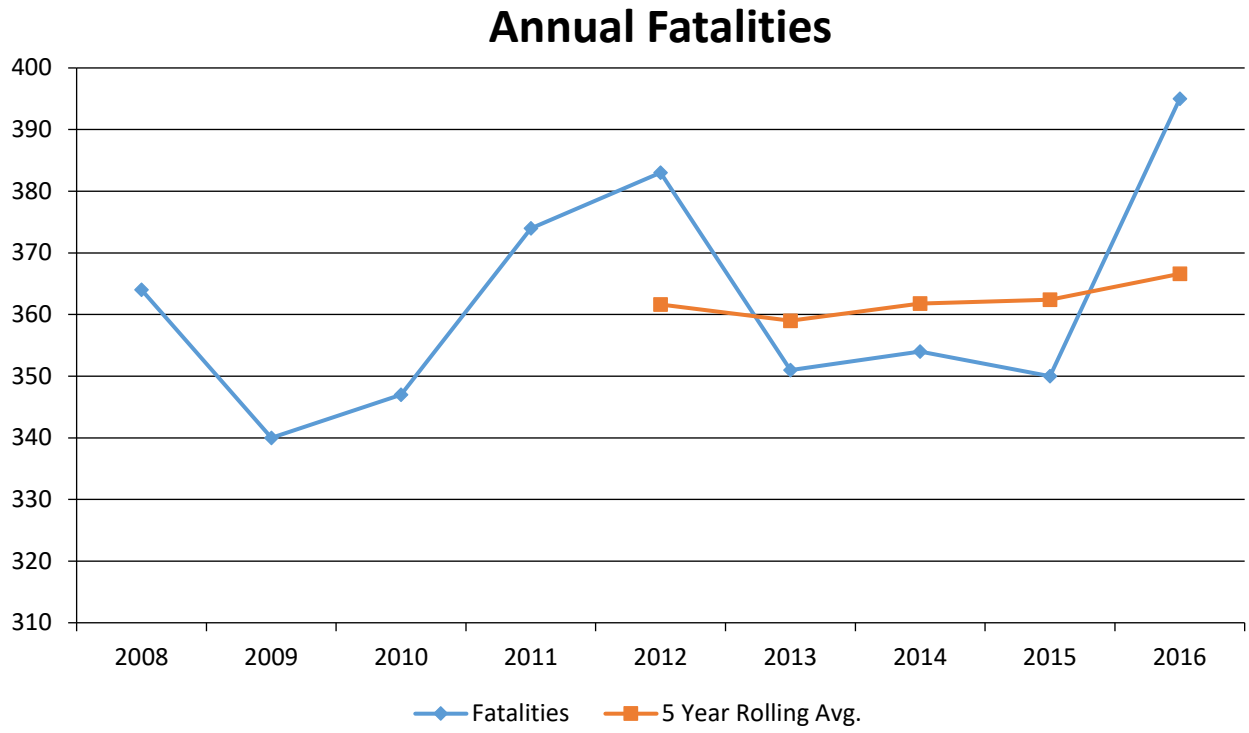
Enter additional comments here to clarify your response for this question or add supporting information.

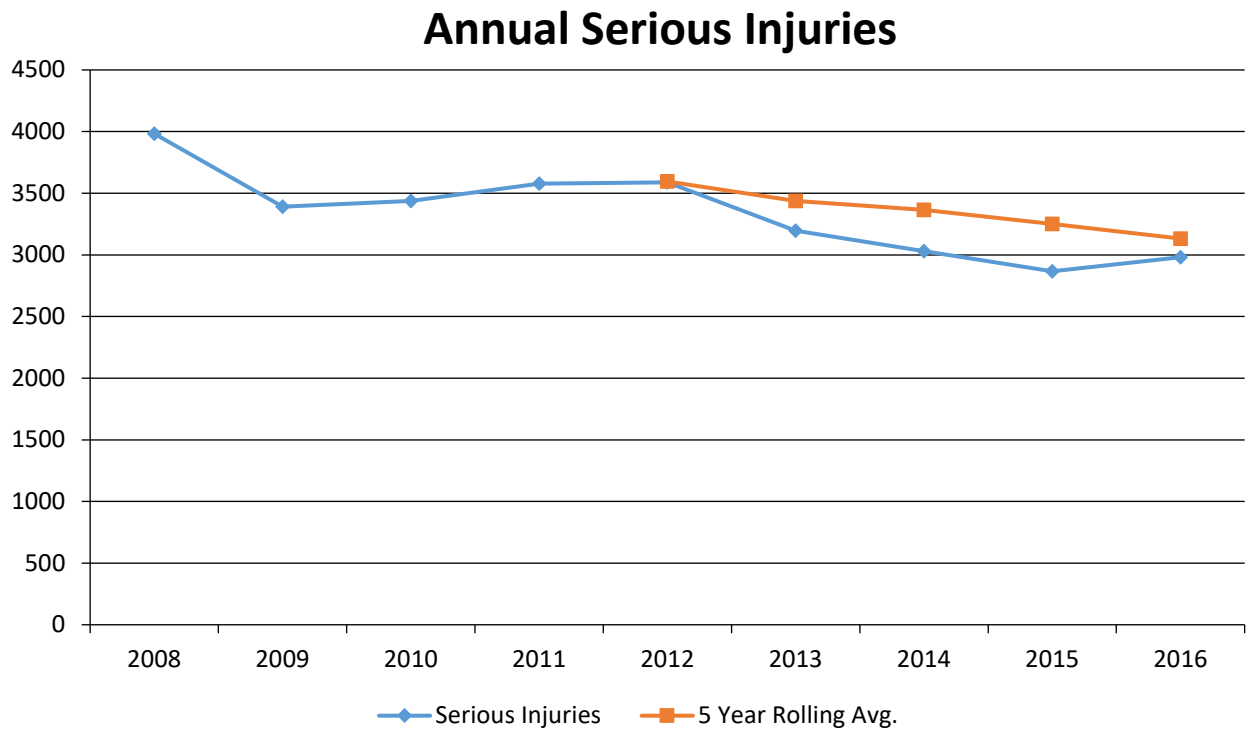
Safety Performance

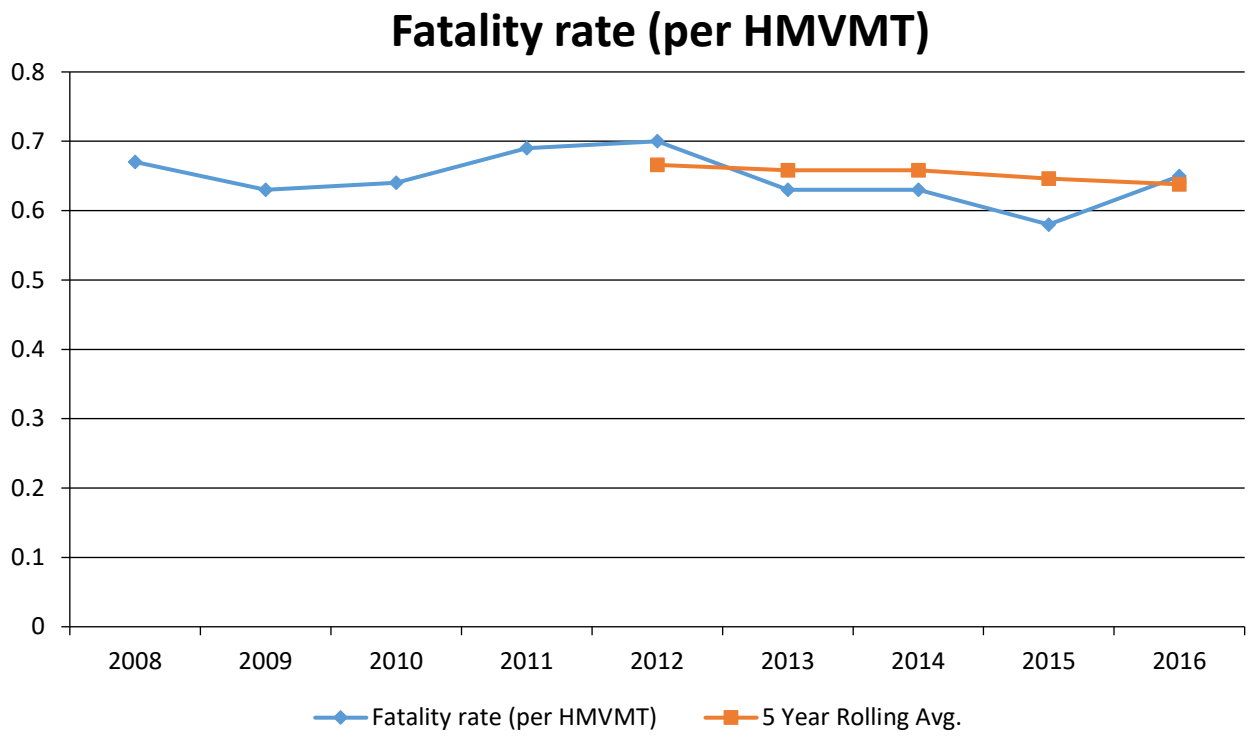
General Highway Safety Trends

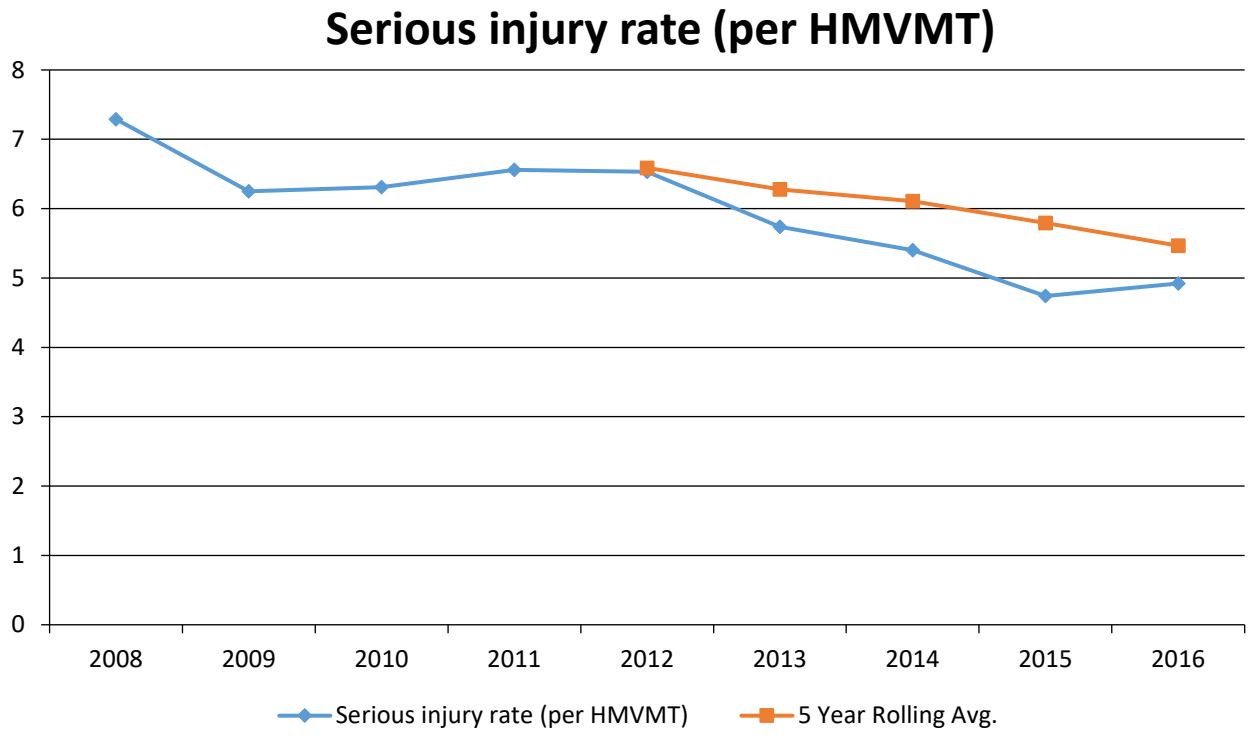
Present data showing the general highway safety trends in the State for the past five years.

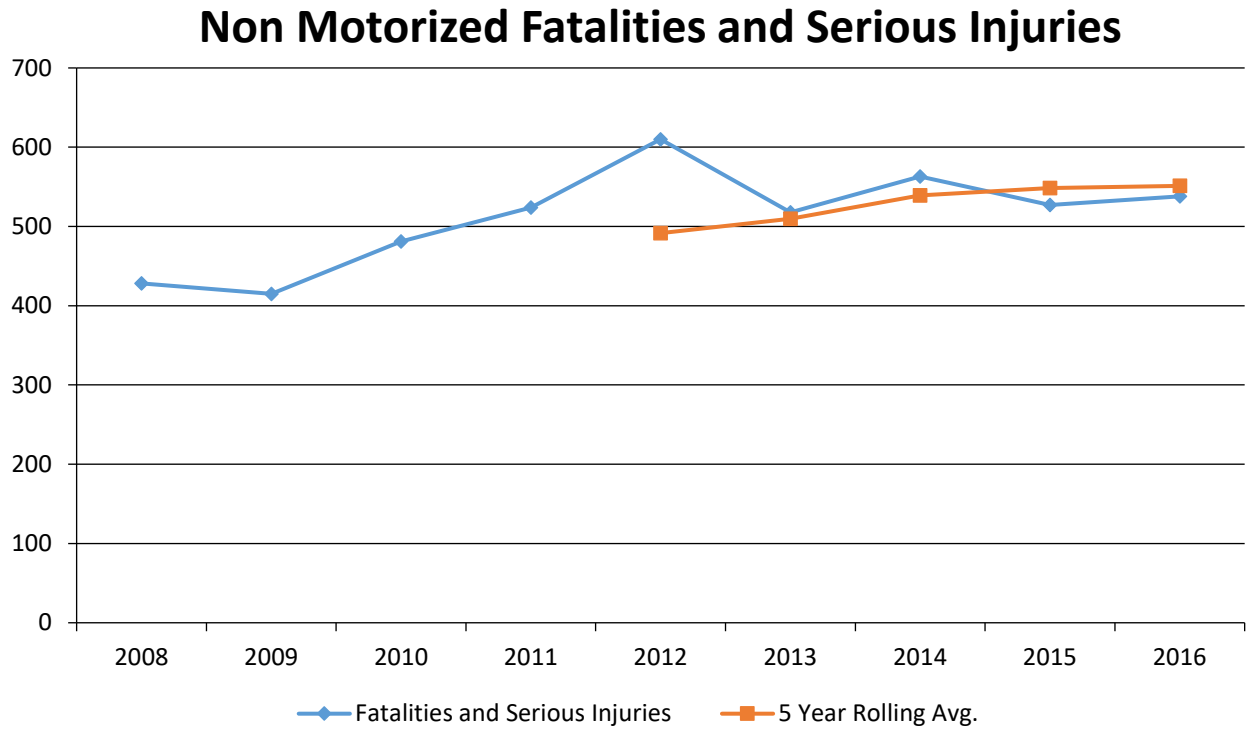
PERFORMANCE MEASURES	2008	2009	2010	2011	2012	2013	2014	2015	2016
Serious Injuries	3,983	3,392	3,437	3,577	3,587	3,197	3,031	2,867	2,980
Serious injury rate (per HMVMT)	7.290	6.250	6.310	6.560	6.530	5.740	5.400	4.740	4.920
Number of non-motorized serious injuries	340	363	403	448	511	432	479	433	447


Annual Fatalities
400
390
380
370
360
350
340
330
320
310
2008
2009
2010
2011
2012
2013
2014
2015
2016
Fatalities
5 Year Rolling Avg.


Annual Serious Injuries
4500
4000
3500
3000
2500
2000
1500
1000
500
0
2008
2009
2010
2011
2012
2013
2014
2015
2016
Serious Injuries
5 Year Rolling Avg.


Fatality rate (per HMVMT)
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
2008
2009
2010
2011
2012
2013
2014
2015
2016
Fatality rate (per HMVMT)
5 Year Rolling Avg.


Serious injury rate (per HMVMT)
8
7
6
5
4
3
2
1
0
2008
2009
2010
2011
2012
2013
2014
2015
2016
Serious injury rate (per HMVMT)
5 Year Rolling Avg.



Enter additional comments here to clarify your response for this question or add supporting information.

Describe fatality data source.

FARS

Enter additional comments here to clarify your response for this question or add supporting information.

To the maximum extent possible, present this data by functional classification and ownership.

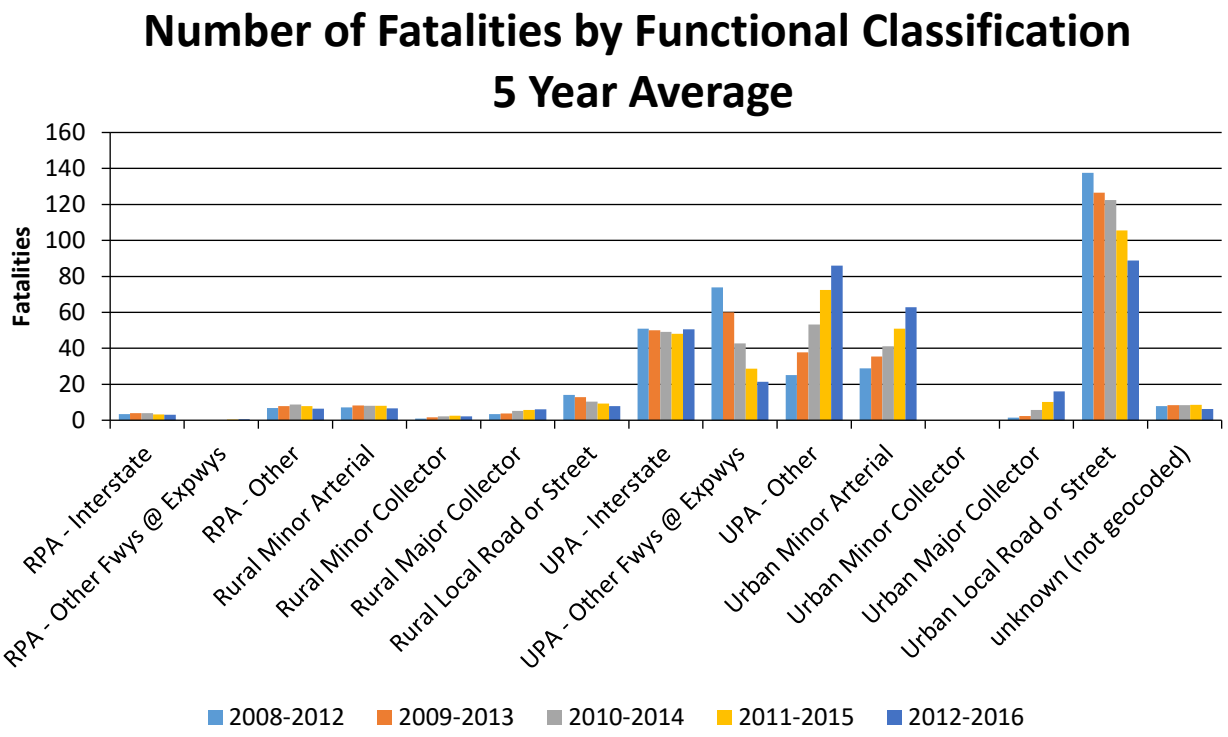
Year 2016

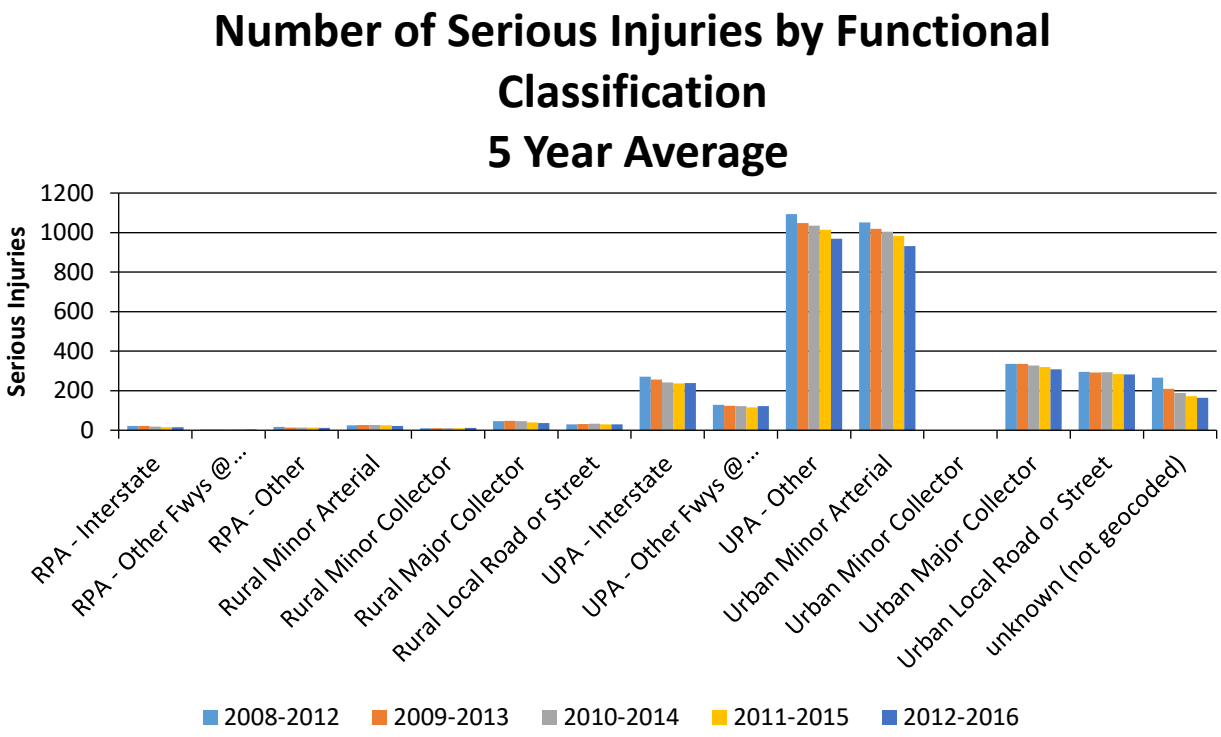
Functional Classification	Number of Fatalities (5-yr avg)	Number of Serious Injuries (5-yr avg)	Fatality Rate (per HMVMT) (5-yr avg)	Serious Injury Rate (per HMVMT) (5-yr avg)
Rural Principal Arterial (RPA) - Interstate	3	16	0.39	2.12
Rural Principal Arterial (RPA) - Other Freeways and Expressways	0.6	3.2	0.64	3.46
Rural Principal Arterial (RPA) - Other	6.4	11.6	2.42	4.1
Rural Minor Arterial	6.6	21.8	1.69	5.36
Rural Minor Collector	2.2	11.2	1.79	9.19
Rural Major Collector	6	37	1.43	8.99

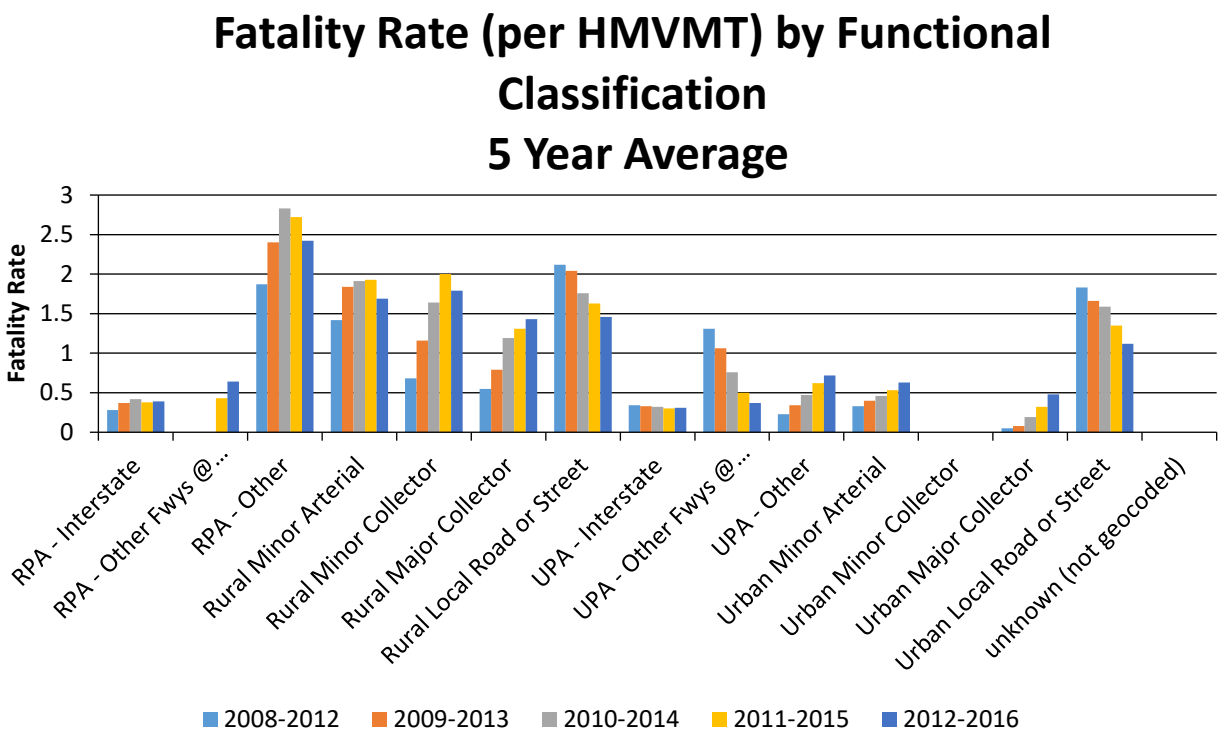
Functional Classification	Number of Fatalities (5-yr avg)	Number of Serious Injuries (5-yr avg)	Fatality Rate (per HMVMT) (5-yr avg)	Serious Injury Rate (per HMVMT) (5-yr avg)
Rural Local Road or Street	7.8	30.2	1.46	5.66
Urban Principal Arterial (UPA) - Interstate	50.6	238.8	0.31	1.48
Urban Principal Arterial (UPA) - Other Freeways and Expressways	21.4	121.4	0.37	2.03
Urban Principal Arterial (UPA) - Other	86	969	0.72	8.2
Urban Minor Arterial	62.8	930.8	0.63	9.65
Urban Minor Collector				
Urban Major Collector	16	308.4	0.48	9.96
Urban Local Road or Street	88.8	281.6	1.12	3.54
unknown (not geocoded)	6.2	164.8	0	0

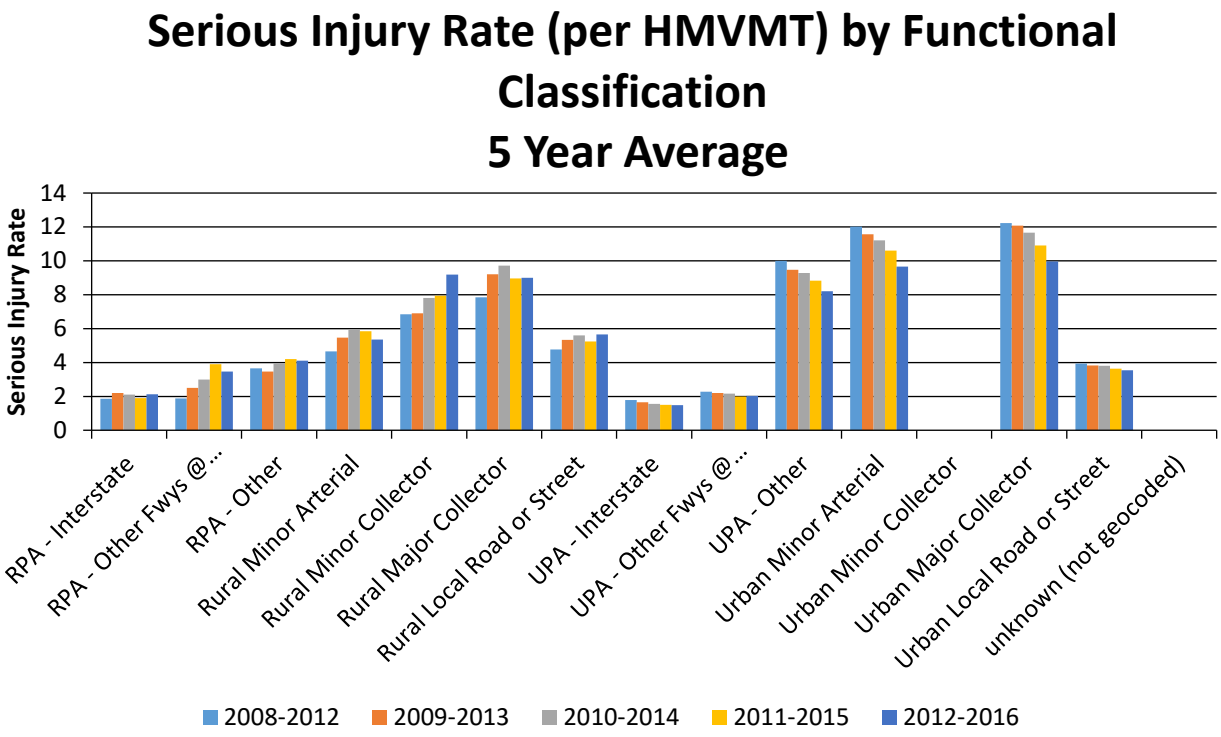
Year 2016

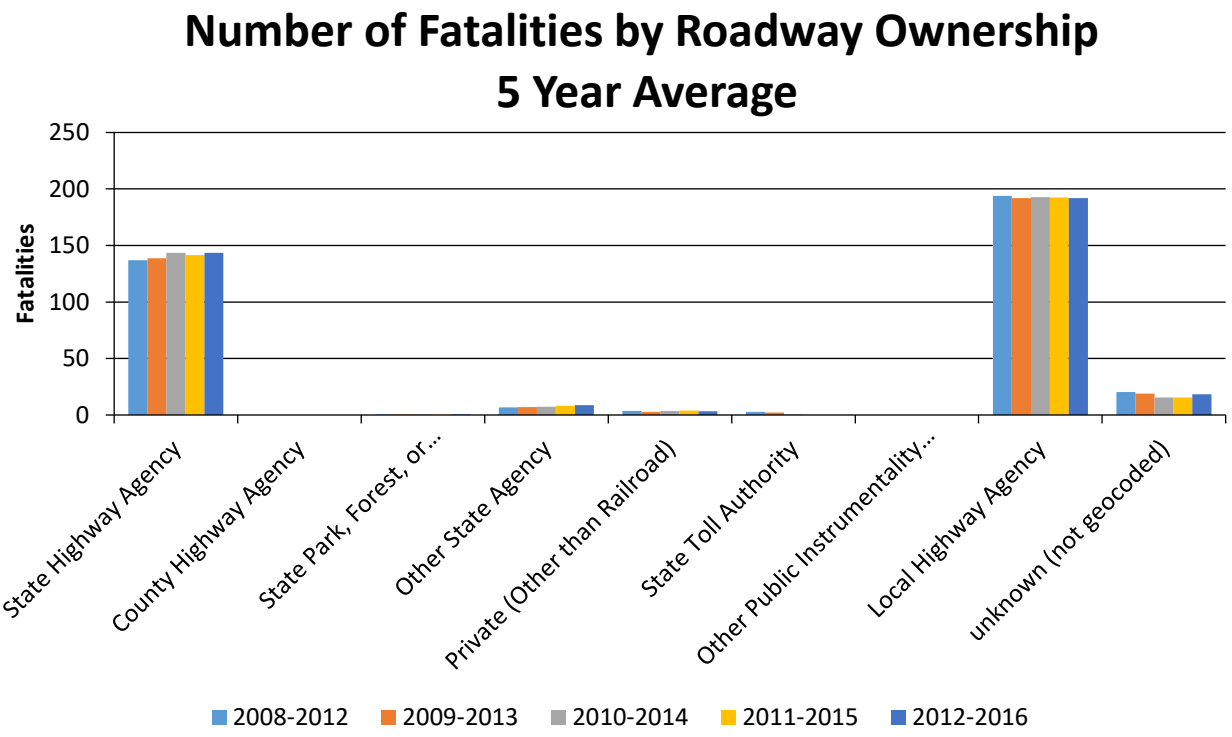
Roadways	Number of Fatalities (5-yr avg)	Number of Serious Injuries (5-yr avg)	Fatality Rate (per HMVMT) (5-yr avg)	Serious Injury Rate (per HMVMT) (5-yr avg)
State Highway Agency	143.4	900.8	0.45	2.85
County Highway Agency				
Town or Township Highway Agency				
City of Municipal Highway Agency				
State Park, Forest, or Reservation Agency	0.4	1	0.48	1.22
Local Park, Forest or Reservation Agency				
Other State Agency	8.8	66	1	7.47
Other Local Agency				
Private (Other than Railroad)	3.2	34.8	0.26	2.83
Railroad				
State Toll Authority				
Local Toll Authority				
Other Public Instrumentality (e.g. Airport, School, University)				
Indian Tribe Nation				
Local Highway Agency	191.8	1,931.6	0.82	8.25
unknown (not geocoded)	18.4	195.8	0	0

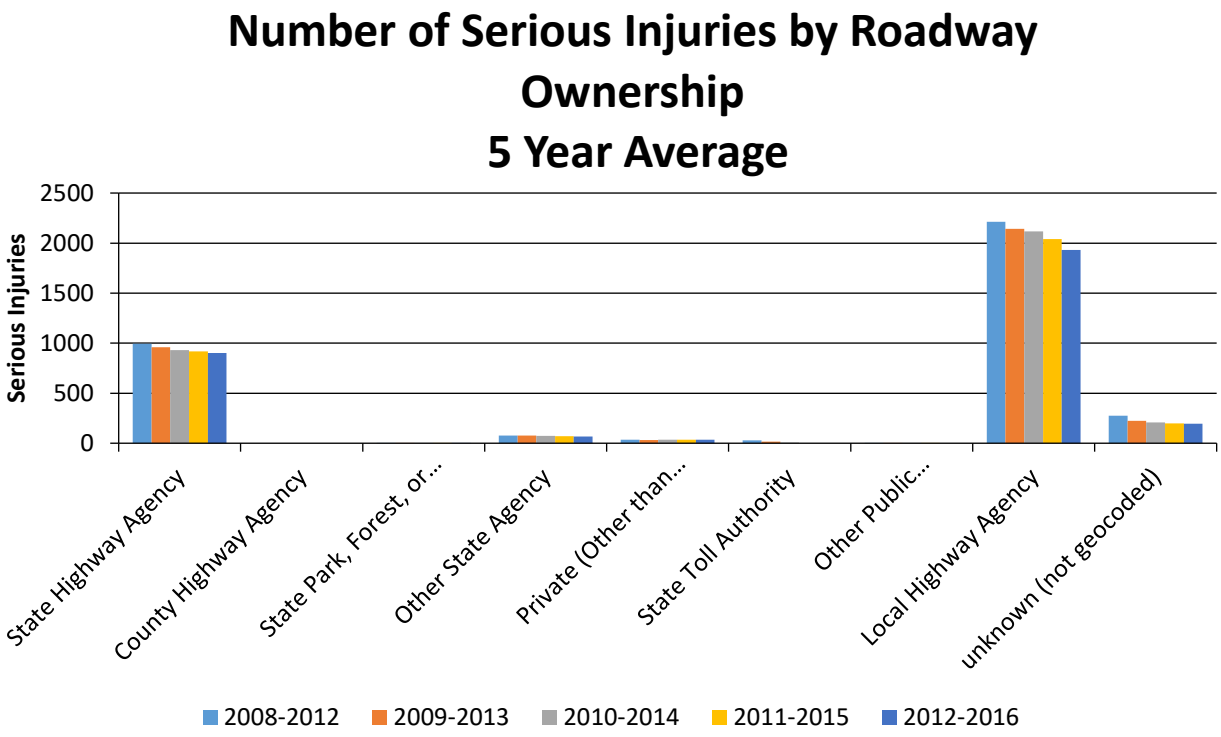

Number of Fatalities by Functional Classification
5 Year Average
Fatalities
160
140
120
100
80
60
40
20
0
RPA - Interstate
RPA - Other Fwys @ Expwys
RPA - Other
Rural Minor Arterial
Rural Minor Collector
Rural Major Collector
Rural Local Road or Street
UPA - Interstate
UPA - Other Fwys @ Expwys
UPA - Other
Urban Minor Arterial
Urban Minor Collector
Urban Major Collector
Urban Local Road or Street
unknown (not geocoded)
2008-2012
2009-2013
2010-2014
2011-2015
2012-2016

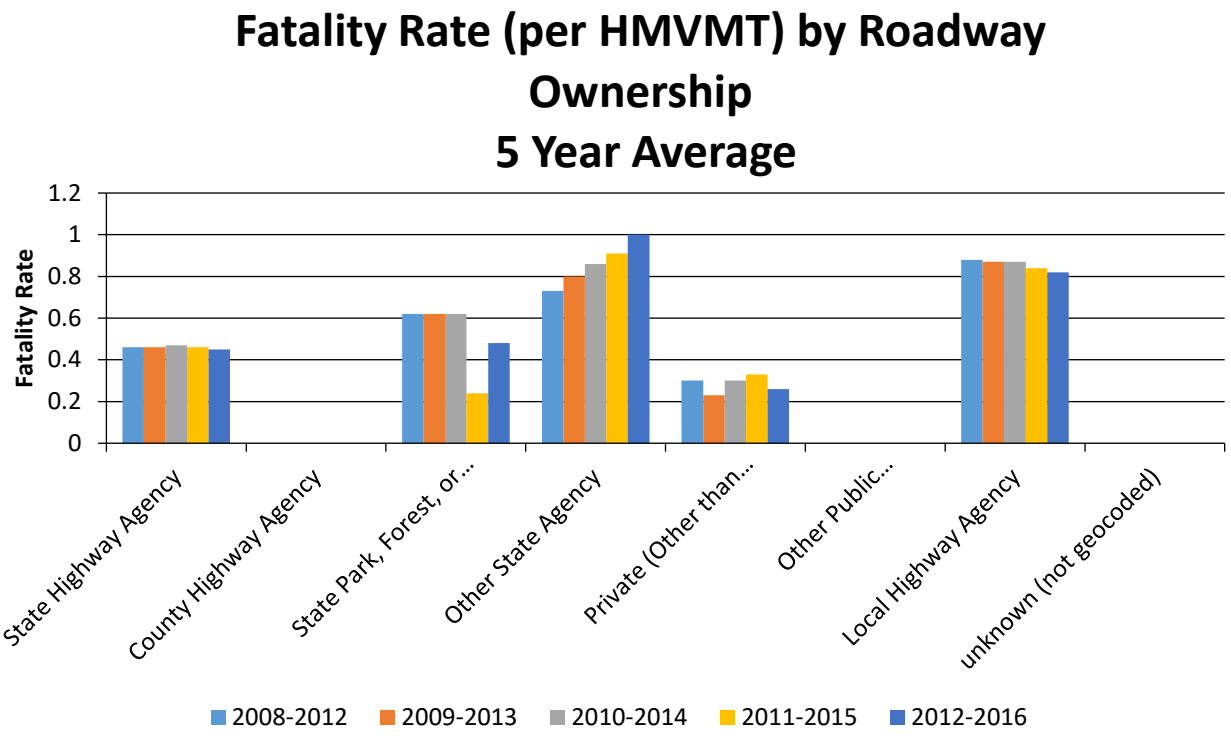

Number of Serious Injuries by Functional Classification
5 Year Average
Serious Injuries
1200
1000
800
600
400
200
0
RPA - Interstate
RPA - Other Fwys @...
RPA - Other
Rural Minor Arterial
Rural Minor Collector
Rural Major Collector
Rural Local Road or Street
UPA - Interstate
UPA - Other Fwys @...
UPA - Other
Urban Minor Arterial
Urban Minor Collector
Urban Major Collector
Urban Local Road or Street
unknown (not geocoded)
2008-2012
2009-2013
2010-2014
2011-2015
2012-2016

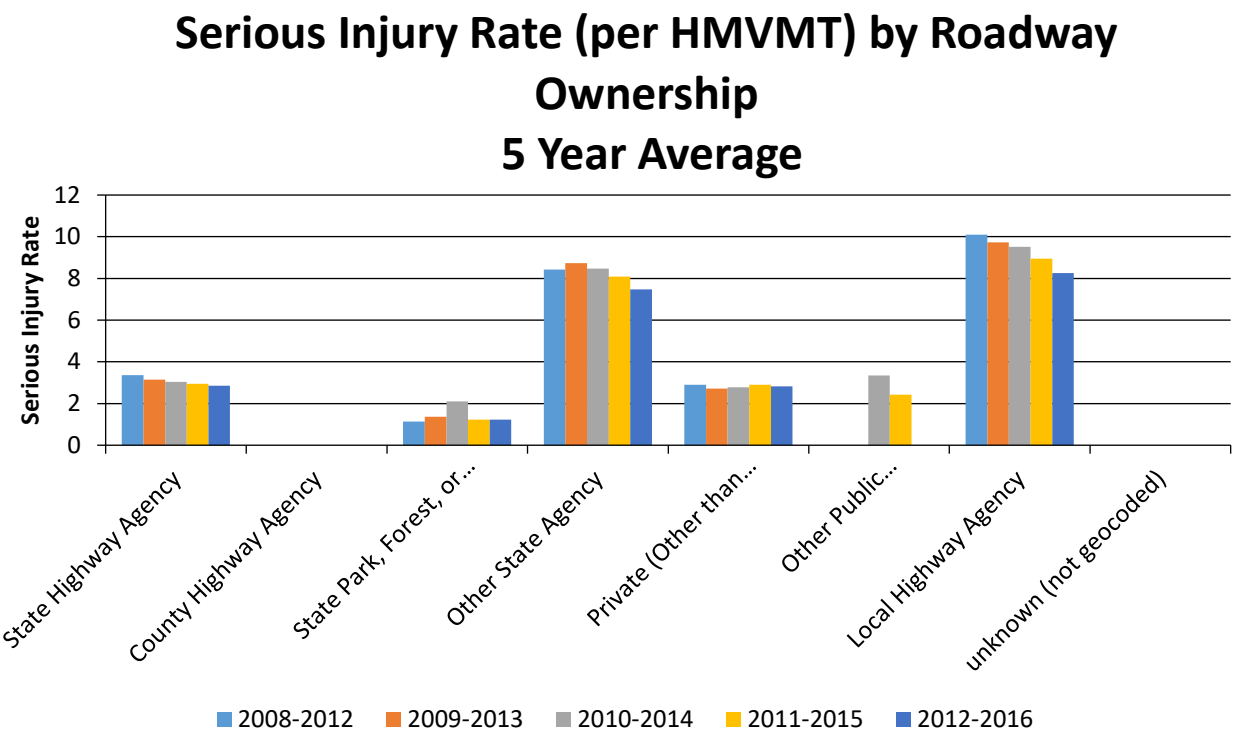

Fatality Rate (per HMVMT) by Functional Classification
5 Year Average
Fatality Rate
3
2.5
2
1.5
1
0.5
0
RPA - Interstate
RPA - Other Fwys @...
RPA - Other
Rural Minor Arterial
Rural Minor Collector
Rural Major Collector
Rural Local Road or Street
UPA - Interstate
UPA - Other Fwys @...
UPA - Other
Urban Minor Arterial
Urban Minor Collector
Urban Major Collector
Urban Local Road or Street
unknown (not geocoded)
2008-2012
2009-2013
2010-2014
2011-2015
2012-2016


Serious Injury Rate (per HMVMT) by Functional Classification
5 Year Average
Serious Injury Rate
14
12
10
8
6
4
2
0
RPA - Interstate
RPA - Other Fwys @...
RPA - Other
Rural Minor Arterial
Rural Minor Collector
Rural Major Collector
Rural Local Road or Street
UPA - Interstate
UPA - Other Fwys @...
UPA - Other
Urban Minor Arterial
Urban Minor Collector
Urban Major Collector
Urban Local Road or Street
unknown (not geocoded)
2008-2012
2009-2013
2010-2014
2011-2015
2012-2016


Number of Fatalities by Roadway Ownership
5 Year Average
Fatalities
250
200
150
100
50
0
State Highway Agency
County Highway Agency
State Park, Forest, or...
Other State Agency
Private (Other than Railroad)
State Toll Authority
Other Public Instrumentality...
Local Highway Agency
unknown (not geocoded)
2008-2012
2009-2013
2010-2014
2011-2015
2012-2016


Number of Serious Injuries by Roadway Ownership
5 Year Average
Serious Injuries
2500
2000
1500
1000
500
0
State Highway Agency
County Highway Agency
State Park, Forest, or...
Other State Agency
Private (Other than...
State Toll Authority
Other Public...
Local Highway Agency
unknown (not geocoded)
2008-2012
2009-2013
2010-2014
2011-2015
2012-2016


Fatality Rate (per HMVMT) by Roadway Ownership
5 Year Average
Fatality Rate
1.2
1
0.8
0.6
0.4
0.2
0
State Highway Agency
County Highway Agency
State Park, Forest, or...
Other State Agency
Private (Other than...
Other Public...
Local Highway Agency
unknown (not geocoded)
2008-2012
2009-2013
2010-2014
2011-2015
2012-2016



Enter additional comments here to clarify your response for this question or add supporting information.

- The VMTs for jurisdiction were based on information provided by MassDOT Planning and is based on a brand new tool. (http://gis.massdot.state.ma.us/DataViewers/vmt/)
- Vehicle mile traveled data are taken from the Federal Highway Administration Office of Policy Information website https://www.fhwa.dot.gov/policyinformation/statistics/2007/vm2.cfm (link shown for 2007 but used 2008-2011). This information was used for the VMTs for functional classification. The VMTs for jurisdiction greater than 2011 were based on information provided by MassDOT Planning and is based on a brand new tool. (http://gis.massdot.state.ma.us/DataViewers/vmt/)
- The fatality data for functional classification came from FARS and the fatality data for jurisdiction was obtained from the Statewide Crash Database System (CDS). The serious injury data for functional classification and for jurisdiction was obtained from CDS.
- Although the crash data is separated by urban major and minor collector, the VMTs are not and therefore, the two categories were combined.
- Prior to 2009, the Massachusetts Turnpike Authority and MassHighway Department were separate entities. In 2009 they were consolidated into MassDOT and the jurisdiction reflects as such “State Highway Agency”
- A category for Unknown functional classification was added so that no fatal or serious injury crashes would be excluded from this analysis. These are data points with unknown functional classification because the crash could not be located to a point and the FARS analyst was unsure how to code (or the statewide crash system did not contain coordinates and therefore was unable to link to roadway data). Similarly, there is an unknown category for jurisdiction for those fatalities and serious injuries that were not able to be located and therefore not able to be linked to the roadway data.
- Less than 0.1% of the VMTs of Massachusetts roads have no jurisdiction category for the years of 2011-13 and therefore were not accounted for in the analysis.
- The category of “City OR Town Highway Agency” was added because Massachusetts does not make a distinction between these roads.

- The category for Other State Agency includes crashes from the Department of Conservations, Massport, and State Inst.
- The category for Private includes crashes that occurred on Private roads as well as those that occurred on Unaccepted roads.
- The category of Other Federal Agency (military, institutional, , etc) includes crashes from Federal Park, Department of Defense, US Army Corps, Federal Inst., Other Federal, US Army, and US Navy.
- The category of Other Public Instrumentality includes crashes that occurred on State College/University property.
- For 2008 & 2009, there were no VMTs available for Rural Principal Arterial (RPA) Other Freeways and Expressways, therefore, crashes in this category were combined with Rural Principal Arterial (RPA) Other so rates could be calculated.
- For 2008, there was no VMT value for Urban Major Collector, therefore, crashes in this category used the VMT for Urban Collector (combined major + minor) VMT value so rates could be calculated.

Are there any other aspects of the general highway safety trends on which the State would like to elaborate?

No

Safety Performance Targets

Safety Performance Targets

Calendar Year 2019 Targets *

Number of Fatalities	353.0

Describe the basis for established target, including how it supports SHSP goals.

Per FHWA guidance, our target setting process began with a trend line projection based on the most recent available data. The number of fatalities in Massachusetts has been relatively stable for 2013, 2014, and 2015. In 2016 there was a marked increase in these numbers (up from about 345 to 395). However, based on preliminary 2017 draft FARS statistics, the 2016 fatalities appear to be an anomaly. Therefore, rather than following the trend of increasing numbers starting in 2016, we predict 2017 and 2018 will return to numbers seen in 2015. Further, the 2019 fatalities should be down because of the strategies being advanced and implemented as part of the soon-to-be released 2018 Strategic Highway Safety Plan (SHSP). The strategies to be adopted through the SHSP include a mix of engineering, enforcement, education, awareness and emergency response strategies, as well as data enhancements to better track the information. With these considerations and initiatives, we anticipate the 5 year average fatalities for 2015-2019 will be 353, a nearly 4% drop from the 2012-2016 5 year rolling average of 367. This target was developed in coordination with the Executive Office of Public Safety and Security – Highway Safety Division (EOPSS/HS) (required to submit targets to NHTSA), the MassDOT Office of Transportation Planning (OTP) working closely with the MPOs, and the Office of Performance

Management and Innovation (OPMI, which produces an annual performance report called Tracker that serves the public and State Legislature). Moreover, it should be noted that our overarching goal is towards zero deaths and we will continue to work towards that goal by implementing SHSP strategies. Our interim goal for 2018-2022 five year average for fatalities is 320 which reflects a nearly 13% drop from the 2012-2016 five year fatality average of 367.

Number of Serious Injuries 2801.0

Describe the basis for established target, including how it supports SHSP goals.

FHWA guidance, we began with the trend line then considered external factors and planned implementation to inform the targets. Based on the trend line, the predicted number of serious injuries for 2015-2019 five year rolling average would be 2801 per year, down from 3132 for 2012-2016 yearly average, a 10.6% drop. Please note that in the Massachusetts crash system, the 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. There are external factors, some specific to Massachusetts and others that are applicable nationwide, that will impact the trend line (positively and negatively) although we do not yet know enough to know how these will impact the trends. Examples include: a required change in reporting and definition of serious injuries on the crash report, a recent State recreational marijuana law (in the process of implementation), a proposed hands-free law and anticipated changes in other roadway safety laws in the near future. Meanwhile, MassDOT will begin implementing strategies and countermeasures that are being developed in the updated 2018 Strategic Highway Safety Plan. This target was developed in coordination with EOPSS/HSD(required to submit targets to NHTSA), the MassDOT OTP working closely with the MPOs, and the Office of Performance Management and Innovation (OPMI, which produces an annual performance report called Tracker that serves the public and State Legislature). Moreover, it should be noted that our overarching goal is towards zero deaths and serious injuries, and we will continue to work towards that goal. Our interim goal for 2018-2022 five year rolling average for serious injuries is 2467 which reflects a nearly 21% drop from the 2012-2016 serious injury five year rolling average of 3132.

Fatality Rate 0.580

Describe the basis for established target, including how it supports SHSP goals.

Fatality Rate: The fatality rate is calculated using the goal of fatalities and the projected vehicle miles traveled (VMT) to obtain the 2015-2019 fatality rate. MassDOT Planning projects a 0.3% annual increase in VMTs. Therefore, the fatality rate from 2012-2016 of 0.64 fatalities per 100 million vehicle miles traveled will drop to 0.58 fatalities per 100 million vehicle miles traveled in 2015-2019 which reflects a 8.7% drop. The interim goal for fatality rate in 2018-2022 is 0.52 which reflects a drop of approximately 18% since 2012-2016. The long term goal is towards zero deaths, so the long term fatality rate target is 0.0 fatalities per 100 million vehicle miles traveled.

Serious Injury Rate 4.370

Describe the basis for established target, including how it supports SHSP goals.

The serious injury rate is calculated using the goal of serious injuries and the projected vehicle miles traveled (VMT) to obtain the 2015-2019 fatality rate goal. MassDOT Planning projects a 0.3% annual increase in VMTs. Therefore, the serious injury rate from 2012-2016 of 5.44 serious injuries per 100 million vehicle miles traveled will drop to 4.37 serious injuries per 100 million vehicle miles traveled in 2015-2019 which reflects a nearly 20% drop. The interim goal for serious injury rate in 2018-2022 is 3.5 which reflects a drop of approximately 36% since 2012-2016.The long term goal is towards zero deaths and injuries, so the long term serious injury rate is 0.0 serious injuries per 100 million vehicle miles traveled.

Total Number of Non-Motorized Fatalities and Serious Injuries	541.0

Describe the basis for established target, including how it supports SHSP goals.

As with all the other target setting measures, FHWA's guidance is to start with a trend line forecast and then consider external factors and planned implementation in order to set targets. Using the historical data to create a trend line, the predicted number of fatalities and serious injuries for non-motorists for 2015-2019 yearly average would be an increase from the 2012-2016 yearly average of 551. However, even though the fatalities and injuries has been trending up instead of down, the many Massachusetts agencies engaged in the safety of non-motorized modes are actively working on strategies to ameliorate the non-motorist fatality and injuries while promoting and encouraging walking and cycling. Therefore, the goal is to reverse the trend of increasing fatalities and injuries and move towards zero deaths and injuries. To do this, we have set the goal identical to last year which is 541 non-motorist fatalities and injuries for the 2015-2019 five year average. As the 2018 Strategic Highway Safety Plan is being completed and the Statewide Pedestrian Plan is being finalized, new multi-disciplined and multi-agency strategies will be developed and implemented. Several projects and multi-agency programs have been and are being implemented that will hopefully help to reverse the existing trend while encouraging non-motorist activities. There will also be an increased effort to attempt to resolve some issues so that systemic projects could be implemented which would help to bring down the non-motorist fatalities and serious injuries. Therefore, although our current trend line shows a projected increase in non-motorist fatalities and serious injuries, our goal is to reverse the trend and move towards zero deaths.

Enter additional comments here to clarify your response for this question or add supporting information.

Describe efforts to coordinate with other stakeholders (e.g. MPOs, SHSO) to establish safety performance targets.

There is a performance target working group committee comprised of MassDOT Planning, Office of Performance Management and Innovation, Traffic and Safety Engineering, MPOs, FHWA and others. The committee has met numerous times to discuss and review the proposed targets. In addition, MassDOT regularly meets with the Highway Safety Division Office to review performance targets so that the targets are aligned in both the Highway Safety Plan (submitted to NHTSA) and the HSIP report. During FFY2017, FHWA

provided a face-to-face training on target setting and included the performance target committee, Highway Safety Division and others. Furthermore, the targets are reviewed by the Secretary of Transportation and published in MassDOT's Tracker system for the State Legislature and the public.

Does the State want to report additional optional targets?

No

Enter additional comments here to clarify your response for this question or add supporting information.

We are currently in the process of updating our SHSP. In addition to our Towards Zero Deaths goal and the five safety performance targets developed, targets are being developed for each of the emphasis areas. Next HSIP annual report will include those targets as the SHSP will be completed after this HSIP report is completed.

Applicability of Special Rules

Does the HRRR special rule apply to the State for this reporting period?

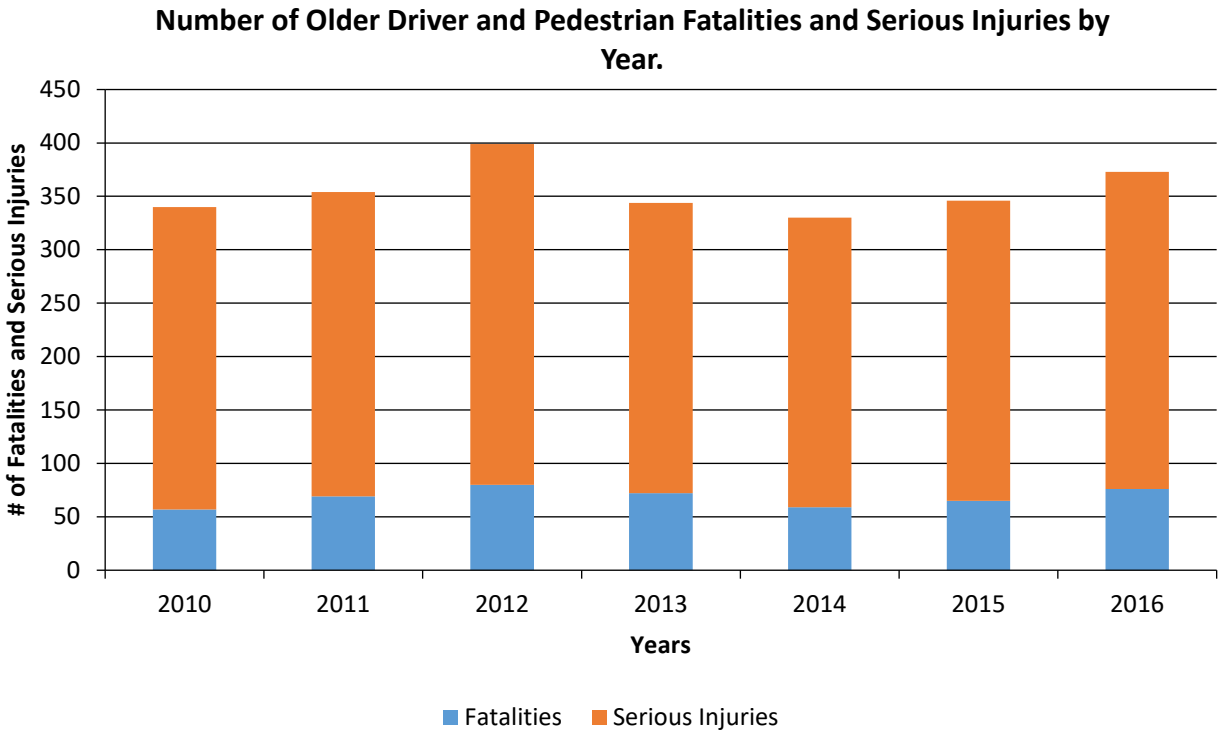
Yes

Enter additional comments here to clarify your response for this question or add supporting information.

On March 2, 2016, MassDOT received email notification that we met the High Risk Rural Road and had to obligate $2.27 million on rural collectors and locally functional classified roadways in Federal Fiscal Year 2017. Therefore, the projects selected, although having to meet the Massachusetts HSIP eligibility guidelines, had to be relatively low cost / systemic / fast turn around projects in order to advertise within 18 months. Therefore, the HSIP projects are typically signs / pavement marking type projects with no right-of-way issues or projects that are non-infrastructure in nature.

Provide the number of older driver and pedestrian fatalities and serious injuries 65 years of age and older for the past seven years.

PERFORMANCE MEASURES	2010	2011	2012	2013	2014	2015	2016
Number of Older Driver and Pedestrian Fatalities	57	69	80	72	59	65	76
Number of Older Driver and Pedestrian Serious Injuries	283	285	319	272	271	281	297



Enter additional comments here to clarify your response for this question or add supporting information.

Evaluation

Program Effectiveness

How does the State measure effectiveness of the HSIP?

Benefit/Cost Ratio

Enter additional comments here to clarify your response for this question or add supporting information.

Using crash costs from FHWA report and MA factor of 1.31:

K - $14,842,300

A - $860,700

B - $260,800

C - $165,000

O - $15,600

Based on the measures of effectiveness selected previously, describe the results of the State's program level evaluations.

For Question 45, all HSIP-funded projects completed in 2013 for evaluated for this year's report (allowing for three years of before and after data). Most of the projects evaluated this year were focused on improving intersections; with some being isolated and others along a corridor. These intersection improvements include improving signalized intersections and converting minor stop-control intersections to a signalized intersection or roundabout. Other projects include adding cable median barrier or glare screens along divided highways and improving an interstate-to-interstate ramp. The intersection and cable-barrier projects produced reductions in intersection crashes and roadway departure crashes, both of which are crash types Massachusetts's SHSP is focused on.

In total, the 12 projects that were evaluated are estimated to be producing an annual benefit of $5.4 million due to the reduction in crashes. Over 20 years at a three percent discount rate, the projects are estimated to have a total benefit/cost ratio of 2.57:1. Over the three years in the after period, it is these sites are estimated to have seen 38.6 less fatal and injury crashes, an annual reduction of 12.87 fatal and injury crashes.

Massachusetts has also reviewed statewide trends with relation to fatal and incapacitating injury crashes.

What other indicators of success does the State use to demonstrate effectiveness and success of the Highway Safety Improvement Program?

RSAs completed

Enter additional comments here to clarify your response for this question or add supporting information.

Are there any significant programmatic changes that have occurred since the last reporting period?

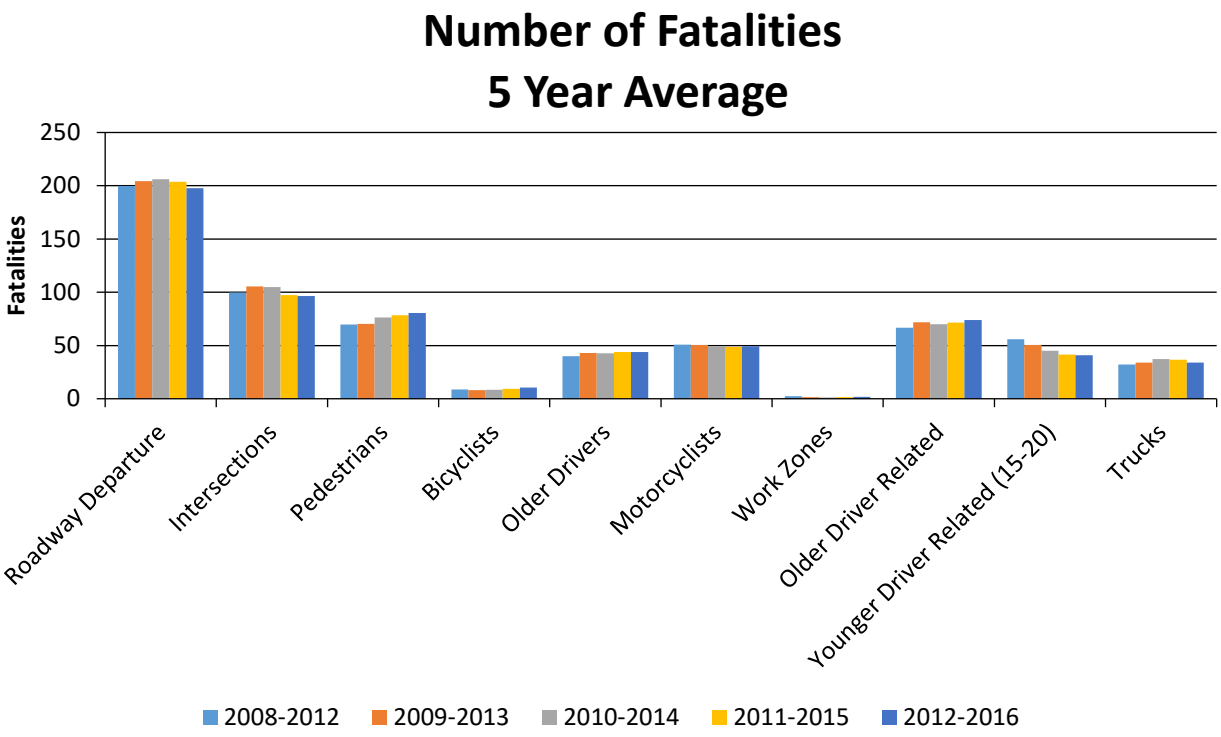
No

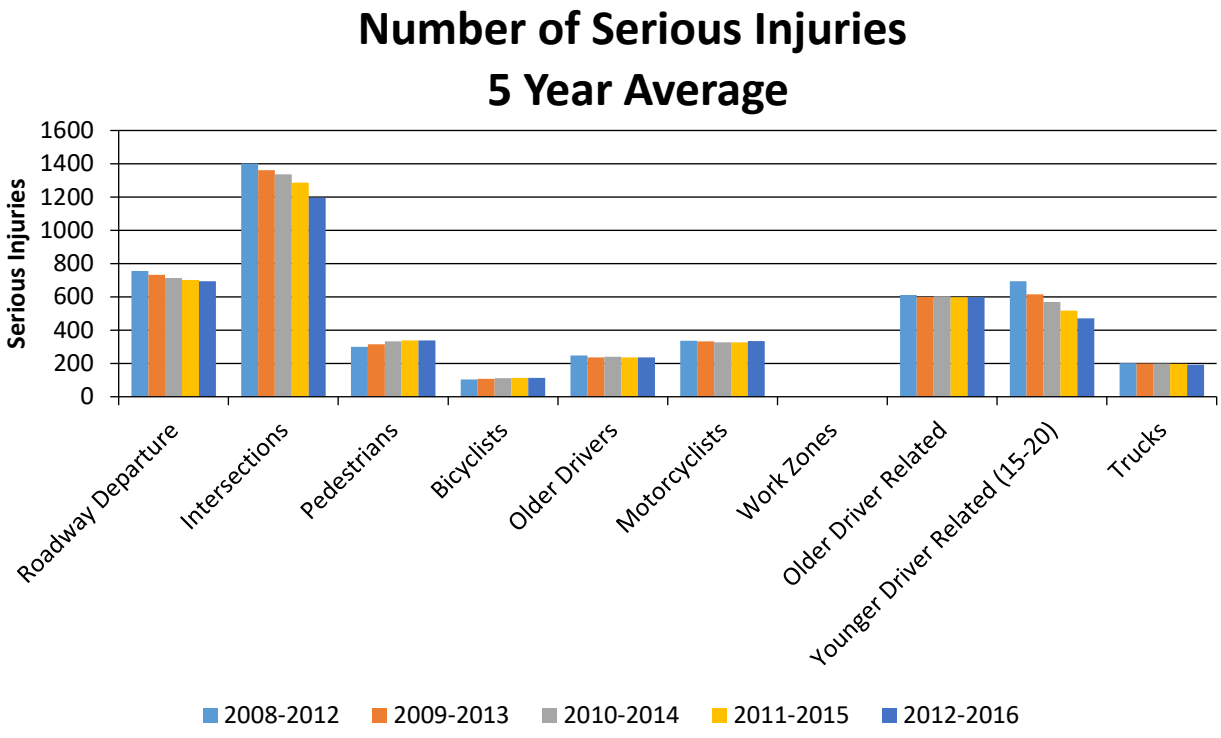
Effectiveness of Groupings or Similar Types of Improvements

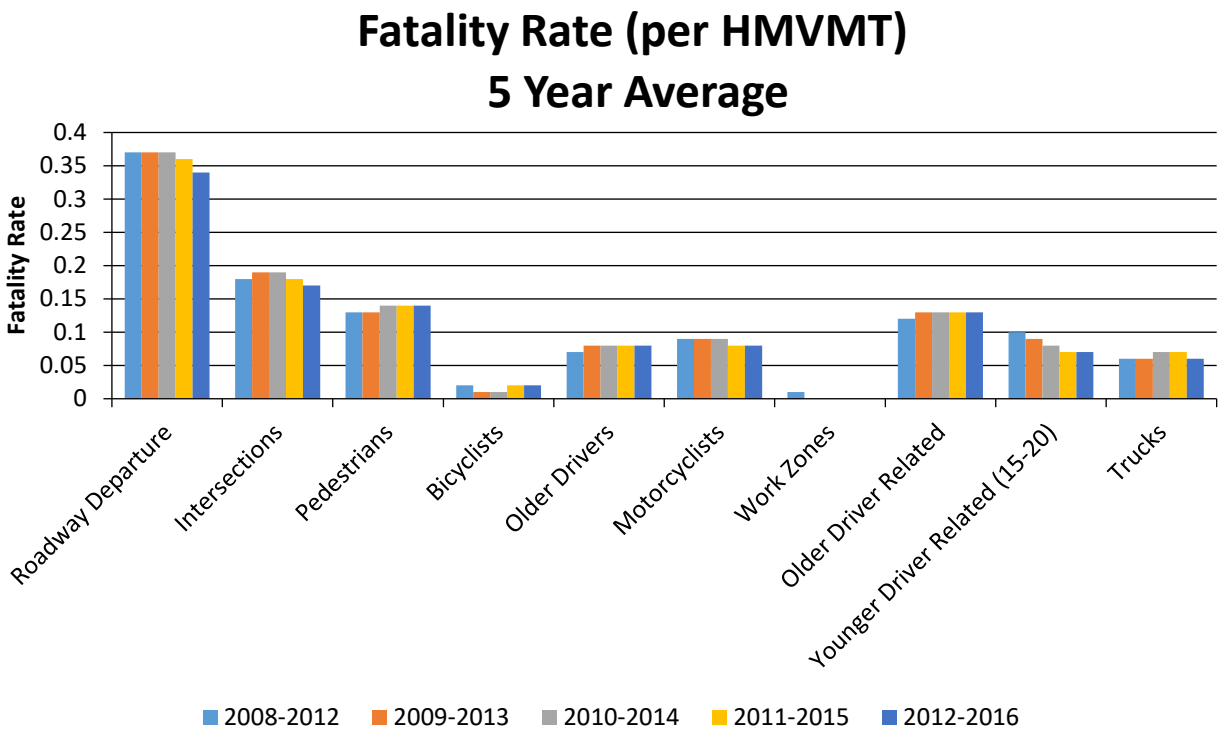
Present and describe trends in SHSP emphasis area performance measures.

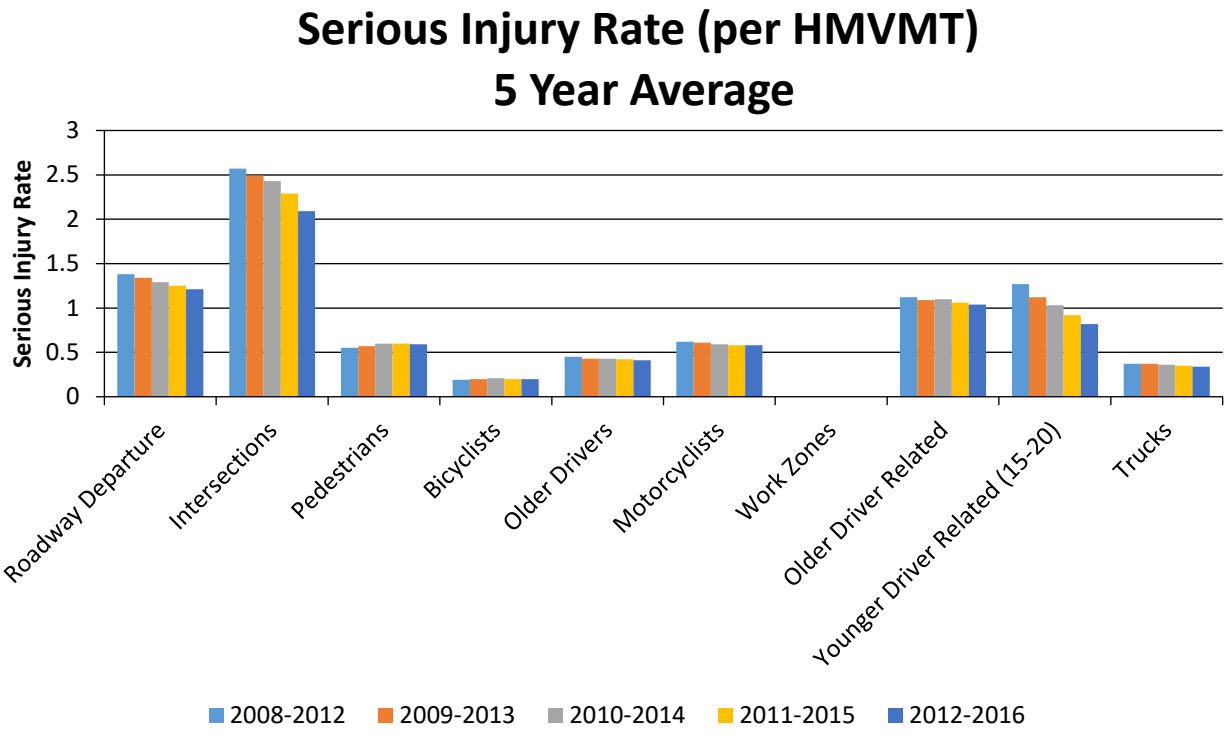
Year 2016

SHSP Emphasis Area	Targeted Crash Type	Number of Fatalities (5-yr avg)	Number of Serious Injuries (5-yr avg)	Fatality Rate (per HMVMT) (5-yr avg)	Serious Injury Rate (per HMVMT) (5-yr avg)	Other 1	Other 2	Other 3
Roadway Departure		197.6	694.2	0.34	1.21	0	0	0
Intersections		96.4	1,196.8	0.17	2.09	0	0	0
Pedestrians		80.4	337.8	0.14	0.59	0	0	0
Bicyclists		10.4	112.6	0.02	0.2	0	0	0
Older Drivers		43.8	236.2	0.08	0.41	0	0	0
Motorcyclists		49.2	334	0.08	0.58	0	0	0
Work Zones		1.8	0	0	0	0	0	0
Older Driver Related		74	598	0.13	1.04	0	0	0
Younger Driver Related (15-20)		41	470.6	0.07	0.82	0	0	0
Trucks		33.8	192.8	0.06	0.34	0	0	0


Number of Fatalities
5 Year Average
Fatalities
250
200
150
100
50
0
Roadway Departure
Intersections
Pedestrians
Bicyclists
Older Drivers
Motorcyclists
Work Zones
Older Driver Related
Younger Driver Related (15-20)
Trucks
2008-2012
2009-2013
2010-2014
2011-2015
2012-2016


Number of Serious Injuries
5 Year Average
Serious Injuries
1600
1400
1200
1000
800
600
400
200
0
Roadway Departure
Intersections
Pedestrians
Bicyclists
Older Drivers
Motorcyclists
Work Zones
Older Driver Related
Younger Driver Related (15-20)
Trucks
2008-2012
2009-2013
2010-2014
2011-2015
2012-2016





Enter additional comments here to clarify your response for this question or add supporting information.

"Trucks" also include buses and for the fatalities the 2008-2010 data comes from FARS and the 2011-2016 comes from MCMIS.

Work zone data for serious injuries was not compiled due to the quality of the data in this field and is listed as 0

VMTs used were taken from MassDOT's Office of Transportation Planning online VMT viewer. They do not report VMTs in the emphasis area categories.

Fatal Data – Data is from FARS and MCMIS

Intersections – Fatalities resulting from crashes occurring at RELJCT2 = 2 (intersection) or 3 (intersection-related)

Roadway Departures – where the first sequence of events involved a vehicle in the crash departing the roadway - Fatalities resulting from crashes where SEQ1 (Vehicle file 2004-2009, VEVENT file 2010 on) = 17,19-43,46,52,53,57,59,63,64,65,67,68,69,71.

Young Drivers – Fatalities from crashes where at least one driver was 15-20 years old - Fatalities resulting from crashes where PER_TYP = 1 (driver) and AGE = 15-20

Older Drivers - Fatalities from crashes where at least one driver was 65+ years old - Fatalities resulting from crashes where PER_TYP = 1 (driver) and AGE >= 65

Pedestrians - Fatalities of PER_TYPE = 5 (pedestrian) AND 8 (Person on Personal Conveyances)

Motorcycles - Motorcycle fatalities (driver or passenger) - Person level fatalities where PER_TYP = 1,2,9 (driver or passenger) AND BODY_TYP = 80-89 (motorcycles)

Bicycles - Fatalities of PER_TYPE = 6 (Bicyclist) AND 7 (Other Cyclist)

Truck-Bus Involved - A large truck is defined in FARS as a truck with a gross vehicle weight rating (GVWR) greater than 10,000 pounds. A bus is defined in FARS as any motor vehicle designed primarily to transport nine or more persons, including the driver. Data was received from MCMIS, not FARS (no specific query)

Serious Injury Data – All data is from Registry of Motor Vehicles Crash Database

Intersections - Persons that had an injury severity = 2 (Incapacitating) where Roadway Junction Type = 2 Or 3 Or 4 Or 8 (Four-way Or T-intersection Or Y-intersection Or Five-point or more)

Roadway Departures - Persons that had an injury severity = 2 (Incapacitating) where the first sequence of events was 36 Or 35 Or 33 Or 32 Or 31 Or 30 Or 28 Or 24 Or 23 Or 22 Or 21 Or 20 Or 40 Or 41 Or 42

Young Drivers - Younger drivers, age 15-20, that had an injury severity = 2 (Incapacitating)

Older Drivers - Older drivers, age 65-110, that had an injury severity = 2 (Incapacitating)

Pedestrians - Persons that had an injury severity = 2 (Incapacitating) where Non-Motorist Type = 1 (Pedestrian)

Motorcycles - Persons that had an injury severity = 2 (Incapacitating) where one of the vehicle configuration codes = 3 (Motorcycle)

Bicycles - Persons that had an injury severity = 2 (Incapacitating) where Non-Motorist Type = 2 (Cyclist)

Has the State completed any countermeasure effectiveness evaluations during the reporting period?

Yes

Please provide the following summary information for each countermeasure effectiveness evaluation.

CounterMeasures:	Median Cable barrier
Description:	
Target Crash Type:	Cross median
Number of Installations:	
Number of Installations:	
Miles Treated:	33
Years Before:	3
Years After:	3
Methodology:	Before/after using empirical Bayes or Full Bayes
Results:	5.2:1 (see attached study)
File Name:	Median Cable Barrier.pdf
CounterMeasures:	Signalized improvements
Description:	General improvements to signalized intersections
Target Crash Type:	Other (define)
Number of Installations:	34
Number of Installations:	34
Miles Treated:	
Years Before:	3
Years After:	3
Methodology:	Before/after using empirical Bayes or Full Bayes
Results:	4.0:1 (see attached study)
File Name:	Signal Improvements.pdf
CounterMeasures:	stop control-roundabout
Description:	Minor stop control to roundabout conversion
Target Crash Type:	Other (define)
Number of Installations:	5
Number of Installations:	5
Miles Treated:	
Years Before:	3

Years After:	3
Methodology:	Before/after using empirical Bayes or Full Bayes
Results:	8.1:1 (see attached study)
File Name:	TWSC to Roundabouts.pdf
CounterMeasures:	minor stop control-signal
Description:	Conversion from minor stop control to signalized intersection
Target Crash Type:	Other (define)
Number of Installations:	6
Number of Installations:	6
Miles Treated:	
Years Before:	3
Years After:	3
Methodology:	Before/after using empirical Bayes or Full Bayes
Results:	2.3:1 (see attached study)
File Name:	TWSC to Signal.pdf

Project Effectiveness

Provide the following information for previously implemented projects that the State evaluated this reporting period.

LOCATION	FUNCTIONAL CLASS	IMPROVEMENT CATEGORY	IMPROVEMENT TYPE	PDO BEFORE	PDO AFTER	FATALITY BEFORE	FATALITY AFTER	SERIOUS INJURY BEFORE	SERIOUS INJURY AFTER	ALL OTHER INJURY BEFORE	ALL OTHER INJURY AFTER	TOTAL BEFORE	TOTAL AFTER	EVALUATION RESULTS (BENEFIT/COST RATIO)
Pittsfield - Route 7 Corridor Improvements	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify traffic signal - modernization/replacement	95.00	84.00			4.00	1.00	22.00	20.00	121.00	105.00	4.82
Worcester - Belmont Street East Improvements	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify traffic signal - modernization/replacement	160.00	112.00			3.00	2.00	42.00	23.00	205.00	137.00	2.71
Westminster - South Street Reconstruction	Urban Major Collector	Roadway	Roadway - other	7.00	5.00						4.00	7.00	9.00	0.18
Northborough - Route 20 Signal Improvements	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify traffic signal - modernization/replacement	80.00	61.00					6.00	9.00	86.00	70.00	1.97
Southwick - Route 10/202 Reconstruction	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify traffic signal - modernization/replacement	73.00	53.00					13.00	19.00	86.00	72.00	0.22
Lancaster - Route 70 at Old Union Turnpike Roundabout	Urban Minor Arterial	Intersection traffic control	Modify control - two-way stop to roundabout	24.00	6.00			3.00		11.00		38.00	6.00	11.58
Yarmouth - Old Town House Road/Forest Street Intersection Realignment	Urban Minor Arterial	Intersection traffic control	Intersection traffic control - other	9.00	9.00					3.00	2.00	12.00	11.00	0.48
Fairhaven - Huttlestone Ave/Route 6 Intersection Improvements	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify control - two-way stop to roundabout	76.00	52.00			1.00		20.00	11.00	97.00	63.00	9.53
Danvers - I95 Median Cable Barrier	Urban Principal Arterial (UPA) - Interstate	Roadside	Barrier - cable	76.00	81.00			3.00	2.00	27.00	22.00	106.00	105.00	1.25
Taunton/Lakeville - Rt 140 Cable Barrier	Urban Principal Arterial (UPA) - Other Freeways and Expressways	Roadside	Barrier - cable	28.00	82.00	2.00	1.00	3.00	6.00	17.00	35.00	50.00	124.00	-0.13
Attleboro - Ramp Improvements	ramps	Interchange design	Interchange design - other	10.00	14.00					3.00	4.00	13.00	18.00	-3.28
West Bridgewater - Rt 24 Glare Screen - Tangents	Urban Principal Arterial (UPA) - Other Freeways and Expressways	Roadway delineation	Roadway delineation - other	278.00	308.00	1.00	2.00	25.00	14.00	135.00	150.00	439.00	474.00	-1.98

Enter additional comments here to clarify your response for this question or add supporting information.

Are there any other aspects of the overall HSIP effectiveness on which the State would like to elaborate?

Yes

Describe any other aspects of HSIP effectiveness on which the State would like to elaborate.

The effectiveness of non-infrastructure projects (like data quality improvement projects and design projects) were not evaluated. This includes the majority of the HRRR funds for 2017.

Compliance Assessment

What date was the State's current SHSP approved by the Governor or designated State representative?

09/30/2013

What are the years being covered by the current SHSP?

From: 2004 To: 2011

When does the State anticipate completing it's next SHSP update?

2018

Enter additional comments here to clarify your response for this question or add supporting information.

The updated SHSP is being actively worked on with an anticipated completion date of September 30, 2018.

Provide the current status (percent complete) of MIRE fundamental data elements collection efforts using the table below.

	NON LOCAL PAVED ROADS - SEGMENT		NON LOCAL PAVED ROADS - INTERSECTION		NON LOCAL PAVED ROADS - RAMPS		LOCAL PAVED ROADS		UNPAVED ROADS	
MIRE NAME (MIRE NO.)	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE
ROADWAY SEGMENT										
Segment Identifier (12)	0.329805881971045	0.554902921541006					0.0146173688736028	0.000296038467058992	0.2875	0.00489847810642037
Route Number (8)	1	1								
Route/Street Name (9)	0.994364734142699	0.999203772891529								
Federal Aid/Route Type (21)	0.994975004869181	0.989973663257181								
Rural/Urban Designation (20)	1	1					1	1		
Surface Type (23)	1	1					1	1		
Begin Point Segment Descriptor (10)	1	1					1	1	1	1
End Point Segment Descriptor (11)	1	1					1	1	1	1
Segment Length (13)	1	1								
Direction of Inventory (18)	0.996273453223398	0.999258896306731								
Functional Class (19)	1	1					1	1	1	1
Median Type (54)	0.999974031032916	0.999957126232621								

MIRE NAME (MIRE NO.)	NON LOCAL PAVED ROADS - SEGMENT		NON LOCAL PAVED ROADS - INTERSECTION		NON LOCAL PAVED ROADS - RAMPS		LOCAL PAVED ROADS		UNPAVED ROADS	
	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE
Access Control (22)	0.13379211841849	0.00135358608440007								
One/Two Way Operations (91)	1	0.999975500704355								
Number of Through Lanes (31)	0.999974031032916	0.999889753169596					1	0.999964116549447		
Average Annual Daily Traffic (79)	0.960566123482439	0.979034727751577					0.825451418744626	0.971481627673317		
AADT Year (80)	0.960566123482439	0.979034727751577								
Type of Governmental Ownership (4)	1	0.996894714276964					1	1	1	1
INTERSECTION										
Unique Junction Identifier (120)			1	0						
Location Identifier for Road 1 Crossing Point (122)			1	0						
Location Identifier for Road 2 Crossing Point (123)			1	0						
Intersection/Junction Geometry (126)			1	0						
Intersection/Junction Traffic Control (131)			0.01	0						
AADT for Each Intersecting Road (79)			0.9606	0						
AADT Year (80)			0.9606	0						
Unique Approach Identifier (139)			1	0						
INTERCHANGE/RAMP										
Unique Interchange Identifier (178)					0	0				
Location Identifier for Roadway at Beginning of Ramp Terminal (197)					0	0				
Location Identifier for Roadway at Ending Ramp Terminal (201)					0	0				
Ramp Length (187)					1	1				
Roadway Type at Beginning of Ramp Terminal (195)					0	0				

MIRE NAME (MIRE NO.)	NON LOCAL PAVED ROADS - SEGMENT		NON LOCAL PAVED ROADS - INTERSECTION		NON LOCAL PAVED ROADS - RAMPS		LOCAL PAVED ROADS		UNPAVED ROADS	
	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE
Roadway Type at End Ramp Terminal (199)					0	0				
Interchange Type (182)					0	0				
Ramp AADT (191)					0.940206481215945	0.913066954643629				
Year of Ramp AADT (192)					0.940206481215945	0.913066954643629				
Functional Class (19)					0.99240034413536	0.125809935205184				
Type of Governmental Ownership (4)					1	1				

*Based on Functional Classification

Enter additional comments here to clarify your response for this question or add supporting information.

Describe actions the State will take moving forward to meet the requirement to have complete access to the MIRE fundamental data elements on all public roads by September 30, 2026.

In reviewing MassDOT's road inventory database for MIRE FDE compliance there are two areas that need attention 1, Intersection Elements and 2, Interchange Elements.

MassDOT is currently working on developing an intersection inventory for Non Local Paved State/State and State/Local intersections. The location of the intersections have been identified through the State's road inventory dataset. The current task involves collecting the required MIRE FDE's as well as a handful of additional MIRE elements to support MassDOT's safety analysis requirements. Completion of the intersection inventory is not anticipated until 2020, given the number of intersections requiring collection.

MassDOT does not currently have an interchange inventory. In late 2018/early 2019, MassDOT will begin efforts to develop a MIRE FDE compliance interchange inventory. Ramps are already included within the State's road inventory database can be separated from road segments.

Minimal work is required on MassDOT's road inventory database to bring into MIRE FDE compliance. One area that does need attention is the assignment of unique road segment identifiers for all road segments. MassDOT leverages Esri Roads & Highways to manage their LRS/Road Inventory file, and has the ability to generate unique segment identifiers.

Provide the suspected serious injury identifier, definition and attributes used by the State for both the crash report form and the crash database using the table below. Please also indicate whether or not these elements are compliant with the MMUCC 4th edition criteria for data element P5. Injury Status, suspected serious injury.

CRITERIA	SUSPECTED SERIOUS INJURY IDENTIFIER(NAME)	MMUCC 4TH EDITION COMPLIANT *	SUSPECTED SERIOUS INJURY DEFINITION	MMUCC 4TH EDITION COMPLIANT *	SUSPECTED SERIOUS INJURY ATTRIBUTES(DESCRIPTORS)	MMUCC 4TH EDITION COMPLIANT *
Crash Report Form	Injury Status	No	N/A	No	N/A	No
Crash Report Form Instruction Manual	Injury Status	No	The level of injury severity for a person involved in the crash	No	Fatal Non-Fatal injury - Incapacitating Non-Fatal injury - Non Incapacitating Non Fatal injury - Possible Non Fatal Injury - No injury Non Fatal injury - Unknown	No

CRITERIA	SUSPECTED SERIOUS INJURY IDENTIFIER(NAME)	MMUCC 4TH EDITION COMPLIANT *	SUSPECTED SERIOUS INJURY DEFINITION	MMUCC 4TH EDITION COMPLIANT *	SUSPECTED SERIOUS INJURY ATTRIBUTES(DESCRIPTORS)	MMUCC 4TH EDITION COMPLIANT *
Crash Database	Injury Status	No	N/A	No	N/A	No
Crash Database Data Dictionary	N/A	No	N/A	No	N/A	No

Please describe the actions the State is taking to become compliant by April 15, 2019.

The Registry of Motor Vehicles (RMV) submitted a Project on a Page to MassDOT IT describing the mandated changes to the Injury status field in the Crash Data System. The intention is to have this in place prior to January 1, 2019. In addition, the RMV has contacted the printer to notify them of the updates to the paper crash report form/overlay to begin the proof process. The RMV and Highway Division of MassDOT conducted a conference call with Records Management System vendors to explain the mandated changes that they will have to make for Massachusetts Law Enforcement Agencies to be complaint by April 15, 2019. The Law Enforcement Liaison has informed the Municipal Police Training Council about the definitions/ attributes for suspected serious injury and will provide outreach during the all phases of this project.

Enter additional comments here to clarify your response for this question or add supporting information.

Did the State conduct an HSIP program assessment during the reporting period?

Yes

Describe the purpose and outcomes of the State's HSIP program assessment.

In 2017, MassDOT performed a self-evaluation of its HSIP. MassDOT's HSIP is primarily distributed at the MPO level; as a result, a survey was developed focusing on this aspect.

The 10-question survey was distributed to a representative from each of Massachusetts's 13 MPOs and RPAs. The agencies were asked the following 10 questions (the percent that responded in the affirmative is provided in parentheses):

1. Is your agency's HSIP program connected to the SHSP safety goals and specific strategies? If not, is there a reason? (86 percent)
2. Does your agency have someone focused on highway safety that monitors the relationship between regional safety projects and SHSP goals and objectives? If so, how so? If not, why not? (79 percent)
3. How does your agency select projects for the TIP HSIP program? Is jurisdiction (state vs local) a factor? (Zero percent considered jurisdiction a factor)
4. Are crash, roadway, and traffic data used in your agency's screening process to identify potential HSIP project locations? If so, how so? If not, why not? (100 percent)
5. Does your agency consider a balance of spot location and systemic safety improvement projects? Why or why not? (50 percent)
6. Are Road Safety Audits used to support the HSIP design process? If not, why not? (100 percent)
7. Does your agency coordinate with other agencies during the HSIP process? If so, with whom? If not, why not? (100 percent)
8. Is HSIP funding limited to stand-alone safety projects? Or are other funding sources leveraged to support HSIP funding for projects? If yes, what other funding sources are used? (100 percent indicated other funding is used)
9. Does your agency use traffic, crash, and roadway data to evaluate the effectiveness of HSIP projects with advanced statistical methodologies? If not, why not? (Zero percent)
10. Does your agency modify its approach to the HSIP program based on the historical performance of other HSIP-funded projects? If not, why not? (21 percent)

Based on the responses, MassDOT developed a main takeaway and action item for each question. These are summarized as follows:

1. Almost all regions incorporate the state's SHSP goals into regional goals. MassDOT will continue to encourage this cooperation and maintain communication with the agencies.
2. The regions monitor their HSIP projects, but most do not have a specific safety person. MassDOT is proposing each RPA/MPO nominate an "HSIP Safety Leader", of which a statewide group will be made. An open exchange between MassDOT and these leaders can prove greatly beneficial for all parties.
3. Regions mainly focus on HSIP clusters, regardless of jurisdiction. As a result, MassDOT will focus on improving the method for identifying HSIP clusters by using HSM methodology and updated EPDO scores.
4. All regions already use these data to identify high crash locations, so MassDOT is going to provide education and support for implementing HSM methodologies to improve the use of these data.
5. Most regions do not implement systemic safety improvements because MassDOT implements so few. To change this, MassDOT will make more of an effort to implement systemic safety improvements statewide, encouraging the regions to adopt them as well.
6. MassDOT has an extensive RSA program driven by its districts and RPAs. MassDOT would like to improve this by using HSM methodology to provide better insights for the RSA.

7. All RPAs coordinate with other agencies during the HSIP process. MassDOT will continue to encourage this coordination and suggest more stakeholders to consider.
8. All regions leverage HSIP funding with other funding sources to finance projects. MassDOT will review different funding sources used and produce a list of best practices for other regions to refer to for funding ideas.
9. Most agencies are unaware of advanced statistical methodologies for evaluating HSIP projects. MassDOT has developed a brief instructional PowerPoint using Massachusetts examples to provide to the agencies.
10. Most agencies do no perform before/after evaluations of HSIP-funded projects. MassDOT will encourage RPAs to adopt this practice to better inform future decision making.

MassDOT is in the process of implementing these solutions. Short-term goals were set for each solution to provide immediate measures of progress for this implementation.

Optional Attachments

Program Structure:

HSIP Criteria Updates.pdf

Project Implementation:

Safety Performance:

Evaluation:

Median Cable Barrier.pdf
Signal Improvements.pdf
TWSC to Roundabouts.pdf
TWSC to Signal.pdf

Compliance Assessment:

Glossary

5 year rolling average	means the average of five individuals, consecutive annual points of data (e.g. annual fatality rate).
Emphasis area	means a highway safety priority in a State's SHSP, identified through a data-driven, collaborative process.
Highway safety improvement project	means strategies, activities and projects on a public road that are consistent with a State strategic highway safety plan and corrects or improves a hazardous road location or feature or addresses a highway safety problem.
HMVMT	means hundred million vehicle miles traveled.
Non-infrastructure projects	are projects that do not result in construction. Examples of non-infrastructure projects include road safety audits, transportation safety planning activities, improvements in the collection and analysis of data, education and outreach, and enforcement activities.
Older driver special rule	applies if traffic fatalities and serious injuries per capita for drivers and pedestrians over the age of 65 in a State increases during the most recent 2-year period for which data are available, as defined in the Older Driver and Pedestrian Special Rule Interim Guidance dated February 13, 2013.
Performance measure	means indicators that enable decision-makers and other stakeholders to monitor changes in system condition and performance against established visions, goals, and objectives.
Programmed funds	mean those funds that have been programmed in the Statewide Transportation Improvement Program (STIP) to be expended on highway safety improvement projects.
Roadway Functional Classification	means the process by which streets and highways are grouped into classes, or systems, according to the character of service they are intended to provide.
Strategic Highway Safety Plan (SHSP)	means a comprehensive, multi-disciplinary plan, based on safety data developed by a State Department of Transportation in accordance with 23 U.S.C. 148.
Systematic	refers to an approach where an agency deploys countermeasures at all locations across a system.
Systemic safety improvement	means an improvement that is widely implemented based on high risk roadway features that are correlated with specific severe crash types.
Transfer	means, in accordance with provisions of 23 U.S.C. 126, a State may transfer from an apportionment under section 104(b) not to exceed 50 percent of the amount apportioned for the fiscal year to any other apportionment of the State under that section.