
Highway Safety Improvement Program

*Data Driven Decisions*

# Missouri
# Highway Safety Improvement Program
# 2016 Annual Report

Prepared by: MO

## 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."

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# 2. Executive Summary

The Missouri Coalition for Roadway Safety and the Missouri Department of Transportation (MoDOT) are dedicated to improving safety of the motoring public through education, engineering, enforcement and emergency medical services initiatives. Safety is one of the Department's core values: "Be Safe." This message is also reinforced in the Department's Practical Design Guide that states, "Safety will not be compromised. Every project we do will make the facility safer after its completion." Additionally, "keeping our customers and ourselves safe" is a MoDOT Tangible Result.

In October 2012, Missouri introduced its third edition of a Strategic Highway Safety Plan (SHSP) and established a highway safety goal of 700 or fewer fatalities by 2016. *Missouri's Blueprint to Save More Lives* guides the State's safety initiatives and addresses safety from a comprehensive standpoint including engineering, enforcement, education, emergency medical services, technology and public policy solutions. The Blueprint focuses on implementing strategies that will reduce both fatal and serious injuries on Missouri roadways. The Blueprint and the statewide fatality goal are considered in the development and implementation of each of the Department's highway safety plans. The state's fourth edition of an SHSP will be introduced in October 2016 and will follow a similar format.

Evidenced-based decision-making is paramount to a sound safety program. Data analysis is a critical part of identifying overrepresented crash types, locations, driver age, driver gender, and driver behaviors. These findings guide the deployment of effective and appropriate strategies to improve safety on the entire system. Efforts are made to analyze fatal and serious injury crashes to help discern where limited safety funding should be applied so that maximum safety improvements and benefits are attained.

From 2005-2014, Missouri experienced a steady decline in both fatalities and serious injuries. During that time, fatalities decreased by 40 percent (1,257 in 2005 to 766 in 2014) and serious injuries decreased by 46 percent (8,621 in 2005 to 4,657 in 2014). In 2015, preliminary data indicates 870 fatalities (14% increase) and 4,451 serious injuries (4% decrease) in Missouri. The 2015 fatality rate in Missouri was 1.21. The 5-year average for fatalities increased in 2015 (from 791 to 801), while the 5-year average for serious injuries decreased (5,039) for the 10th year in a row.

# 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 MAP-21 Reporting Guidance dated February 13, 2013 and consists of four sections: program structure, progress in implementing HSIP projects, progress in achieving safety performance targets, and assessment of the effectiveness of the improvements.

# Program Structure

## Program Administration

**3. How are Highway Safety Improvement Program funds administered in the State?**

District

If District, how are the HSIP funds allocated?
Formula

**4. Describe how local roads are addressed as part of Highway Safety Improvement Program**.

Our local roads are included in the crash data system analysis. We evaluate all roadways in the state and place emphasis on severe crashes. This analysis is performed for both intersections and non-intersection locations. To date we have used an analysis method, which places weight on the severe crashes and locations that have experienced a higher frequency of severe crashes and are often those that will find their way on our top priority lists. While most of the locations to date have been on the state system roadways, we have recently seen a few of the local roads locations make these high priority lists. While we continue to believe that the majority of the problem locations will be state system locations, we have evaluated non-state system severe crash locations and have determined that 55% of our non-state system fatalities are in seven counties. Local strategic highway safety plans (SHSP) have been developed for these seven counties (Jackson, Jefferson, St. Louis City, Greene County, St. Louis County, Franklin, and St. Charles). The local SHSPs identify systemic countermeasures and high priority projects. To date we have communicated the problem locations to the planning entities like our Metropolitan Planning Organizations and Regional Planning Commissions. We also work with our LTAP center to continue to move safety forward in our state. Additionally, we have used the RSA process to better address local road issues on occasion, we have a Transportation Engineering Assistance Program (TEAP) to assist locals, and we also have a subcommittee from our SHSP that focuses on infrastructure improvement opportunities for local roads.

**5. Identify which internal partners are involved with Highway Safety Improvement Program planning**.

Design

Planning
Maintenance
Operations
Governors Highway Safety Office

**6. Briefly describe coordination with internal partners**.

MoDOT has focused for some time on system-wide safety solutions. We have worked with our Design Division to address our Engineering Policy, we have worked with our Operations and Maintenance staff to improve the roadsides, and we have worked with the Planning staff to better evaluate and select safety needs for improvements. We have also worked with the previously mentioned internal partners on the training and use of the Highway Safety Manual (HSM). Additionally, we work daily with the Highway Safety office to evaluate and monitor the crash types. It is vital that all areas in our department work together and focus on safety improvements. We have begun efforts to improve our safety situation on the local roads and have developed local SHSPs for our top counties. We are also working with our Planning and Design Divisions to consider how we might best administer safety projects on local roads.

**7. Identify which external partners are involved with Highway Safety Improvement Program planning**.

Metropolitan Planning Organizations
Governors Highway Safety Office
Local Government Association
Other-Law Enforcement
Other-Emergency services, Department of Revenue, Universities, etc.
Other-Federal Highway Administration
Other-National Highway Traffic Safety Administration
Other-Federal Motor Carrier Safety Administration

**8. Identify any program administration practices used to implement the HSIP that have changed since the last reporting period**.

Other-The total distribution of HSIP funds to the districts will increase by $7 million beginning in state fiscal year 2017 (starts July 1, 2016). Another $3 million in HSIP will be administered by Central Office during state fiscal year 2017.

**9. Describe any other aspects of Highway Safety Improvement Program Administration on which you would like to elaborate**.

Safety initiatives continue to be driven by the State SHSP. The State SHSP includes numerous safety initiatives that are data driven. Each district develops a regional district safety plan for their available HSIP funds. These district plans must support the overarching goals of the statewide SHSP at the district level.

## Program Methodology

**10. Select the programs that are administered under HSIP.**

| | | |
|---|---|---|
| Median Barrier | Intersection | Horizontal Curve |
| Skid Hazard | Roadway Departure | Local Safety |

## 11. Program: Median Barrier

**Date of Program Methodology: 9/27/2002**

**What data types were used in the program methodology?**

| *Crashes* | *Exposure* | *Roadway* |
|---|---|---|
| All crashes | Volume | Horizontal curvature |
| Fatal and serious injury crashes only | | Functional classification |
| | | Roadside features |

**What project identification methodology was used for this program?**

Crash frequency
Relative severity index
Excess proportions of specific crash types

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

Yes
If yes, are local road projects identified using the same methodology as state roads?
Yes

**How are highway safety improvement projects advanced for implementation?**

Other-Systemic evaluation

**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

| | |
|---|---|
| Systemic safety initiative | 1 |

## 11. Program: Intersection

**Date of Program Methodology: 1/21/2009**

**What data types were used in the program methodology?**

| *Crashes* | *Exposure* | *Roadway* |
|---|---|---|
| All crashes | Volume | Functional classification |
| Fatal and serious injury crashes only | | |

**What project identification methodology was used for this program?**
Crash frequency
Relative severity index
Excess proportions of specific crash types

**Are local roads (non-state owned and operated) included or addressed in this program?**
Yes
If yes, are local road projects identified using the same methodology as state roads?
Yes

**How are highway safety improvement projects advanced for implementation?**
Other-Systemic evaluation

**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

| | |
|---|---|
| Systemic safety initiative | 1 |

## 11. Program: Horizontal Curve

**Date of Program Methodology: 2/8/2013**

**What data types were used in the program methodology?**

| *Crashes* | *Exposure* | *Roadway* |
|---|---|---|
| All crashes | Volume | Horizontal curvature |

Fatal and serious injury crashes
only

**What project identification methodology was used for this program?**
Crash frequency
Relative severity index
Excess proportions of specific crash types

**Are local roads (non-state owned and operated) included or addressed in this program?**
Yes
If yes, are local road projects identified using the same methodology as state roads?
Yes

**How are highway safety improvement projects advanced for implementation?**
Other-Systemic evaluation

**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

| | |
|---|---|
| Systemic safety initiative | 1 |

## 11. Program: Skid Hazard

**Date of Program Methodology: 2/8/2013**

**What data types were used in the program methodology?**

| *Crashes* | *Exposure* | *Roadway* |
|---|---|---|
| All crashes | | Horizontal curvature |
| Fatal and serious injury crashes only | | |
| Other-Wet pavement crashes | | |

**What project identification methodology was used for this program?**
Crash frequency
Relative severity index
Excess proportions of specific crash types

**Are local roads (non-state owned and operated) included or addressed in this program?**
Yes
If yes, are local road projects identified using the same methodology as state roads?
Yes

**How are highway safety improvement projects advanced for implementation?**

Other-Systemic evaluation

**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

| | |
|---|---|
| Systemic safety initiative | 1 |

## 11. Program: Roadway Departure

**Date of Program Methodology: 10/1/2004**

**What data types were used in the program methodology?**

| *Crashes* | *Exposure* | *Roadway* |
|---|---|---|
| All crashes | Volume | Functional classification |
| Fatal and serious injury crashes only | | |

**What project identification methodology was used for this program?**
Crash frequency
Relative severity index
Excess proportions of specific crash types

**Are local roads (non-state owned and operated) included or addressed in this program?**
Yes
If yes, are local road projects identified using the same methodology as state roads?
Yes

**How are highway safety improvement projects advanced for implementation?**
Other-Systemic evaluation

**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

| | |
|---|---|
| Systemic safety initiative | 1 |

## 11. Program: Local Safety

**Date of Program Methodology: 2/8/2013**

**What data types were used in the program methodology?**

| *Crashes* | *Exposure* | *Roadway* |
|---|---|---|
| All crashes | Volume | Horizontal curvature |
| Fatal and serious injury crashes only | | Functional classification |
| | | Roadside features |

**What project identification methodology was used for this program?**

Crash frequency
Relative severity index
Excess proportions of specific crash types

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

Yes
If yes, are local road projects identified using the same methodology as state roads?
Yes

**How are highway safety improvement projects advanced for implementation?**

Other-Systemic evaluation

**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

| | |
|---|---|
| Systemic safety initiatives | 1 |

**12. What proportion of highway safety improvement program funds address systemic improvements?**

80%

**Highway safety improvement program funds are used to address which of the following systemic improvements?**

Cable Median Barriers
Rumble Strips
Pavement/Shoulder Widening
Install/Improve Signing
Install/Improve Pavement Marking and/or Delineation
Safety Edge
Other-Intersection improvments, wrong-way driving countermeasures, high friction surface treatments, and local safety initiatives. Other initiatives implemented due to policy change.

**13. What process is used to identify potential countermeasures?**

Engineering Study
Road Safety Assessment
Other-Enforcement and other stakeholders input.
Other-Peer Exchange - lessons learned

**14. Identify any program methodology practices used to implement the HSIP that have changed since the last reporting period.**

Other-Utilization of district safety plans to identify needs and improvments at the district level.

**15. Describe any other aspects of the Highway Safety Improvement Program methodology on which you would like to elaborate.**

MoDOT uses a systemic approach to safety project implementation. The top crash types have been determined and focus strategies have been identified for implementation for each district. The strategies are listed in MoDOT's Engineering Policy Guide at http://epg.modot.org/index.php?title=907.1_Safety_Program_Guidelines.

# Progress in Implementing Projects

## Funds Programmed

**16. Reporting period for Highway Safety Improvement Program funding.**

State Fiscal Year

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

| Funding Category | Programmed* | | Obligated | |
|---|---|---|---|---|
| | Amount | Percentage | Amount | Percentage |
| **HSIP (Section 148)** | $36,561,000.00 | 85 % | $38,439,734.00 | 78 % |
| **HRRRP (SAFETEA-LU)** | $0.00 | 0 % | $30,865.00 | 0 % |

| | | | | |
|---|---|---|---|---|
| **Penalty Transfer - Section 154** | $2,836,000.00 | 7 % | $7,991,571.00 | 16 % |
| **Other Federal-aid Funds (i.e. STP, NHPP)** | $3,575,000.00 | 8 % | $2,674,000.00 | 5 % |
| **Totals** | $42,972,000.00 | 100% | $49,136,170.00 | 100% |

**18. How much funding is programmed to local (non-state owned and operated) safety projects?**
0 %
**How much funding is obligated to local safety projects?**
0 %

**19. How much funding is programmed to non-infrastructure safety projects?**
0 %
**How much funding is obligated to non-infrastructure safety projects?**
0 %

**20. How much funding was transferred in to the HSIP from other core program areas during the reporting period?**
0 %
**How much funding was transferred out of the HSIP to other core program areas during the reporting period?**
0 %

**21. Discuss impediments to obligating Highway Safety Improvement Program funds and plans to overcome this in the future**.

The largest impediment to fully obligating HSIP funding in recent years relates to overall transportation funding. Due to limited state funding, this created an issue with fully programming the HSIP funding on safety projects. With a shrinking construction budget, MoDOT has been limited on the number of systemic safety improvements that can be implemented (an example is the adding of a paved shoulder with rumble strips - less paving projects also means fewer shoulder improvements). This resulted in a growth of unobligated HSIP funding.

Beginning in state fiscal year 2017, (started July 1, 2016) MoDOT's overall construction program has increased to near normal levels. MoDOT's leadership also increased the amount of safety funds available for programming by $10 million for FY2017. Together, these changes will enhance MoDOT's ability to fully obligate and program HSIP funds.

**22. Describe any other aspects of the general Highway Safety Improvement Program implementation progress on which you would like to elaborate.**

MoDOT has implemented numerous safety initiatives to reduce fatal and serious injury crashes on state-maintained highways. MoDOT is also looking at opportunities to fund necessary safety efforts at the local level. With the completion of our local strategic highway safety plans, we are now seeing some local safety initiatives in regards to identified needs (an example is curve improvements related to curve warning signs).

## General Listing of Projects

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

| Project | Improvement Category | Output | HSIP Cost | Total Cost | Funding Category | Functional Classification | AADT | Speed | Roadway Ownership | Relationship to SHSP | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Emphasis Area | Strategy |
| **High friction surface treatment on the westbound l** | Roadway Pavement surface - high friction surface | 0.36 Miles | 117000 | 143000 | Other Federal-aid Funds (i.e. STP, NHPP) | Urban Principal Arterial - Other Freeways and Expressways | 12599 | 60 | State Highway Agency | Lane Departure | Improve curve safety |
| **High friction surface treatment on southbound lane** | Roadway Pavement surface - high friction surface | 0.189 Miles | 57000 | 87000 | Other Federal-aid Funds (i.e. STP, NHPP) | Urban Principal Arterial - Other Freeways and Expressways | 8725 | 60 | State Highway Agency | Lane Departure | Improve curve safety |
| **Pavement and intersection improvements at various** | Intersection traffic control Intersection traffic control - other | 0.801 Miles | 682000 | 748000 | HSIP (Section 148) | Urban Principal Arterial - Other | 19812 | 45 | State Highway Agency | Intersections | Improve intersection safety |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Pavement and intersection improvements at various** | Intersection traffic control Intersection traffic control - other | 0.489 Miles | 743000 | 811000 | HSIP (Section 148) | Rural Minor Arterial | 7606 | 55 | State Highway Agency | Intersections | Improve intersection safety |
| **Bridge improvements at Front Street, Rte. 24 and R** | Roadside Barrier end treatments (crash cushions, terminals) | 0.35 Miles | 227000 | 3738000 | Penalty Transfer - Section 154 | Urban Principal Arterial - Interstate | 41550 | 60 | State Highway Agency | Lane Departure | Remove, shield, and/or delineate roadside obstacle |
| **Intersection and pavement improvements at Rte. F,** | Intersection traffic control Intersection traffic control - other | 0.692 Miles | 635000 | 701000 | HSIP (Section 148) | Rural Principal Arterial - Other Freeways and Expressways | 10826 | 65 | State Highway Agency | Intersections | Improve intersection safety |
| **High friction surface treatment to both lanes of t** | Roadway Pavement surface - high friction surface | 0.217 Miles | 77000 | 94000 | Other Federal-aid Funds (i.e. STP, NHPP) | Urban Principal Arterial - Interstate | 12383 | 60 | State Highway Agency | Lane Departure | Improve pavement friction |
| **On-call work zone enforcement at various locations** | Work Zone | 1 Numbers | 226761 | 252000 | HSIP (Section 148) | Various Routes | 1 | 1 | State Highway Agency | Work Zones | Increase enforcement efforts |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Pavement, shoulder and signal improvements from Rt** | Intersection traffic control Intersection signing - miscellaneous/other/unspecified | 1 Numbers | 887000 | 1853000 | HSIP (Section 148) | Rural Minor Arterial | 677 | 55 | State Highway Agency | Intersections | Improve intersection safety |
| **Pavement improvements on the eastbound and westbou** | Intersection geometry Auxiliary lanes - miscellaneous/other/unspecified | 22.1 Miles | 298000 | 6035000 | HSIP (Section 148) | Rural Principal Arterial - Other Freeways and Expressways | 20000 | 70 | State Highway Agency | Intersections | Improve intersection safety |
| **Pavement, shoulders and curve improvements from we** | Roadway Rumble strips - edge or shoulder | 2.242 Miles | 1976000 | 2329000 | HSIP (Section 148) | Rural Major Collector | 1488 | 55 | State Highway Agency | Lane Departure | Install center and edgeline rumble strips |
| **Construct left turn lane and shoulder additions fr** | Intersection geometry Auxiliary lanes - add left-turn lane | 1 Numbers | 1248000 | 4217000 | HSIP (Section 148) | Urban Minor Arterial | 9590 | 55 | State Highway Agency | Intersections | Improve intersection safety |
| **Signal, lighting and ADA facilities improvements a** | Intersection traffic control Intersection traffic control - other | 1 Numbers | 649000 | 675000 | HSIP (Section 148) | Urban Principal Arterial - Other | 10833 | 55 | State Highway Agency | Intersections | Improve intersection safety |
| **Signal, lighting and ADA facilities** | Intersection traffic control Intersection traffic control - other | 1 Numbers | 573000 | 597000 | HSIP (Section 148) | Rural Principal Arterial - Other | 7422 | 55 | State Highway Agency | Intersections | Improve intersection safety |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **improvements a** | | | | | | | | | | | |
| **On-call work zone enforcement at various locations** | Work Zone | 1 Numbers | 518000 | 576000 | HSIP (Section 148) | Various Routes | 1 | 1 | State Highway Agency | Work Zones | Increase enforcement efforts |
| **Pavement and safety improvements from Rte. 76 to R** | Roadway Rumble strips - edge or shoulder | 14.14 Miles | 593000 | 1446000 | Penalty Transfer - Section 154 | Rural Major Collector | 2273 | 55 | State Highway Agency | Lane Departure | Install center and edgeline rumble strips |
| **Pavement and safety improvements from Bus. 37 to R** | Roadway Rumble strips - edge or shoulder | 1.39 Miles | 44000 | 345000 | HSIP (Section 148) | Rural Minor Arterial | 1246 | 55 | State Highway Agency | Lane Departure | Install center and edgeline rumble strips |
| **Pavement and safety improvements from Rte. 97 to R** | Roadway Rumble strips - edge or shoulder | 4.677 Miles | 129000 | 473000 | HSIP (Section 148) | Rural Major Collector | 1860 | 55 | State Highway Agency | Lane Departure | Install center and edgeline rumble strips |
| **Pavement and safety improvements from Rte. BB west** | Roadway Rumble strips - edge or shoulder | 24.985 Miles | 631000 | 2368000 | HSIP (Section 148) | Rural Minor Arterial | 1000 | 55 | State Highway Agency | Lane Departure | Install center and edgeline rumble strips |
| **Pavement** | Shoulder treatments | 4.29 | 13170 | 248400 | HSIP | Rural | 247 | 65 | State | Lane | Add and |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **and safety improvements from Rte. 52 west** | Widen shoulder - paved or other | Miles | 00 | 0 | (Section 148) | Principal Arterial - Other Freeways and Expressways | 2 | | Highway Agency | Departure | improve shoulders |
| **High friction surface treatment on curves near Ric** | Roadway Pavement surface - high friction surface | 0.097 Miles | 55000 | 61000 | HSIP (Section 148) | Urban Principal Arterial - Other | 13282 | 55 | State Highway Agency | Lane Departure | Improve curve safety |
| **Pavement improvements from west of Rte. 266 (Chest** | Roadside Barrier- metal | 17.79 Miles | 4727000 | 5520000 | HSIP (Section 148) | Rural Principal Arterial - Interstate | 35000 | 60 | State Highway Agency | Lane Departure | Remove, shield, and/or delineate roadside obstacle |
| **Safety improvements on various sections of Glensto** | Intersection traffic control Intersection signing - add enhanced advance warning (double-up and/or oversize) | 6.419 Miles | 603000 | 658000 | Penalty Transfer - Section 154 | Urban Principal Arterial - Other | 9814 | 40 | State Highway Agency | Intersections | Improve intersection safety |
| **Operational and roadway improvements from north of** | Roadside Barrier - concrete | 2.79 Miles | 1089000 | 12249000 | HSIP (Section 148) | Urban Principal Arterial - Other Freeways and Expressways | 2386 | 65 | State Highway Agency | Lane Departure | Install median barrier |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Pavement and safety improvements from I-44 to Rte.** | Roadway Rumble strips - edge or shoulder | 23.139 Miles | 753000 | 2000000 | Penalty Transfer - Section 154 | Rural Major Collector | 616 | 55 | State Highway Agency | Lane Departure | Install center and edgeline rumble strips |
| **Safety improvements at the intersection of Rte. 43** | Intersection geometry Intersection geometrics - miscellaneous/other/unspecified | 1 Numbers | 1784000 | 1784000 | Penalty Transfer - Section 154 | Rural Principal Arterial - Other Freeways and Expressways | 1799 | 65 | State Highway Agency | Intersections | Improve intersection safety |
| **High friction surface treatment 0.9 mile south of** | Roadway Pavement surface - high friction surface | 0.338 Miles | 67000 | 111000 | Penalty Transfer - Section 154 | Rural Principal Arterial - Other | 4044 | 55 | State Highway Agency | Lane Departure | Improve curve safety |
| **On-call work zone enforcement at various locations** | Work Zone | 1 Numbers | 4691 | 5212 | HSIP (Section 148) | Various Routes | 1 | 1 | State Highway Agency | Work Zones | Increase enforcement efforts |
| **On-call work zone enforcement at various locations** | Work Zone | 1 Numbers | 25000 | 27000 | HSIP (Section 148) | Various Routes | 1 | 1 | State Highway Agency | Work Zones | Increase enforcement efforts |
| **Replace nonstandar** | Roadside Barrier - other | 1 Numb | 63000 | 69000 | HSIP (Sectio | Various Routes | 1 | 1 | State Highway | Lane Departure | Remove, shield, |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **d guardrail, installation of gua** | | ers | | | n 148) | | | | Agency | | and/or delineate roadside obstacle |
| **Relocate and new grade separation from near Hamilt** | Railroad grade crossings Grade separation | 1 Numbers | 2250000 | 6343000 | Other Federal-aid Funds (i.e. STP, NHPP) | Rural Major Collector | 2554 | 55 | State Highway Agency | Intersections | Improve intersection safety |
| **High friction surface treatment on curves east of** | Roadway Pavement surface - high friction surface | 0.249 Miles | 94000 | 123000 | Other Federal-aid Funds (i.e. STP, NHPP) | Rural Principal Arterial - Other Freeways and Expressways | 12399 | 65 | State Highway Agency | Lane Departure | Improve curve safety |
| **High friction surface treatment on ramp curves at** | Roadway Pavement surface - high friction surface | 1 Numbers | 79000 | 95000 | Other Federal-aid Funds (i.e. STP, NHPP) | Urban Principal Arterial - Interstate | 3628 | 70 | State Highway Agency | Lane Departure | Improve curve safety |
| **Guardrail improvements at various locations along** | Roadside Barrier- metal | 222.303 Miles | 683000 | 703000 | HSIP (Section 148) | Various Routes | 1 | 1 | State Highway Agency | Lane Departure | Remove, shield, and/or delineate roadside obstacle |
| **Pavement improveme** | Shoulder treatments Widen shoulder - paved | 11.91 Miles | 1398000 | 1753000 | HSIP (Sectio | Urban Major | 745 | 55 | State Highway | Lane Departure | Add and improve |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **nts and adding two foot shoulder** | or other | | | | n 148) | Collector | | | Agency | | shoulders |
| **Pavement improvements and widening for shoulders a** | Roadway Rumble strips - edge or shoulder | 4.129 Miles | 306000 | 845000 | HSIP (Section 148) | Urban Minor Arterial | 2432 | 55 | State Highway Agency | Lane Departure | Install center and edgeline rumble strips |
| **Striping of various routes across the state** | Roadway delineation Improve retroreflectivity | 1 Numbers | 19347 | 19347 | HSIP (Section 148) | Various | 1 | 1 | State Highway Agency | Lane Departure | Maintain roadway visibility features |

# Progress in Achieving Safety Performance Targets

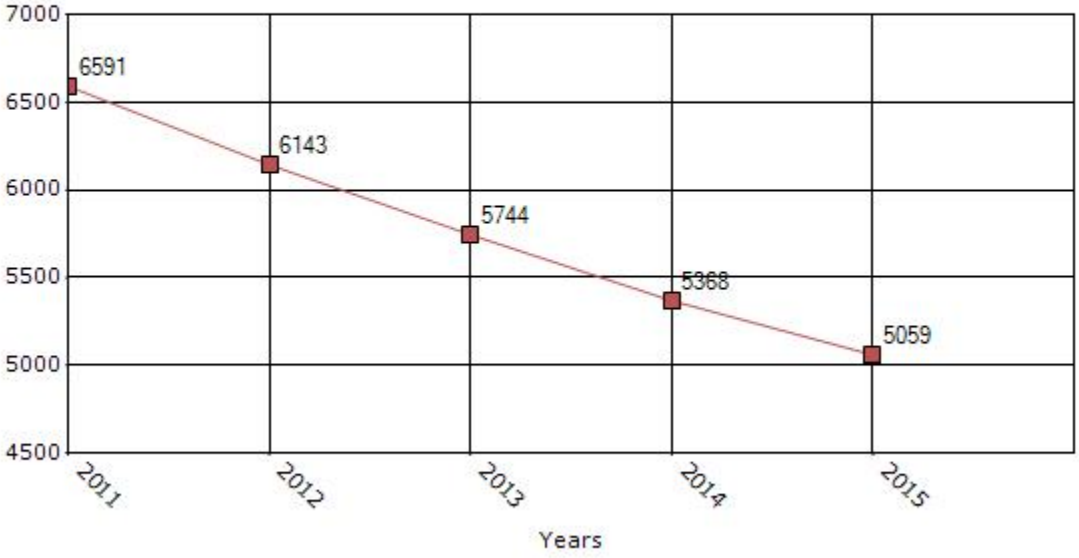
## Overview of General Safety Trends

**24. Present data showing the general highway safety trends in the state for the past five years.**

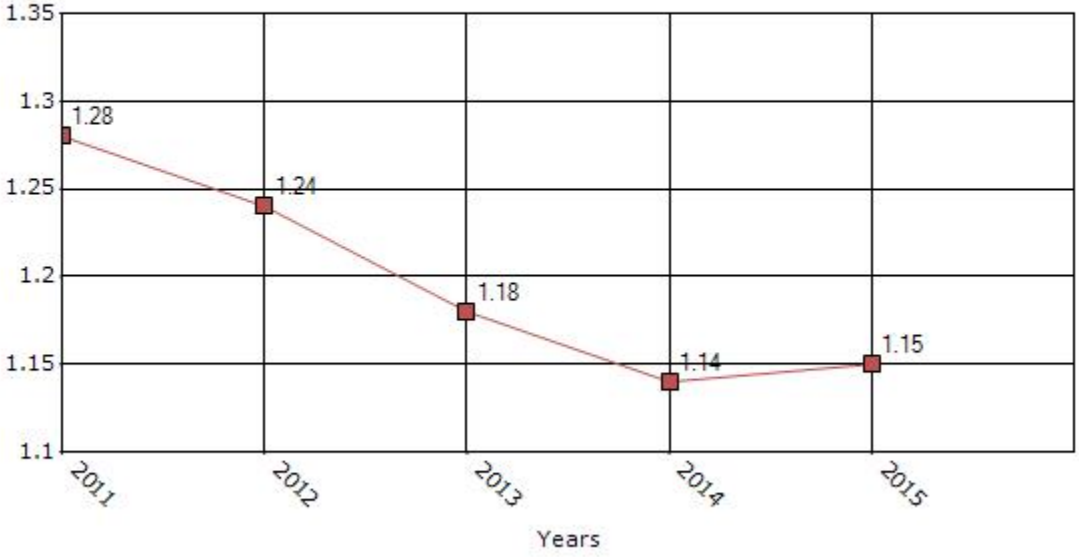
| Performance Measures* | 2011 (5-yr avg) | 2012 (5-yr avg) | 2013 (5-yr avg) | 2014 (5-yr avg) | 2015 (5-yr avg) |
|---|---|---|---|---|---|
| **Number of fatalities** | 887 | 854 | 814 | 791 | 801 |
| **Number of serious injuries** | 6591 | 6143 | 5744 | 5368 | 5059 |
| **Fatality rate (per HMVMT)** | 1.28 | 1.24 | 1.18 | 1.14 | 1.15 |
| **Serious injury rate (per HMVMT)** | 9.54 | 8.91 | 8.29 | 7.71 | 7.25 |

*Performance measure data is presented using a five-year rolling average.

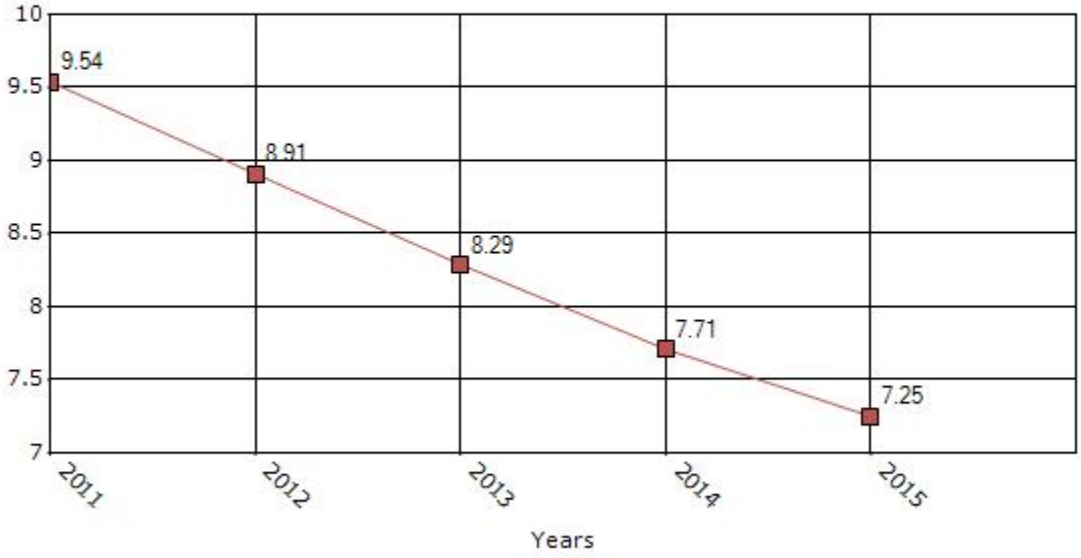
## Number of Serious Injuries for the Last Five Years
## 5-yr Average Measure Data




## Rate of Fatalities for the Last Five Years
## 5-yr Average Measure Data



## Rate of Serious Injuries for the Last Five Years
## 5-yr Average Measure Data

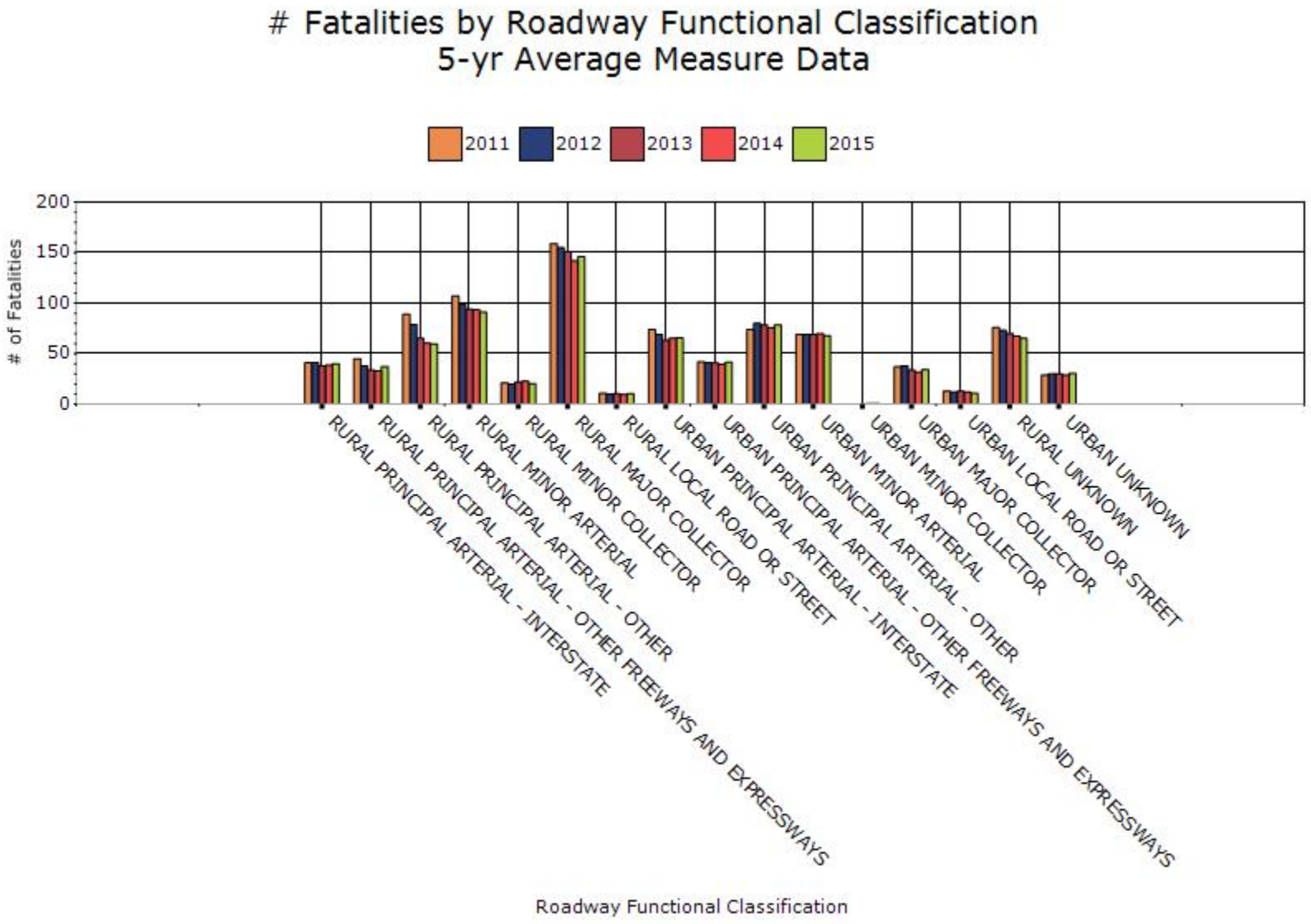


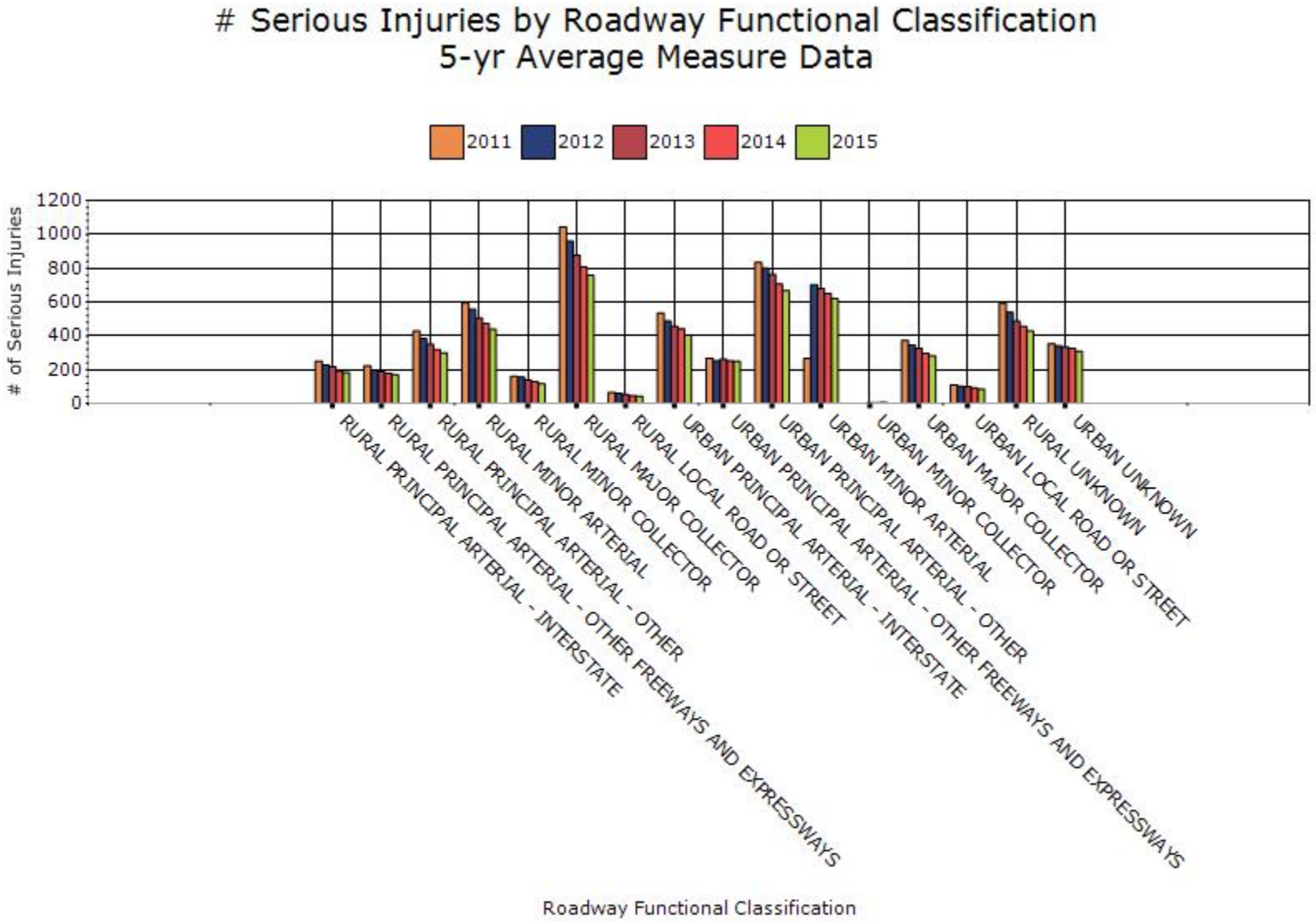
**25. To the maximum extent possible, present performance measure data by functional classification and ownership.**

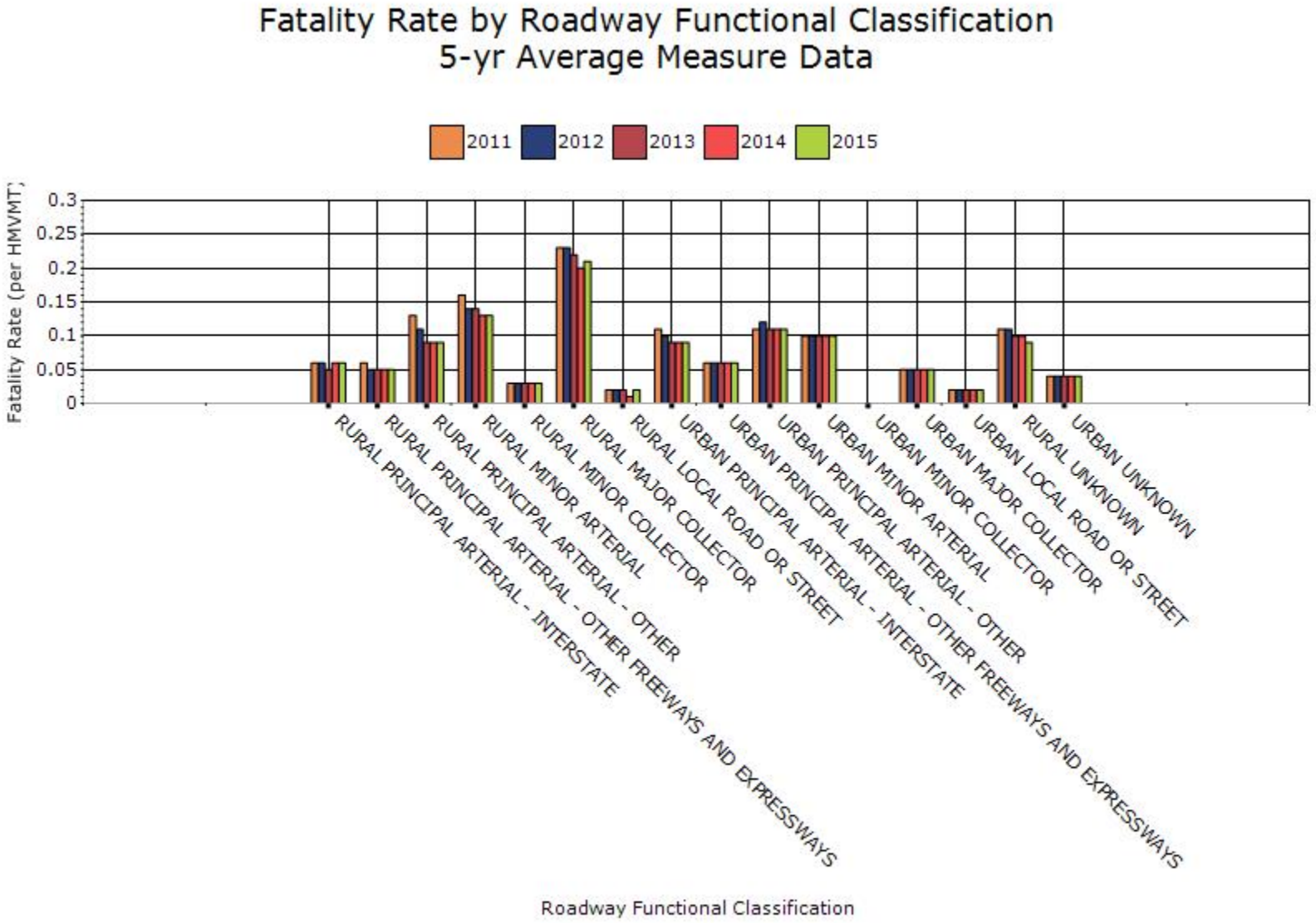
## Year - 2015

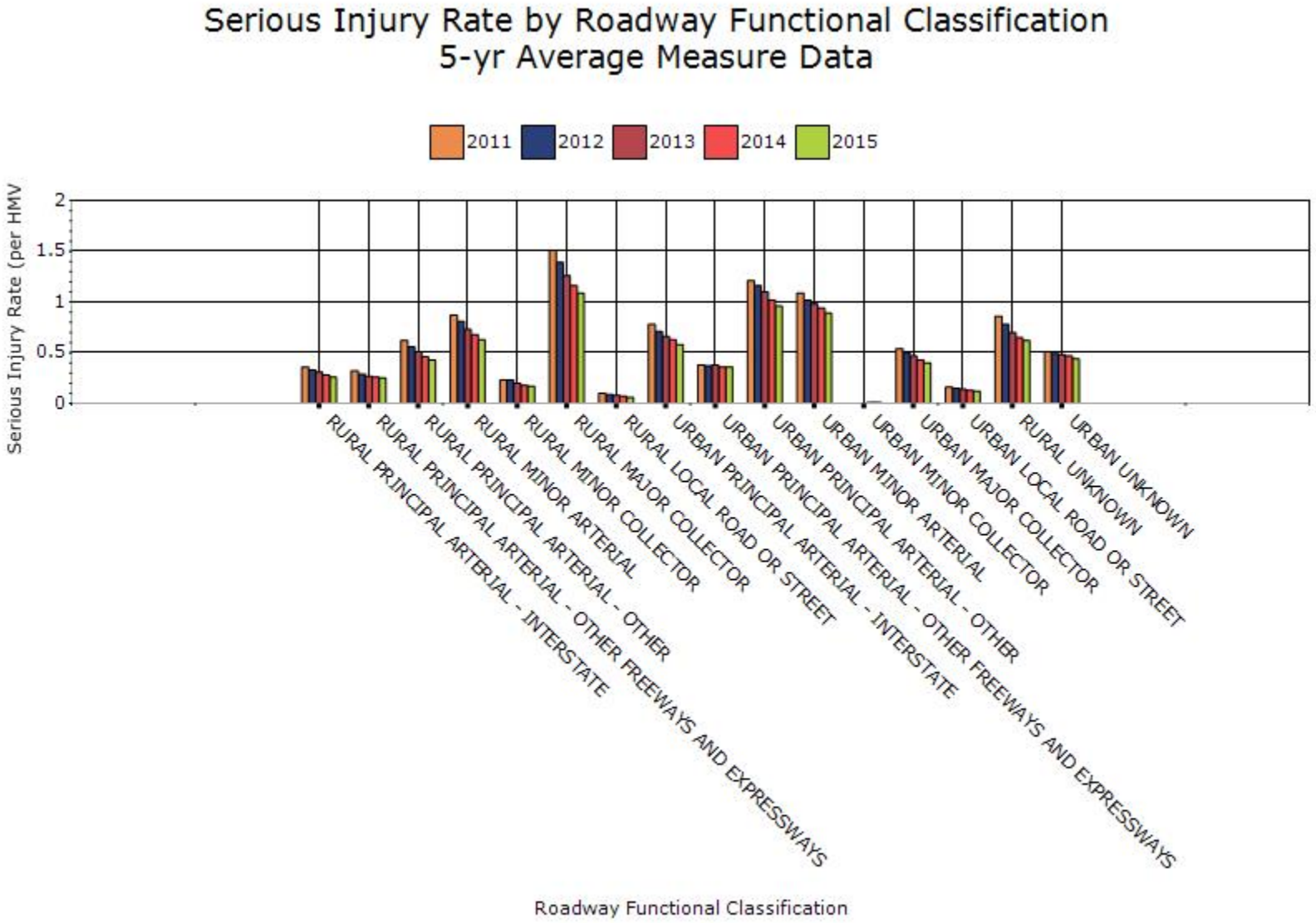
| Function Classification | Number of fatalities (5-yr avg) | Number of serious injuries (5-yr avg) | Fatality rate (per HMVMT) (5-yr avg) | Serious injury rate (per HMVMT) (5-yr avg) |
|---|---|---|---|---|
| **RURAL PRINCIPAL ARTERIAL - INTERSTATE** | 40 | 183 | 0.06 | 0.26 |
| **RURAL PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXPRESSWAYS** | 37.2 | 171.2 | 0.05 | 0.25 |
| **RURAL PRINCIPAL ARTERIAL - OTHER** | 59.6 | 298.4 | 0.09 | 0.43 |
| **RURAL MINOR ARTERIAL** | 91.2 | 438.8 | 0.13 | 0.63 |
| **RURAL MINOR COLLECTOR** | 20.4 | 115.8 | 0.03 | 0.17 |
| **RURAL MAJOR COLLECTOR** | 146.2 | 759 | 0.21 | 1.09 |
| **RURAL LOCAL ROAD OR STREET** | 10.6 | 43.2 | 0.02 | 0.06 |
| **URBAN PRINCIPAL ARTERIAL - INTERSTATE** | 65.6 | 403.8 | 0.09 | 0.58 |
| **URBAN PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXPRESSWAYS** | 41.8 | 250 | 0.06 | 0.36 |
| **URBAN PRINCIPAL ARTERIAL - OTHER** | 78.6 | 667.4 | 0.11 | 0.96 |
| **URBAN MINOR ARTERIAL** | 68 | 620.8 | 0.1 | 0.89 |

| | | | | |
|---|---|---|---|---|
| **URBAN MINOR COLLECTOR** | 0.8 | 5.6 | | 0.01 |
| **URBAN MAJOR COLLECTOR** | 34.2 | 280.4 | 0.05 | 0.4 |
| **URBAN LOCAL ROAD OR STREET** | 10.8 | 85.6 | 0.02 | 0.12 |
| **RURAL UNKNOWN** | 65.2 | 428.4 | 0.09 | 0.62 |
| **URBAN UNKNOWN** | 30.6 | 307.6 | 0.04 | 0.44 |


# Fatalities by Roadway Functional Classification
5-yr Average Measure Data
2011
2012
2013
2014
2015
# of Fatalities
200
150
100
50
0
RURAL PRINCIPAL ARTERIAL - INTERSTATE
RURAL PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXPRESSWAYS
RURAL PRINCIPAL ARTERIAL - OTHER
RURAL MINOR ARTERIAL
RURAL MINOR COLLECTOR
RURAL MAJOR COLLECTOR
RURAL LOCAL ROAD OR STREET
URBAN PRINCIPAL ARTERIAL - INTERSTATE
URBAN PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXPRESSWAYS
URBAN PRINCIPAL ARTERIAL - OTHER
URBAN MINOR ARTERIAL
URBAN MINOR COLLECTOR
URBAN MAJOR COLLECTOR
URBAN LOCAL ROAD OR STREET
RURAL UNKNOWN
URBAN UNKNOWN
Roadway Functional Classification

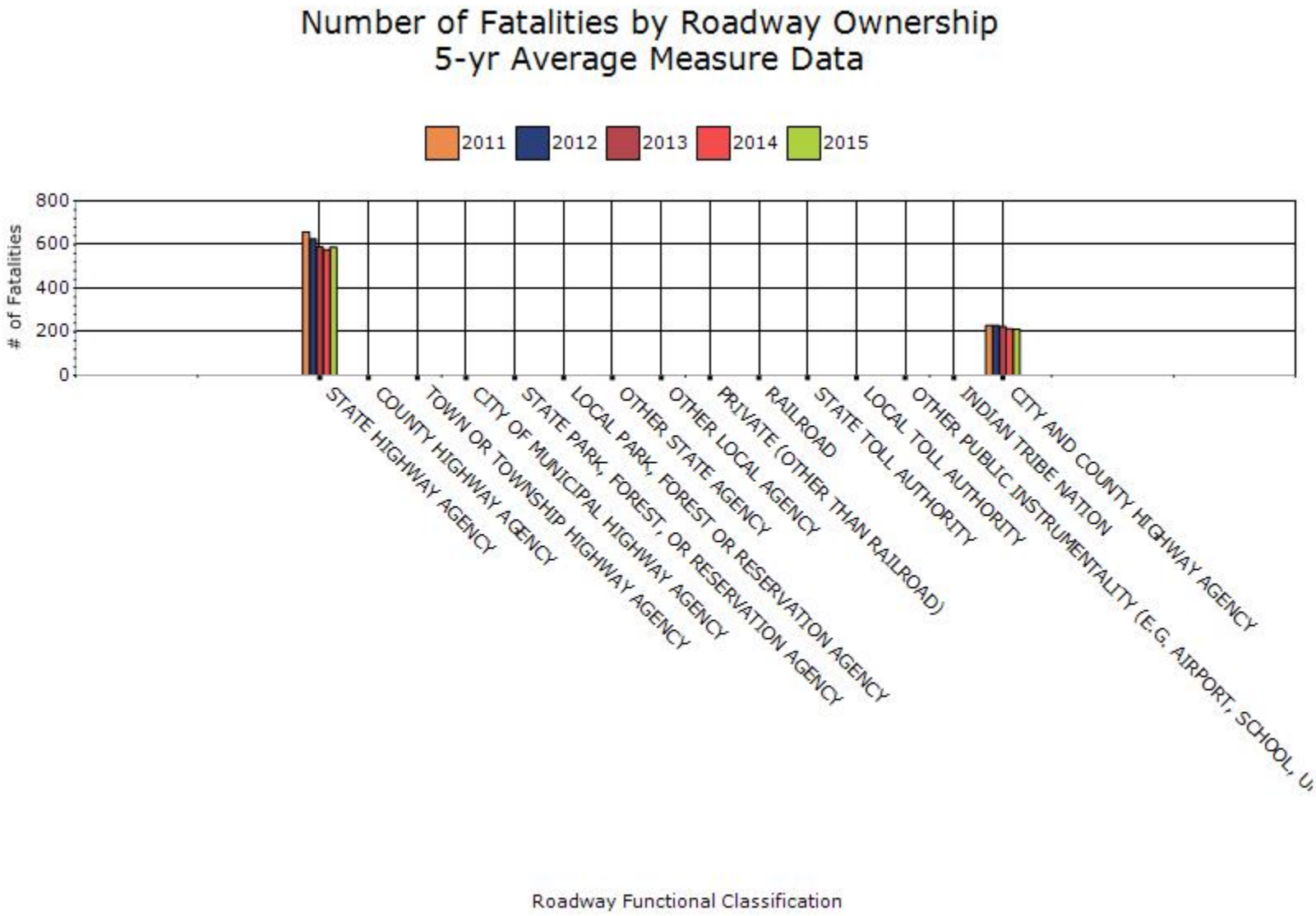

# Serious Injuries by Roadway Functional Classification
5-yr Average Measure Data
2011
2012
2013
2014
2015
# of Serious Injuries
1200
1000
800
600
400
200
0
RURAL PRINCIPAL ARTERIAL - INTERSTATE
RURAL PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXPRESSWAYS
RURAL PRINCIPAL ARTERIAL - OTHER
RURAL MINOR ARTERIAL
RURAL MINOR COLLECTOR
RURAL MAJOR COLLECTOR
RURAL LOCAL ROAD OR STREET
URBAN PRINCIPAL ARTERIAL - INTERSTATE
URBAN PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXPRESSWAYS
URBAN PRINCIPAL ARTERIAL - OTHER
URBAN MINOR ARTERIAL
URBAN MINOR COLLECTOR
URBAN MAJOR COLLECTOR
URBAN LOCAL ROAD OR STREET
RURAL UNKNOWN
URBAN UNKNOWN
Roadway Functional Classification

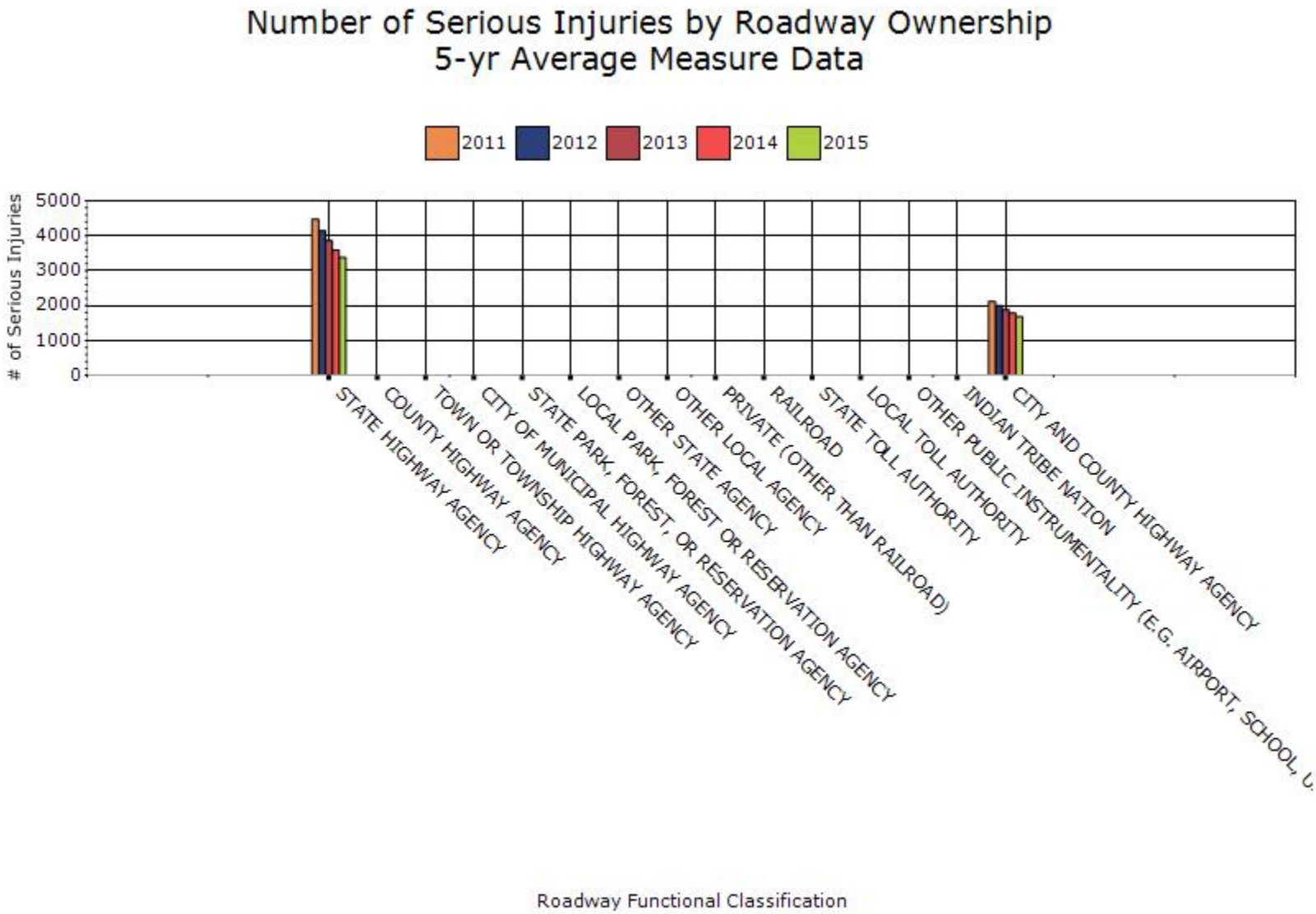

Fatality Rate by Roadway Functional Classification
5-yr Average Measure Data
2011
2012
2013
2014
2015
Fatality Rate (per HMVMT)
0.3
0.25
0.2
0.15
0.1
0.05
0
RURAL PRINCIPAL ARTERIAL - INTERSTATE
RURAL PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXPRESSWAYS
RURAL PRINCIPAL ARTERIAL - OTHER
RURAL MINOR ARTERIAL
RURAL MINOR COLLECTOR
RURAL MAJOR COLLECTOR
RURAL LOCAL ROAD OR STREET
URBAN PRINCIPAL ARTERIAL - INTERSTATE
URBAN PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXPRESSWAYS
URBAN PRINCIPAL ARTERIAL - OTHER
URBAN MINOR ARTERIAL
URBAN MINOR COLLECTOR
URBAN MAJOR COLLECTOR
URBAN LOCAL ROAD OR STREET
RURAL UNKNOWN
URBAN UNKNOWN
Roadway Functional Classification

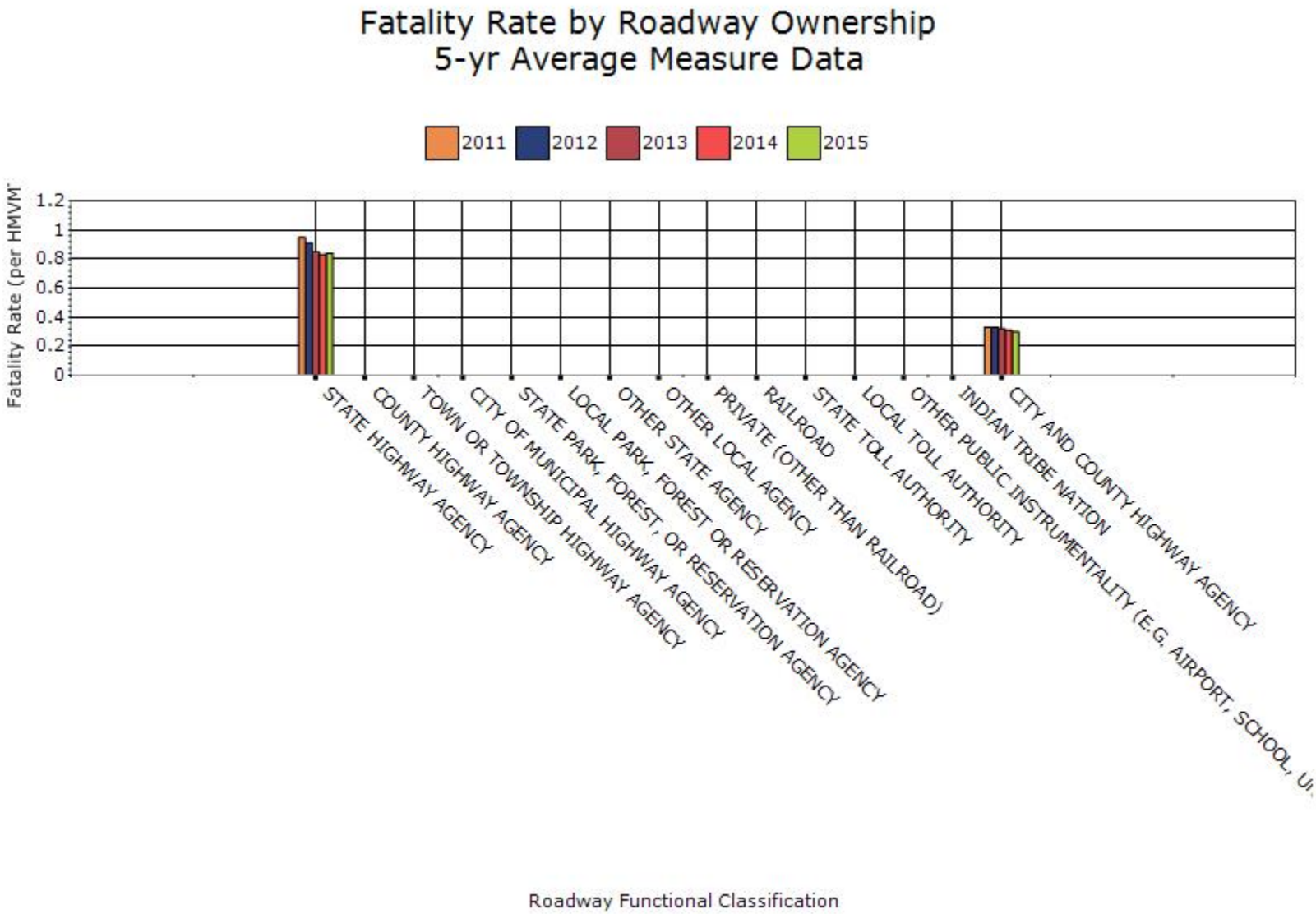

Serious Injury Rate by Roadway Functional Classification
5-yr Average Measure Data
2011
2012
2013
2014
2015
Serious Injury Rate (per HMV
2
1.5
1
0.5
0
RURAL PRINCIPAL ARTERIAL - INTERSTATE
RURAL PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXPRESSWAYS
RURAL PRINCIPAL ARTERIAL - OTHER
RURAL MINOR ARTERIAL
RURAL MINOR COLLECTOR
RURAL MAJOR COLLECTOR
RURAL LOCAL ROAD OR STREET
URBAN PRINCIPAL ARTERIAL - INTERSTATE
URBAN PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXPRESSWAYS
URBAN PRINCIPAL ARTERIAL - OTHER
URBAN MINOR ARTERIAL
URBAN MINOR COLLECTOR
URBAN MAJOR COLLECTOR
URBAN LOCAL ROAD OR STREET
RURAL UNKNOWN
URBAN UNKNOWN
Roadway Functional Classification

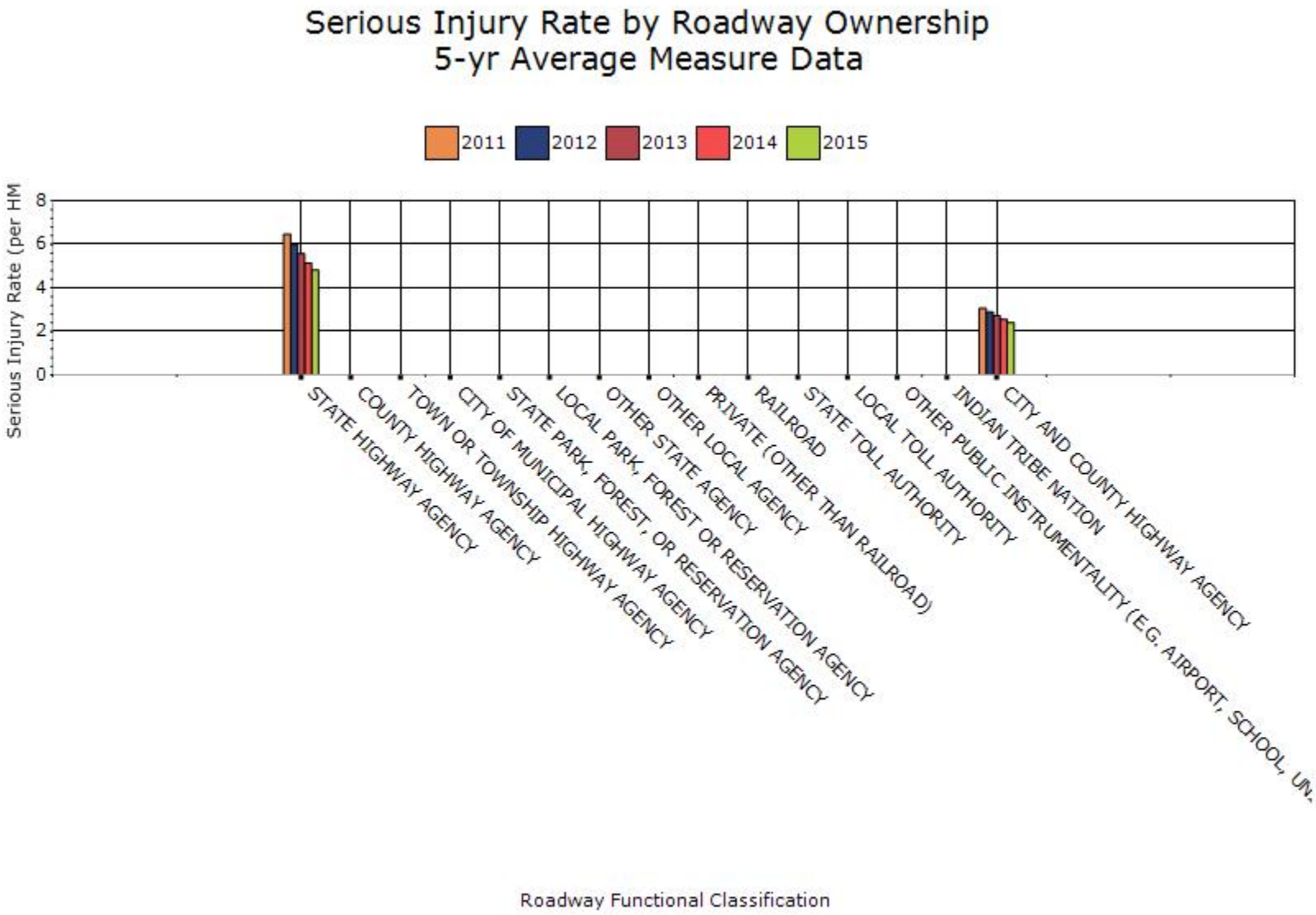
## Year - 2015

| Roadway Ownership | Number of fatalities | Number of serious injuries | Fatality rate (per HMVMT) | Serious injury rate (per HMVMT) |
|---|---|---|---|---|
| **STATE HIGHWAY AGENCY** | 588 | 3376 | 0.84 | 4.83 |
| **CITY AND COUNTY HIGHWAY AGENCY** | 213 | 1683 | 0.3 | 2.41 |


Number of Fatalities by Roadway Ownership
5-yr Average Measure Data
2011
2012
2013
2014
2015
# of Fatalities
800
600
400
200
0
STATE HIGHWAY AGENCY
COUNTY HIGHWAY AGENCY
TOWN OR TOWNSHIP HIGHWAY AGENCY
CITY OF MUNICIPAL HIGHWAY AGENCY
STATE PARK, FOREST, OR RESERVATION AGENCY
LOCAL PARK, FOREST OR RESERVATION AGENCY
OTHER STATE AGENCY
OTHER LOCAL AGENCY
PRIVATE (OTHER THAN RAILROAD)
RAILROAD
STATE TOLL AUTHORITY
LOCAL TOLL AUTHORITY
OTHER PUBLIC INSTRUMENTALITY (E.G. AIRPORT, SCHOOL, U
INDIAN TRIBE NATION
CITY AND COUNTY HIGHWAY AGENCY
Roadway Functional Classification


Number of Serious Injuries by Roadway Ownership
5-yr Average Measure Data
2011
2012
2013
2014
2015
# of Serious Injuries
5000
4000
3000
2000
1000
0
STATE HIGHWAY AGENCY
COUNTY HIGHWAY AGENCY
TOWN OR TOWNSHIP HIGHWAY AGENCY
CITY OF MUNICIPAL HIGHWAY AGENCY
STATE PARK, FOREST, OR RESERVATION AGENCY
LOCAL PARK, FOREST OR RESERVATION AGENCY
OTHER STATE AGENCY
OTHER LOCAL AGENCY
PRIVATE (OTHER THAN RAILROAD)
RAILROAD
STATE TOLL AUTHORITY
LOCAL TOLL AUTHORITY
OTHER PUBLIC INSTRUMENTALITY (E.G. AIRPORT, SCHOOL, U
INDIAN TRIBE NATION
CITY AND COUNTY HIGHWAY AGENCY
Roadway Functional Classification


Fatality Rate by Roadway Ownership
5-yr Average Measure Data
2011
2012
2013
2014
2015
Fatality Rate (per HMVM
1.2
1
0.8
0.6
0.4
0.2
0
STATE HIGHWAY AGENCY
COUNTY HIGHWAY AGENCY
TOWN OR TOWNSHIP HIGHWAY AGENCY
CITY OF MUNICIPAL HIGHWAY AGENCY
STATE PARK, FOREST, OR RESERVATION AGENCY
LOCAL PARK, FOREST OR RESERVATION AGENCY
OTHER STATE AGENCY
OTHER LOCAL AGENCY
PRIVATE (OTHER THAN RAILROAD)
RAILROAD
STATE TOLL AUTHORITY
LOCAL TOLL AUTHORITY
OTHER PUBLIC INSTRUMENTALITY (E.G. AIRPORT, SCHOOL, U
INDIAN TRIBE NATION
CITY AND COUNTY HIGHWAY AGENCY
Roadway Functional Classification


Serious Injury Rate by Roadway Ownership
5-yr Average Measure Data
2011
2012
2013
2014
2015
Serious Injury Rate (per HM
8
6
4
2
0
STATE HIGHWAY AGENCY
COUNTY HIGHWAY AGENCY
TOWN OR TOWNSHIP HIGHWAY AGENCY
CITY OF MUNICIPAL HIGHWAY AGENCY
STATE PARK, FOREST, OR RESERVATION AGENCY
LOCAL PARK, FOREST OR RESERVATION AGENCY
OTHER STATE AGENCY
OTHER LOCAL AGENCY
PRIVATE (OTHER THAN RAILROAD)
RAILROAD
STATE TOLL AUTHORITY
LOCAL TOLL AUTHORITY
OTHER PUBLIC INSTRUMENTALITY (E.G. AIRPORT, SCHOOL, UN.
INDIAN TRIBE NATION
CITY AND COUNTY HIGHWAY AGENCY
Roadway Functional Classification

**26. Describe any other aspects of the general highway safety trends on which you would like to elaborate**.

MoDOT has placed a large safety emphasis on the major roads in the state (both urban and rural). These major roads are considered the interstate, freeways & expressways, and principal arterials. These roads also carry the largest traffic volumes in our state. Over time, the focus has shifted to provide safety improvements on additional miles of higher traveled minor roads, primarily through the addition of 2-foot shoulders with rumble strips. While overall fatalities were up in Missouri for 2015, the number of fatalities on state-maintained minor roads decreased by about 7%. Intersection and pedestrian fatalities both increased by about 50% in 2015.

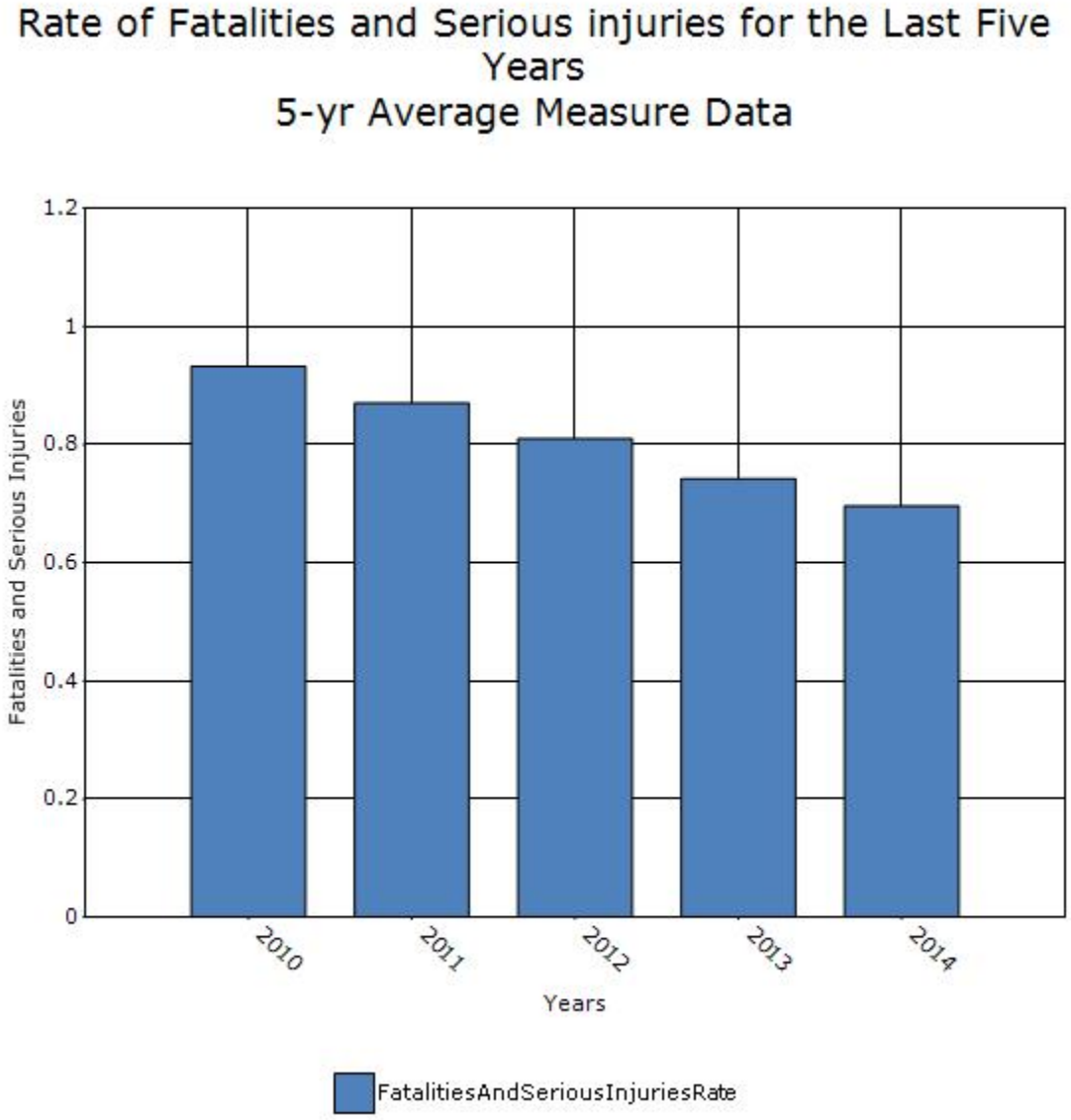
## Application of Special Rules

**27. Present the rate of traffic fatalities and serious injuries per capita for drivers and pedestrians 65 years of age and older.**

| Older Driver Performance Measures | 2010 (5-yr avg) | 2011 (5-yr avg) | 2012 (5-yr avg) | 2013 (5-yr avg) | 2014 (5-yr avg) |
|---|---|---|---|---|---|
| **Fatality rate (per capita)** | 0.186 | 0.176 | 0.164 | 0.154 | 0.152 |
| **Serious injury rate (per capita)** | 0.746 | 0.694 | 0.646 | 0.588 | 0.544 |
| **Fatality and serious injury rate (per capita)** | 0.932 | 0.87 | 0.81 | 0.742 | 0.696 |

*Performance measure data is presented using a five-year rolling average.

Example: 5-Yr Rate Ending in 2014: (F+SI 2014 Drivers and Pedestrians 65 years of age and older/2014 Population Figure) + (F+SI 2013 Drivers and Pedestrians 65 years of age and older /2013 Population Figure) + (F+SI 2012 Drivers and Pedestrians 65 years of age and older/2012 Population Figure) + (F+SI 2011 Drivers and Pedestrians 65 years of age and older/2011 Population Figure) + (F+SI 2010 Drivers and Pedestrians 65 years of age and older/2010 Population Figure) / 5




**28. Does the older driver special rule apply to your state?**

No

## Assessment of the Effectiveness of the Improvements (Program Evaluation)

**29. What indicators of success can you use to demonstrate effectiveness and success in the Highway Safety Improvement Program?**

Other-Evaluation of individual HSIP projects and programs

**30. What significant programmatic changes have occurred since the last reporting period?**

None

**31. Briefly describe significant program changes that have occurred since the last reporting period**.

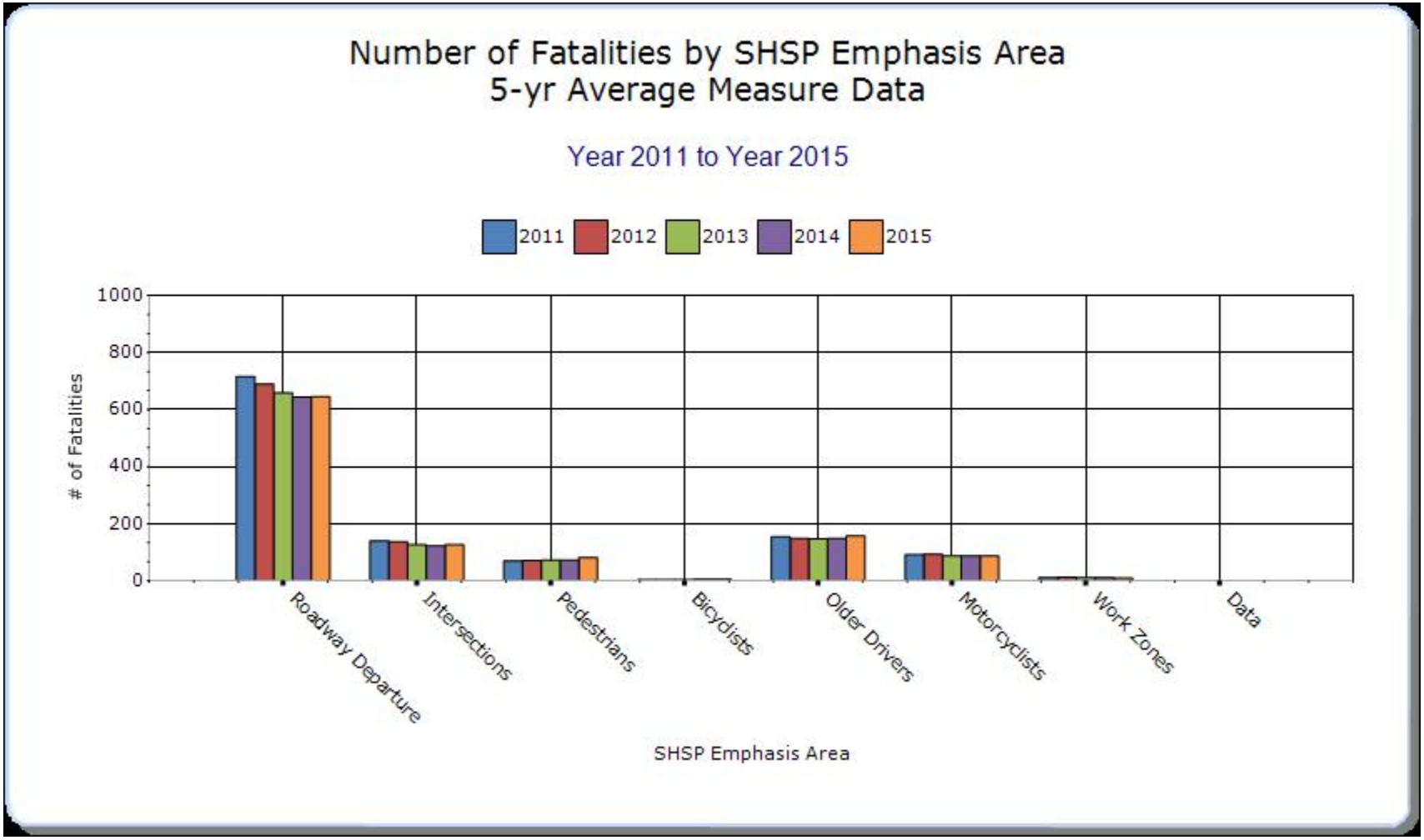
There have been no significant program changes since the last reporting period. MoDOT is researching opportunities to use HSIP funds on local roads.

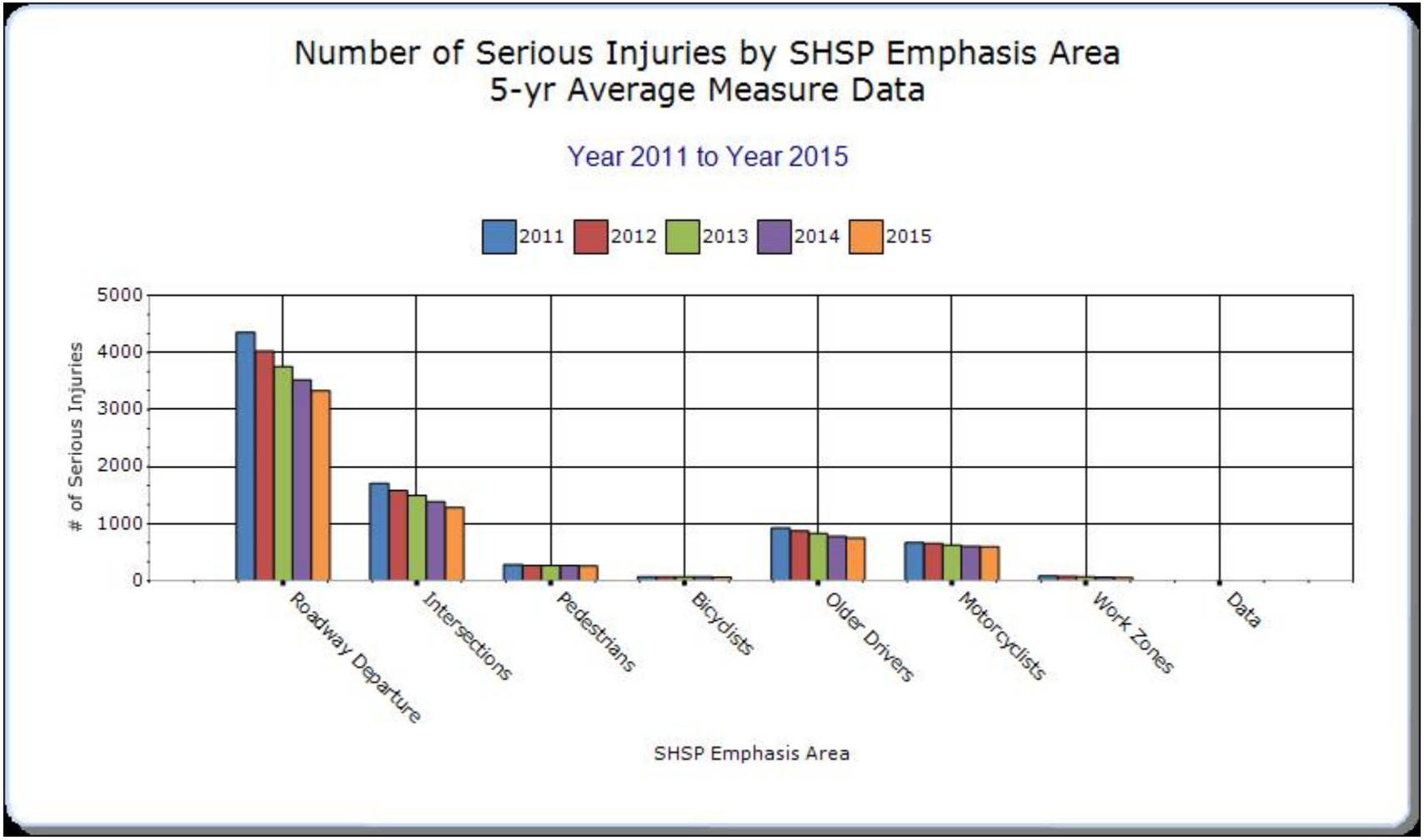
## SHSP Emphasis Areas

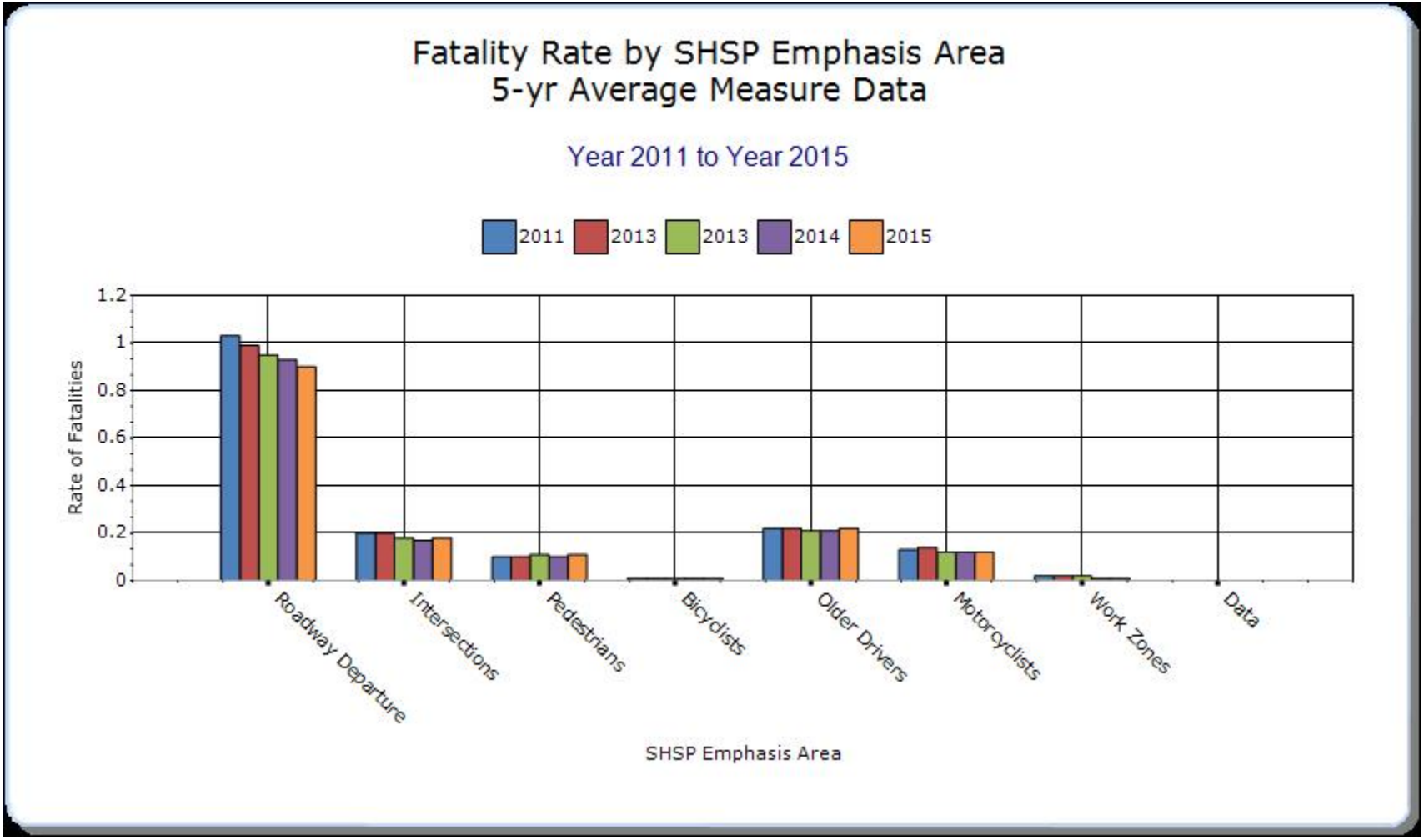
**32. Present and describe trends in SHSP emphasis area performance measures.**

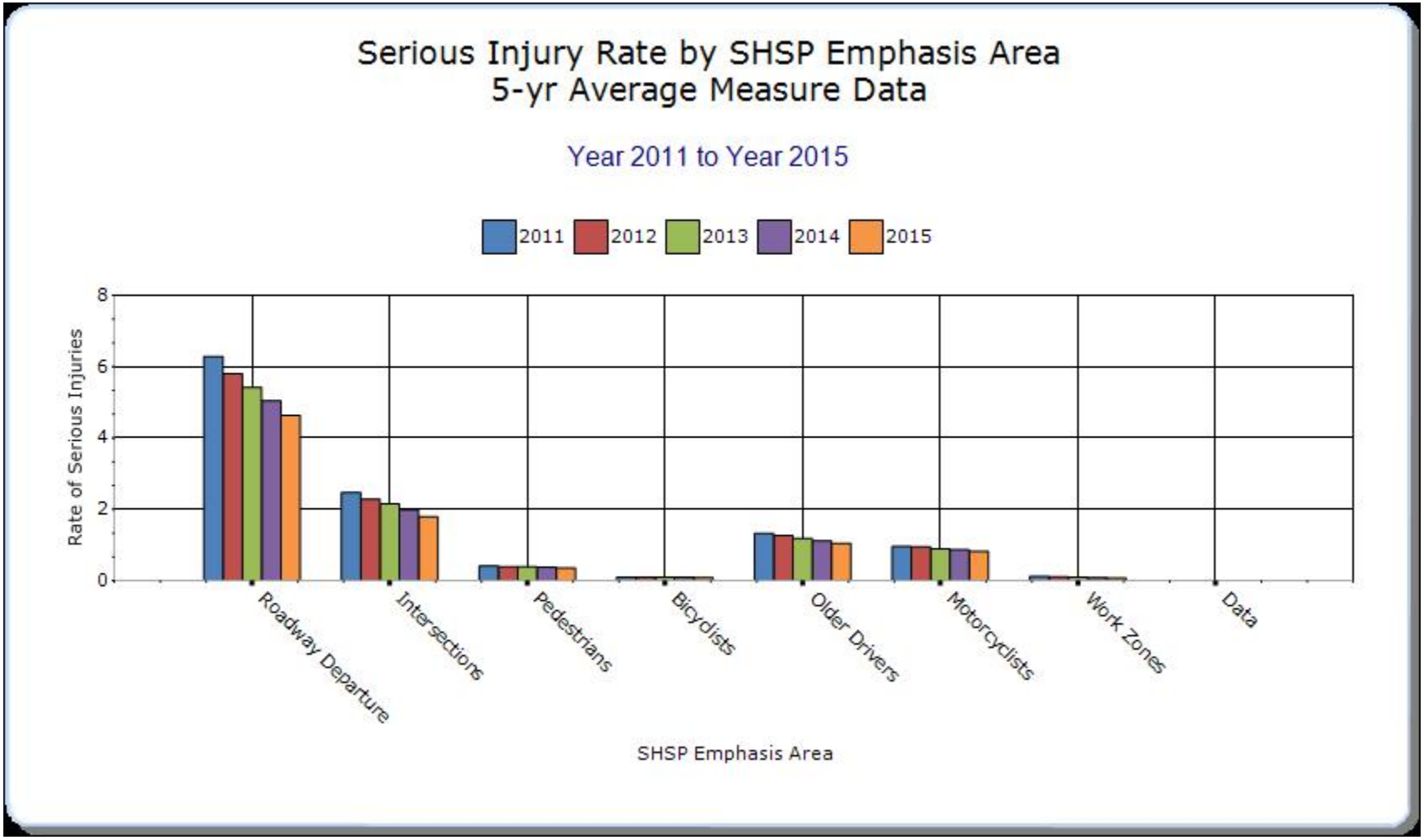
**Year - 2015**

| HSIP-related SHSP Emphasis Areas | Target 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 (5-yr avg) | Other-2 (5-yr avg) | Other-3 (5-yr avg) |
|---|---|---|---|---|---|---|---|---|
| **Roadway Departure** | Lane Departure | 644.8 | 3333 | 0.9 | 4.64 | | | |
| **Intersections** | Intersection Related | 126.8 | 1284.6 | 0.18 | 1.79 | | | |
| **Pedestrians** | Vehicle/pedestrian | 81.8 | 258.8 | 0.11 | 0.36 | | | |
| **Bicyclists** | Vehicle/bicycle | 4.8 | 63.8 | 0.01 | 0.09 | | | |
| **Older Drivers** | All | 157.2 | 752.6 | 0.22 | 1.05 | | | |
| **Motorcyclists** | Motorcycle Related | 86.6 | 598.4 | 0.12 | 0.83 | | | |
| **Work Zones** | Work Zone Related | 9 | 57.6 | 0.01 | 0.08 | | | |


Number of Fatalities by SHSP Emphasis Area
5-yr Average Measure Data
Year 2011 to Year 2015
2011
2012
2013
2014
2015
1000
800
600
400
200
0
# of Fatalities
Roadway Departure
Intersections
Pedestrians
Bicyclists
Older Drivers
Motorcyclists
Work Zones
Data
SHSP Emphasis Area


Number of Serious Injuries by SHSP Emphasis Area
5-yr Average Measure Data
Year 2011 to Year 2015
2011
2012
2013
2014
2015
# of Serious Injuries
5000
4000
3000
2000
1000
0
Roadway Departure
Intersections
Pedestrians
Bicyclists
Older Drivers
Motorcyclists
Work Zones
Data
SHSP Emphasis Area


Fatality Rate by SHSP Emphasis Area
5-yr Average Measure Data
Year 2011 to Year 2015
2011
2013
2013
2014
2015
Rate of Fatalities
1.2
1
0.8
0.6
0.4
0.2
0
Roadway Departure
Intersections
Pedestrians
Bicyclists
Older Drivers
Motorcyclists
Work Zones
Data
SHSP Emphasis Area

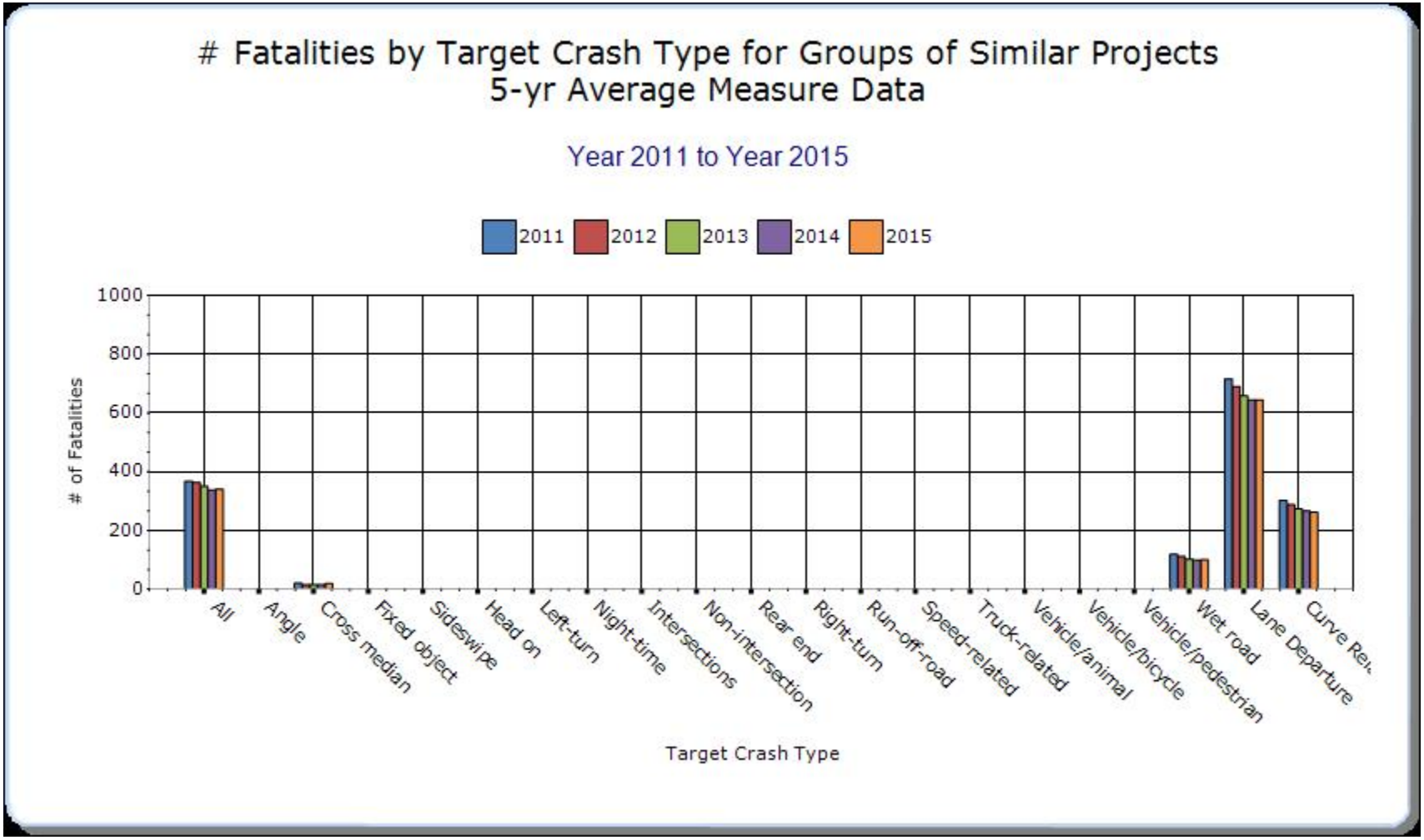


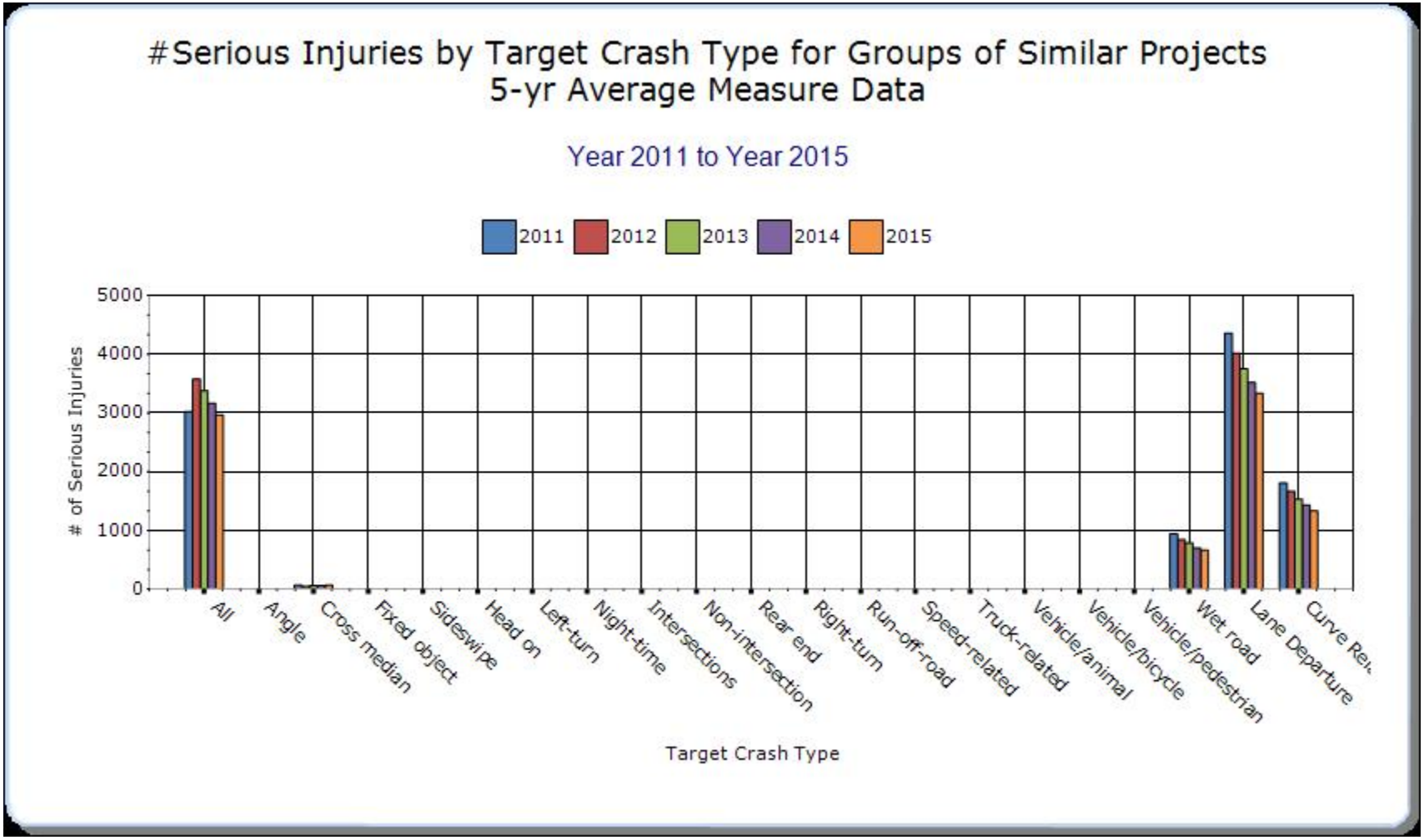

## Groups of similar project types

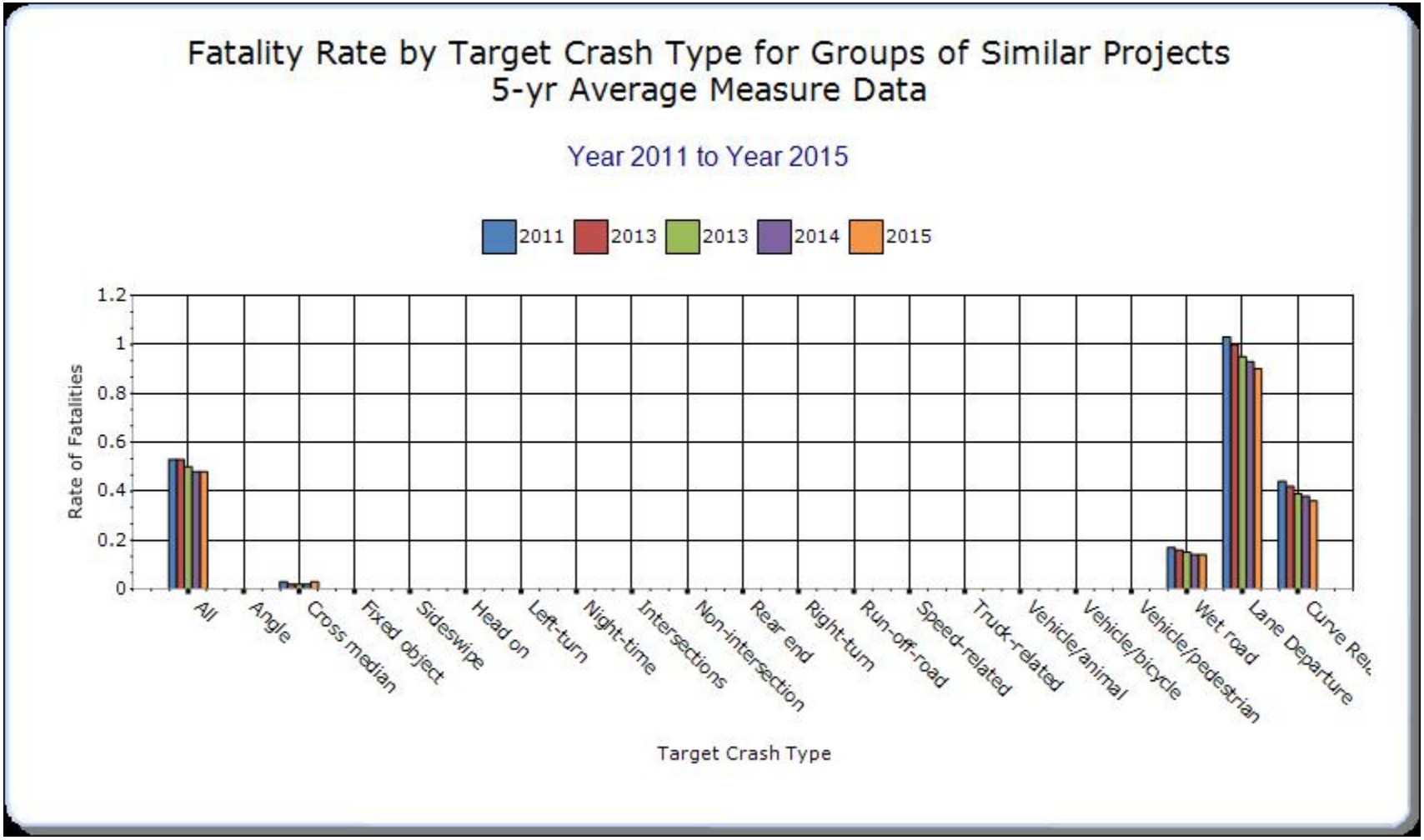
**33. Present the overall effectiveness of HSIP subprograms.**

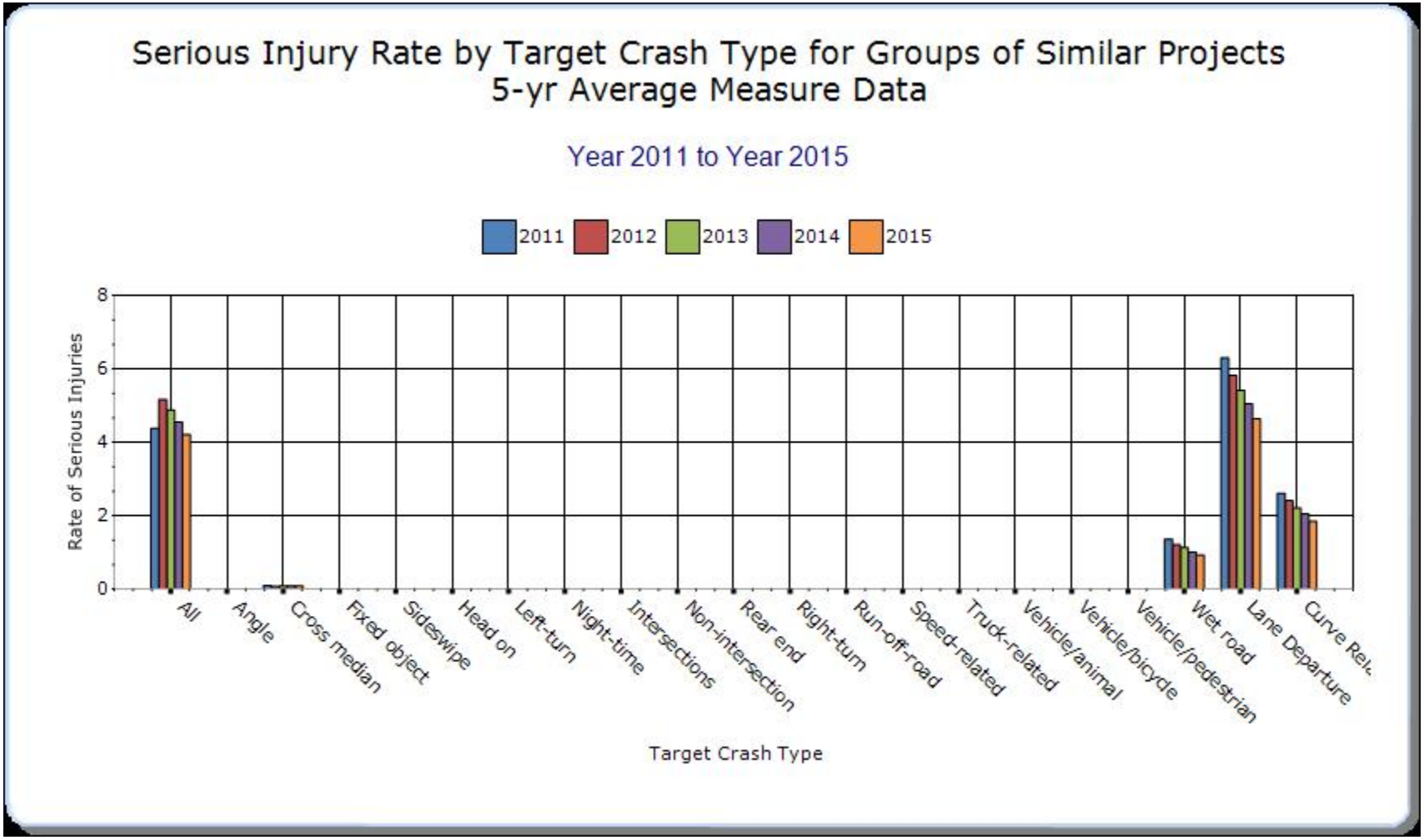
## Year - 2015

| HSIP Sub-program Types | Target 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 (5-yr avg) | Other-2 (5-yr avg) | Other-3 (5-yr avg) |
|---|---|---|---|---|---|---|---|---|
| **Intersection** | All | 126.8 | 1284.6 | 0.18 | 1.79 | | | |
| **Roadway Departure** | Lane Departure | 644.8 | 3333 | 0.9 | 4.64 | | | |
| **Local Safety** | All | 213 | 1683 | 0.3 | 2.42 | | | |
| **Median Barrier** | Cross median | 18.6 | 66.4 | 0.03 | 0.09 | | | |
| **Skid Hazard** | Wet road | 99.6 | 666 | 0.14 | 0.93 | | | |
| **Horizontal Curve** | Curve Related | 262 | 1332.6 | 0.36 | 1.85 | | | |


# Fatalities by Target Crash Type for Groups of Similar Projects
5-yr Average Measure Data
Year 2011 to Year 2015
2011
2012
2013
2014
2015
# of Fatalities
1000
800
600
400
200
0
All
Angle
Cross median
Fixed object
Sideswipe
Head on
Left-turn
Night-time
Intersections
Non-intersection
Rear end
Right-turn
Run-off-road
Speed-related
Truck-related
Vehicle/animal
Vehicle/bicycle
Vehicle/pedestrian
Wet road
Lane Departure
Target Crash Type


#Serious Injuries by Target Crash Type for Groups of Similar Projects
5-yr Average Measure Data
Year 2011 to Year 2015
2011
2012
2013
2014
2015
# of Serious Injuries
5000
4000
3000
2000
1000
0
All
Angle
Cross median
Fixed object
Sideswipe
Head on
Left-turn
Night-time
Intersections
Non-intersection
Rear end
Right-turn
Run-off-road
Speed-related
Truck-related
Vehicle/animal
Vehicle/bicycle
Vehicle/pedestrian
Wet road
Lane Departure
Target Crash Type


Fatality Rate by Target Crash Type for Groups of Similar Projects
5-yr Average Measure Data
Year 2011 to Year 2015
2011
2013
2013
2014
2015
Rate of Fatalities
1.2
1
0.8
0.6
0.4
0.2
0
All
Angle
Cross median
Fixed object
Sideswipe
Head on
Left-turn
Night-time
Intersections
Non-intersection
Rear end
Right-turn
Run-off-road
Speed-related
Truck-related
Vehicle/animal
Vehicle/bicycle
Vehicle/pedestrian
Wet road
Lane Departure
Curve Rel
Target Crash Type

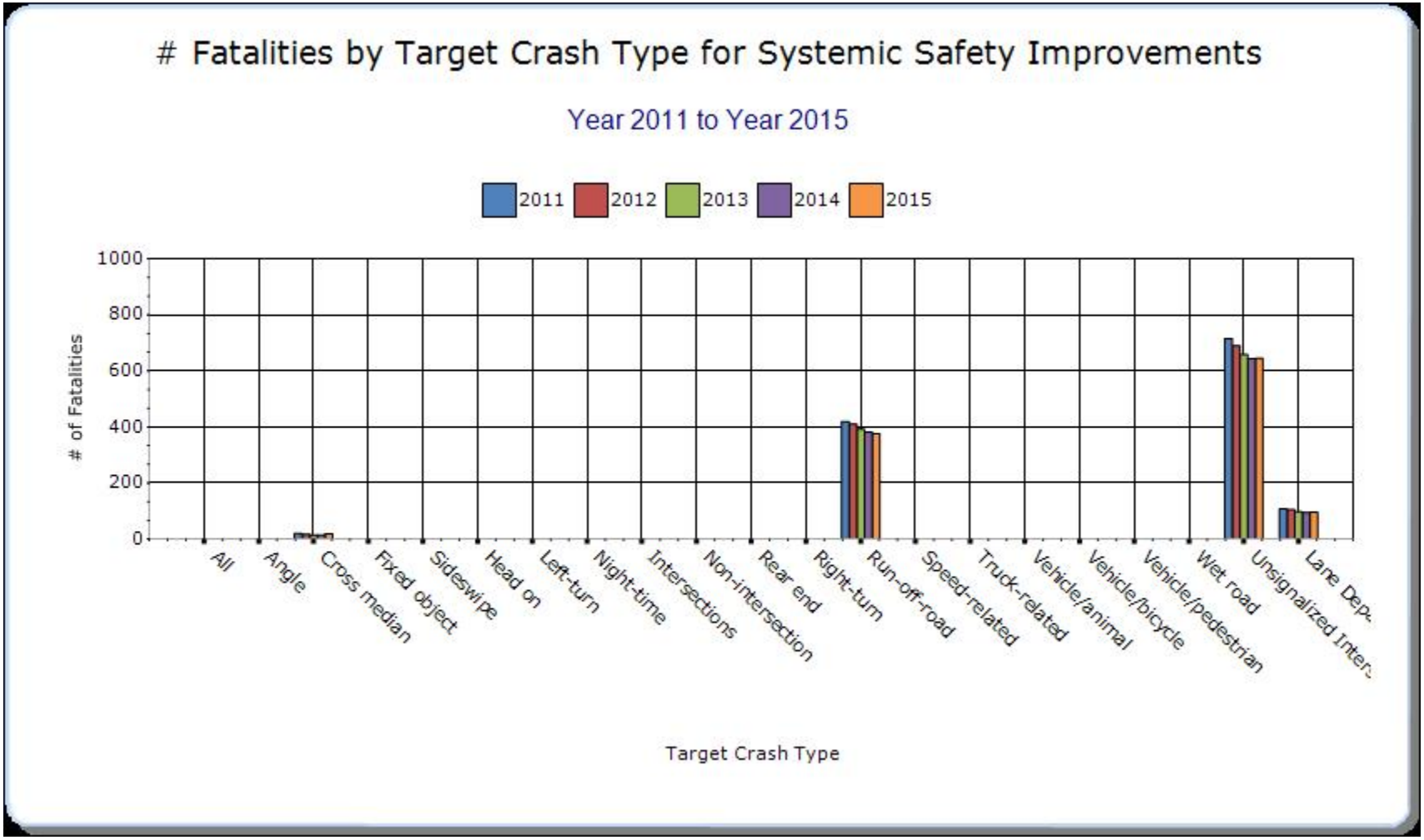


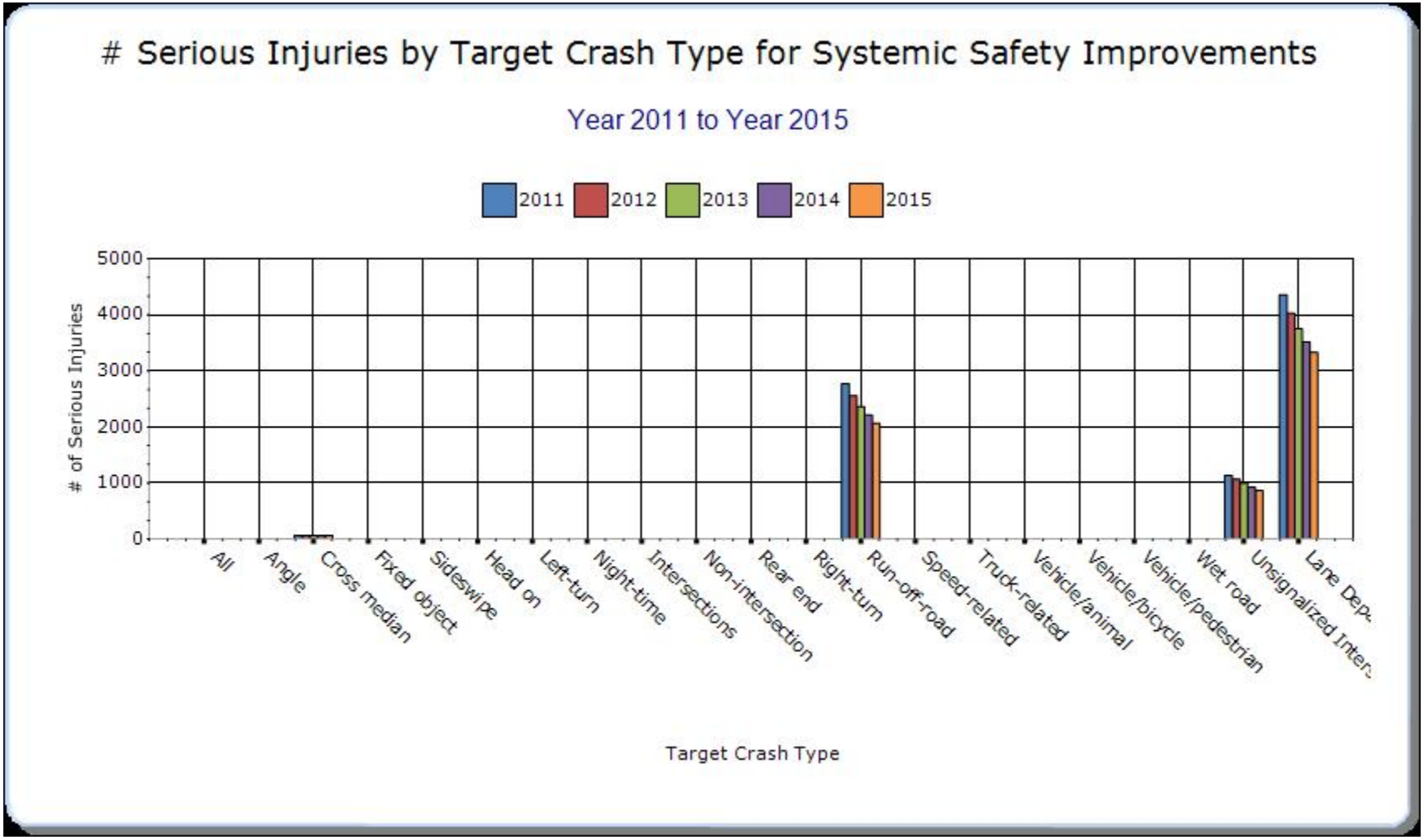

## Systemic Treatments

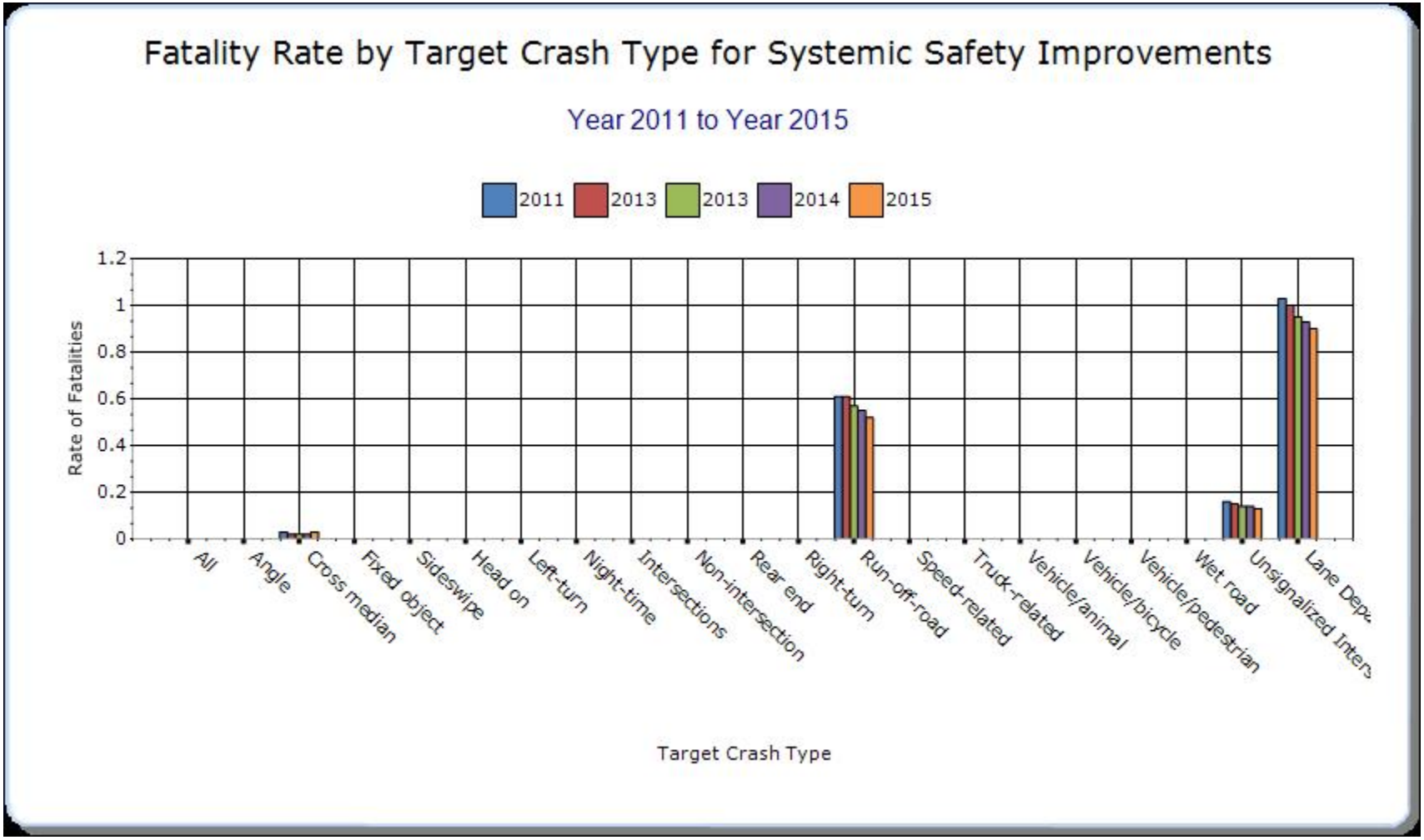
**34. Present the overall effectiveness of systemic treatments.**

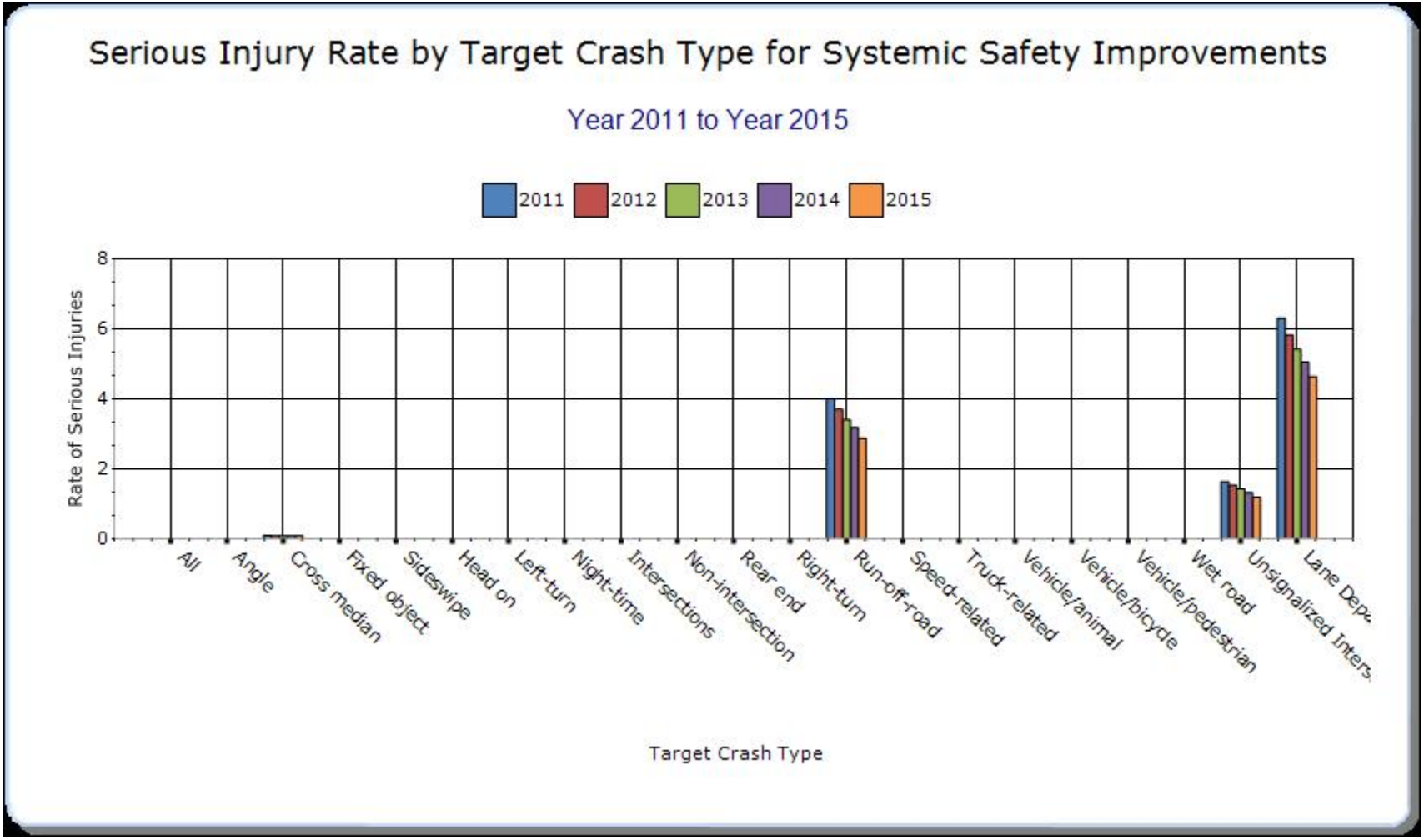
## Year - 2015

| Systemic improvement | Target 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 (5-yr avg) | Other-2 (5-yr avg) | Other-3 (5-yr avg) |
|---|---|---|---|---|---|---|---|---|
| **Innovative Intersections** | Unsignalized Intersections | 96.4 | 865 | 0.13 | 1.2 | 19 | 36 | 11 |
| **Cable Median Barriers** | Cross median | 18.6 | 66.4 | 0.03 | 0.09 | 850 | | |
| **Pavement/Shoulder Widening** | Run-off-road | 376 | 2068 | 0.52 | 2.88 | | | |
| **Rumble Strips** | Lane Departure | 644.8 | 3333 | 0.9 | 4.64 | | 13500 | |


# Fatalities by Target Crash Type for Systemic Safety Improvements
Year 2011 to Year 2015
2011
2012
2013
2014
2015
# of Fatalities
1000
800
600
400
200
0
All
Angle
Cross median
Fixed object
Sideswipe
Head on
Left-turn
Night-time
Intersections
Non-intersection
Rear end
Right-turn
Run-off-road
Speed-related
Truck-related
Vehicle/animal
Vehicle/bicycle
Vehicle/pedestrian
Wet road
Unsignalized Inter
Lane Dep
Target Crash Type


# Serious Injuries by Target Crash Type for Systemic Safety Improvements
Year 2011 to Year 2015
2011
2012
2013
2014
2015
# of Serious Injuries
5000
4000
3000
2000
1000
0
All
Angle
Cross median
Fixed object
Sideswipe
Head on
Left-turn
Night-time
Intersections
Non-intersection
Rear end
Right-turn
Run-off-road
Speed-related
Truck-related
Vehicle/animal
Vehicle/bicycle
Vehicle/pedestrian
Wet road
Unsignalized Inter
Lane Dep
Target Crash Type


Fatality Rate by Target Crash Type for Systemic Safety Improvements
Year 2011 to Year 2015
2011
2013
2013
2014
2015
Rate of Fatalities
1.2
1
0.8
0.6
0.4
0.2
0
All
Angle
Cross median
Fixed object
Sideswipe
Head on
Left-turn
Night-time
Intersections
Non-intersection
Rear end
Right-turn
Run-off-road
Speed-related
Truck-related
Vehicle/animal
Vehicle/bicycle
Vehicle/pedestrian
Wet road
Unsignalized Inters
Lane Depa
Target Crash Type


Serious Injury Rate by Target Crash Type for Systemic Safety Improvements
Year 2011 to Year 2015
2011
2012
2013
2014
2015
Rate of Serious Injuries
0
2
4
6
8
All
Angle
Cross median
Fixed object
Sideswipe
Head on
Left-turn
Night-time
Intersections
Non-intersection
Rear end
Right-turn
Run-off-road
Speed-related
Truck-related
Vehicle/animal
Vehicle/bicycle
Vehicle/pedestrian
Wet road
Unsignalized Inters
Lane Dep
Target Crash Type

**35. Describe any other aspects of the overall Highway Safety Improvement Program effectiveness on which you would like to elaborate**.

MoDOT is in early stages of beginning to implement safety countermeasures on the local road system. County SHSPs have been developed for several of the high need counties in the state and MoDOT plans to host a peer exchange in November 2016 to learn best practices for using HSIP on local roads. Overall, Missouri has seen a very good reduction in the roadway fatalities and serious injuries with much of the success due to the systemic approach used in the state. Engineering safety policy will allow Missouri to continue to see success on many of the high need roads in the state.

## Project Evaluation

**36. Provide project evaluation data for completed projects (optional)**.

| Location | Functional Class | Improvement Category | Improvement Type | Bef-Fatal | Bef-Serious Injury | Bef-All Injuries | Bef-PDO | Bef-Total | Aft-Fatal | Aft-Serious Injury | Aft-All Injuries | Aft-PDO | Aft-Total | Evaluation Results (Benefit/ Cost Ratio) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **I-29 from Gene Field Road to MO 92** | Rural Principal Arteria - Interstate | Roadside | Barrier - cable | | 3 | 163 | 766 | 932 | | 2 | 136 | 679 | 817 | 4 |
| **US 61 and West Ely/Pleasant in Hannibal** | Rural Principal Arterial - Other | Intersection geometry | Intersection geometrics - miscellaneous/other/unspecified | | 2 | 12 | 59 | 73 | | | 10 | 46 | 56 | 5 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **MO 19 south from MO 8 to MO 49** | Rural Minor Arterial | Roadway | Roadway widening - travel lanes | | 4 | 6 | 8 | 18 | 1 | 1 | 8 | 12 | 22 | 1 |
| **IS 170 from IS 270 to Page Ave.** | Urban Principal Arterial - Interstate | Roadside | Barrier - cable | 1 | | 4 | 7 | 12 | | 1 | | 2 | 3 | 13 |
| **MO 79 at RT Y, Hackman Rd, Vomund Rd., and Dyer Rd.** | Rural Minor Arterial | Intersection geometry | Intersection geometrics - miscellaneous/other/unspecified | | 1 | 4 | 11 | 16 | | | 1 | 5 | 6 | 1 |
| **MO 43 at MO 96** | Rural Major Collector | Intersection geometry | Intersection geometrics - miscellaneous/other/unspecified | 2 | 2 | 1 | 6 | 11 | | | 2 | 6 | 8 | 57 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **US 65 at Rochester Road in Taney County** | Rural Principal Arterial - Other | Intersection geometry | Intersection geometrics - miscellaneous/other/unspecified | | 4 | 4 | 2 | 10 | 1 | | | | 1 | 1 |
| **MO 13 at RT U / Y in Polk County** | Rural Principal Arterial - Other | Intersection geometry | Intersection geometrics - miscellaneous/other/unspecified | 1 | 1 | 4 | 8 | 14 | 1 | 3 | 7 | 8 | 19 | 1 |
| **US 67 from Declue Lane to RT JJ in St. Francois County** | Urban Principal Arterial - Other | Intersection geometry | Intersection geometrics - miscellaneous/other/unspecified | | | | | | | | | | | 1 |
| **RT O from US 61 to MO 32 in Ste. Genevieve County** | Rural Major Collector | Roadway | Rumble strips - edge or shoulder | 1 | | 4 | 8 | 13 | | | 1 | 2 | 3 | 31 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **MO 47 from MO 21 to US 67 in St. Francois County** | Rural Major Collector | Roadway | Rumble strips - edge or shoulder | | 3 | 13 | 28 | 44 | 1 | 4 | 23 | 30 | 58 | 1 |
| **RT C from MO 25 to MO 51 in Bollinger County** | Rural Major Collector | Roadway | Rumble strips - edge or shoulder | | | 3 | 1 | 4 | | | | 1 | 1 | 1 |
| **MO 86 from 2.9 miles East of RT H in Barry Co. to MO 13 in Stone Co.** | Rural Major Collector | Roadway | Rumble strips - edge or shoulder | 2 | 4 | 24 | 34 | 64 | | 1 | 8 | 20 | 29 | 71 |
| **MO 248 from Barry Co. to MO 265/413 in Stone Co.** | Rural Major Collector | Roadway | Rumble strips - edge or shoulder | 1 | 5 | 19 | 35 | 60 | 1 | 6 | 3 | 11 | 21 | 1 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **MO 39 from RT H to Arkansas St Line** | Rural Major Collector | Roadway | Rumble strips - edge or shoulder | | 1 | | 3 | 4 | | | | | | 6 |
| **MO 176 from MO 265/413 to MO 13 in Stone Co.** | Rural Major Collector | Roadway | Rumble strips - edge or shoulder | 1 | 6 | 19 | 20 | 46 | | 2 | 7 | 27 | 36 | 53 |
| **MO 173 from MO 413 to MO 76 in Stone County** | Rural Major Collector | Roadway | Rumble strips - edge or shoulder | | 1 | 6 | 4 | 11 | 1 | 3 | 5 | 6 | 15 | 1 |
| **RT Z from RT F to MO 25 in Cape Girardeau County** | Rural Major Collector | Roadway | Rumble strips - edge or shoulder | | 1 | 3 | 2 | 6 | | 1 | 2 | 2 | 5 | 1 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **RT OO from MO 34 to RT Z in Cape Girardeau County** | Rural Major Collector | Roadway | Rumble strips - edge or shoulder | | 4 | 8 | 6 | 18 | | 2 | 9 | 5 | 16 | 3 |
| **RT N from MO 21 North to MO 21 South in Iron County** | Rural Major Collector | Roadway | Rumble strips - edge or shoulder | | 6 | 16 | 16 | 38 | | 1 | 3 | 5 | 9 | 6 |
| **MO 30 @ Main St. / Redwood Dr.** | Urban Principal Arterial - Other Freeways and Expressways | Intersection geometry | Intersection geometrics - miscellaneous/other/unspecified | 2 | 9 | 17 | 37 | 65 | | | 3 | 3 | 6 | 95 |
| **MO 30 @ multiple intersections** | Rural Principal Arterial - Other | Intersection geometry | Intersection geometrics - miscellaneous/other/unspecified | | 20 | 49 | 202 | 271 | 3 | 13 | 17 | 57 | 90 | 1 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **IS 55 from RT E in Cape Girardeau County to US 67** | Rural Principal Arteria - Interstate | Roadside | Barrier - cable | | 1 | 7 | 9 | 17 | | | 2 | 3 | 5 | 1 |
| **MO 413 from US 60 West of Billings to 0.3 mile South of Crane** | Rural Minor Arterial | Roadway | Rumble strips - edge or shoulder | 1 | 5 | 16 | 20 | 42 | | 1 | 10 | 26 | 37 | 27 |
| **MO 265 from 0.3 mile South of Crane to MO 13 in Branson West** | Rural Minor Arterial | Roadway | Rumble strips - edge or shoulder | 1 | 11 | 34 | 104 | 150 | | 5 | 21 | 63 | 89 | 25 |
| **MO 19 from MO 8 to MO 49 in Crawford County** | Rural Minor Arterial | Roadway | Rumble strips - edge or shoulder | | 4 | 6 | 8 | 18 | 1 | 1 | 8 | 12 | 22 | 1 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **MO 10 from RT C to MO 13 in Ray County** | Rural Principal Arterial - Other | Roadway | Rumble strips - edge or shoulder | | | | 2 | 2 | | | 2 | | 2 | 1 |
| **I-29 from south of Route O to Platte County Line** | Rural Principal Arteria - Interstate | Roadway | Rumble strips - edge or shoulder | | 1 | 50 | 216 | 267 | 1 | 1 | 31 | 197 | 230 | 1 |
| **US 59 at MO 45 near Winthrop** | Rural Principal Arterial - Other | Lighting | Intersection lighting | | | 10 | 13 | 23 | | | 1 | 2 | 3 | 1 |
| **US 24 Intersections in City of Palmyra** | Rural Principal Arterial - Other | Intersection geometry | Intersection geometrics - miscellaneous/other/unspecified | 1 | 1 | 5 | 17 | 24 | 1 | | 4 | 6 | 11 | 1 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **US 24 from Randolph Co line to 1.1 miles West of RT U near Paris** | Rural Principal Arterial - Other | Roadway | Rumble strips - edge or shoulder | 2 | 3 | 13 | 50 | 68 | | 3 | 10 | 28 | 41 | 27 |
| **US 67 at MO 221 and RT W in Farmington** | Urban Principal Arterial - Other | Intersection geometry | Intersection geometrics - miscellaneous/other/unspecified | | 2 | 3 | 11 | 16 | | | 1 | 11 | 12 | 1 |
| **US 63 from Maries County line to north of I-44** | Rural Principal Arterial - Other | Roadway | Rumble strips - edge or shoulder | | | 2 | 4 | 6 | | 1 | 4 | 5 | 10 | 1 |
| **US 50 from 0.1 mile west of Lisletown Rd to the concrete pavement just west of** | Rural Principal Arterial - Other | Shoulder treatments | Pave existing shoulders | | | 4 | 10 | 14 | | | 1 | 5 | 6 | 1 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Big Meadows Rd** | | | | | | | | | | | | | | |
| **IS 70 W from 0.3 miles east of US 54 to the Boone County line** | Rural Principal Arteria - Interstate | Roadway | Rumble strips - edge or shoulder | 1 | 6 | 23 | 153 | 183 | 1 | 1 | 7 | 72 | 81 | 12 |
| **US 63 from 0.5 miles south of US 54 to Rt. P in Freeburg** | Rural Principal Arterial - Other | Shoulder treatments | Pave existing shoulders | 6 | 9 | 23 | 49 | 87 | 1 | 1 | 9 | 26 | 37 | 104 |

## Optional Attachments

| Sections | Files Attached |
| --- | --- |

# Glossary

**5 year rolling average** means the average of five individual, 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.