Highway Safety Improvement Program

Data Driven Decisions

Colorado
Highway Safety Improvement Program
2014 Annual Report

Prepared by: CO

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."

Table of Contents

Executive Summary

The general trend in fatal crash reduction experienced on Colorado roadways has continued to remain stable in the most recent reporting period. Colorado's Strategic Highway Safety Plan (SHSP) emphasizes the goal of crash reduction and includes, among other performance measures, reducing fatal and injury crash rates. Colorado has continued to progress in meeting these goals by effectively utilizing HSIP resources to incorporate safety improvements across a broad range of maintenance, safety and even non-safety-specific projects. Innovative methodologies have been developed and used by CDOT to identify locations, on a statewide scale, with the greatest potential for crash reduction. Crash data processing has improved considerably over the last few years. The increase in completeness, accuracy and timeliness has significantly improved crash data analysis and network screening. In combination with HSIP funding, these procedures have been applied to the selection of highly cost-effective safety improvement projects constructed under the Federal Highway Safety Improvement Program. An updated SHSP is anticipated to be implemented within the next fiscal year. This new SHSP will provide a detailed analysis of safety performance measures and will focus on additional emphasis areas in order to provide guidance on how to reduce severe crashes across the state.

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

How are Highway Safety Improvement Program funds allocated in a State?

☒ Central

☐ District

☐ Other

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

Under this program all public roadways are eligible for participation. Submittals for projects not located on the State Highway system are also solicited from local authorities through the various MPOs and the Special Highway Committee of the Colorado Counties, Inc. and the Colorado Municipal League. These candidate proposals for safety improvement projects are submitted for locations identified using the locals' own high hazard locations identification system. As with the Region applications, all submittals will be required to meet the minimum criteria. Copies of project applications received in the Safety and Traffic Engineering Office from locals are submitted to the Region offices for comments, evaluation and approval. The Region offices are specifically requested to verify project cost estimates, and when

necessary, are also requested to make project cost adjustments with the submitting local authorities' concurrence.

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

☒Design

☒Planning

☐Maintenance

☒Operations

☒Governors Highway Safety Office

☒Other: Other-Regional Traffic Operational and Design Units

☒Other: Other-Headquarters Safety and Traffic Engineering Branch

☒Other: Other-Office of Finance Management & Budget

Briefly describe coordination with internal partners.

A statewide composite listing of potential locations for accident reduction is compiled for all highway segments and intersections performing at a sub-standard level of service of safety (LOSS) as well as identifying accident patterns that are overrepresented at those locations. This listing is then stratified by the Region and provided to the appropriate CDOT Regions and Local Agencies for review. The initial candidate listing of high hazard locations is reviewed by each Regional traffic engineering unit. The Regions use the high hazard listing along with other information such as their own operational reviews, input from citizens, staff and city/county personnel as well as other ongoing or scheduled construction activities in order to determine the most feasible and beneficial candidate safety project submittals. The Region may also choose to nominate other safety project locations besides those mentioned on the listing. Any regional nominations not on the list will still need to meet the criteria discussed above.

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

☒Metropolitan Planning Organizations

☒Governors Highway Safety Office

☒Local Government Association

☒Other: Other-Local Municipalities

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

☐Multi-disciplinary HSIP steering committee

☒Other: Other-Strategic Highway Safety Plan (SHSP)

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

An updated Colorado SHSP is anticipated to be implemented within the next fiscal year. This new SHSP will provide a detailed analysis of safety performance measures and will focus on additional emphasis areas in order to provide guidance on how to reduce severe crashes across the state.

Program Methodology

Select the programs that are administered under the HSIP.

☐Median Barrier	☐Intersection	☐Safe Corridor
☐Horizontal Curve	☐Bicycle Safety	☐Rural State Highways
☐Skid Hazard	☐Crash Data	☐Red Light Running Prevention
☐Roadway Departure	☐Low-Cost Spot Improvements	☐Sign Replacement And Improvement

☐ Local Safety ☐ Pedestrian Safety ☐ Right Angle Crash

☐ Left Turn Crash ☐ Shoulder Improvement ☐ Segments

☒ Other: Other-General

Program: **Other-General**

Date of Program Methodology: **1/1/2000**

What data types were used in the program methodology?

Crashes	*Exposure*	*Roadway*
☒ All crashes	☐ Traffic	☐ Median width
☐ Fatal crashes only	☒ Volume	☐ Horizontal curvature
☐ Fatal and serious injury crashes only	☐ Population	☒ Functional classification
☐ Other	☐ Lane miles	☐ Roadside features
	☐ Other	☐ Other

What project identification methodology was used for this program?

☒ Crash frequency

☒ Expected crash frequency with EB adjustment

☐ Equivalent property damage only (EPDO Crash frequency)

☐ EPDO crash frequency with EB adjustment

☐ Relative severity index

☐ Crash rate

☐ Critical rate

☒ Level of service of safety (LOSS)

☒ Excess expected crash frequency using SPFs

☒ Excess expected crash frequency with the EB adjustment

☐ Excess expected crash frequency using method of moments

☒ Probability of specific crash types

☒ Excess proportions of specific crash types

☐ Other

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

☒ Yes

☐ No

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

☒ Yes

☐ No

How are highway safety improvement projects advanced for implementation?

☒ Competitive application process

☐ Selection committee

☐ Other

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

☒ Rank of Priority Consideration

- ☒ Ranking based on B/C 2
- ☒ Available funding 1
- ☐ Incremental B/C
- ☐ Ranking based on net benefit
- ☐ Other

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

5

Highway safety improvment program funds are used to address which of the following systemic improvments?

- ☒ Cable Median Barriers
- ☒ Traffic Control Device Rehabilitation
- ☒ Install/Improve Signing
- ☒ Upgrade Guard Rails
- ☒ Safety Edge
- ☒ Add/Upgrade/Modify/Remove Traffic Signal
- ☒ Rumble Strips
- ☒ Pavement/Shoulder Widening
- ☒ Install/Improve Pavement Marking and/or Delineation
- ☒ Clear Zone Improvements
- ☒ Install/Improve Lighting
- ☐ Other

What process is used to identify potential countermeasures?

☒Engineering Study

☒Road Safety Assessment

☒Other: Other-Requests for investigation by local agencies

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

☒Highway Safety Manual

☐Road Safety audits

☐Systemic Approach

☐Other:

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

Locations with potential for accidents reductions are updated on a periodic basis. Safety performance functions (SPF) and level of service of safety (LOSS) metrics are also planned to be recalibrated in the upcoming fiscal year based on the latest available state crash data.

Progress in Implementing Projects

Funds Programmed

Reporting period for Highway Safety Improvement Program funding.

☐ Calendar Year

☒ State Fiscal Year

☐ Federal Fiscal Year

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

Funding Category	Programmed*		Obligated	
HSIP (Section 148)	35175364	90 %	28836995	88 %
HRRRP (SAFETEA-LU)				
HRRR Special Rule				
Penalty Transfer - Section 154				
Penalty Transfer – Section 164				
Incentive Grants - Section 163				
Incentive Grants (Section 406)				
Other Federal-aid Funds (i.e. STP, NHPP)				
State and Local Funds	3965074	10 %	3965074	12 %

Totals	39140438	100%	32802069	100%

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

$3,665,468.00

How much funding is obligated to local safety projects?

$2,370,812.00

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

$491,382.00

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

$639,000.00

How much funding was transferred in to the HSIP from other core program areas during the reporting period?

$0.00

How much funding was transferred out of the HSIP to other core program areas during the reporting period?

$0.00

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

There are longer than expected start up times for safety improvement projects, especially those run by local agencies. Special attention will now be given to construction scheduling and priority for fund programming will be given to projects that can deliver on a timely basis. The plan includes identifying projects in advance for future fiscal years and funding projects in phases in order to obligate funds in the year that they are being spent.

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

A revised general budget process at CDOT will be implemented which will allow obligation of HSIP funding to be processed more efficiently.

General Listing of Projects

List each highway safety improvement project obligated during the reporting period.

Project	Improvement Category	Output	HSIP Cost	Total Cost	Funding Category	Functional Classification	AADT	Speed	Roadway Ownership	Relationship to SHSP	
										Emphasis Area	
US50 Widen Fortino to Wills	Intersection geometry Auxiliary lanes - miscellaneous/other/unspecified	3 Numbers	139625	629295	HSIP (Section 148)	Urban Principal Arterial - Other Freeways and Expressways	38000	0	State Highway Agency	Intersections	
	Intersection geometry Auxiliary lanes - add acceleration lane	1 Numbers	108280	123358	HSIP (Section 148)	Urban Principal Arterial - Other	49000	0	City of Municipal Highway Agency	Intersections	
FEDERAL BLVD SIGNALS UPGRADES AT 54TH, 5	Intersection traffic control Modify traffic signal - modernization/replace	6 Numbers	1000000	1412144	HSIP (Section 148)	Urban Principal Arterial - Other	31000	0	State Highway Agency	Intersections	

	ment										
US287 & Garfield Ave Signal Replacement	Intersection traffic control Modify traffic signal - modernization/replacement	1 Numbers	301500	335000	HSIP (Section 148)	Urban Principal Arterial - Other	35300	0	City of Municipal Highway Agency	Intersections	
BRIARGATE PKWY @ VOYAGER PKWY	Intersection geometry Auxiliary lanes - add right-turn lane	1 Numbers	58716	65240	HSIP (Section 148)	Urban Major Collector	48000	0	City of Municipal Highway Agency	Intersections	
CAREFREE CIRCLE SOUTH @ NEW CENTER POINT	Intersection geometry Intersection geometry - other	1 Numbers	124243	138048	HSIP (Section 148)	Urban Minor Arterial	9000	0	City of Municipal Highway Agency	Intersections	
US 6 & SH 139 Signal at Loma	Intersection traffic control Modify traffic signal - modernization/replacement	1 Numbers	1305125	313203	HSIP (Section 148)	Rural Major Collector	2200	0	State Highway Agency	Intersections	
2010 Denver HES 5 Signal	Intersection traffic control Modify traffic	5 Numb	12335	13705	HSIP (Secti	Various	3000	0	City of Munici	Intersections	

upgrade Project	signal - modernization/replacement	ers	35	94	on 148)	Facilities	0		pal Highway Agency		
WIDENING SH45 TO ADD TURNING LANES	Intersection geometry Auxiliary lanes - add left-turn lane	1 Numbers	1532863	2336942	HSIP (Section 148)	Urban Principal Arterial - Other Freeways and Expressways	24500	0	State Highway Agency	Intersections	
DENVER 2011 HES SIGNAL RPLMT PCKG 1	Intersection traffic control Modify traffic signal - modernization/replacement	1 Numbers	1242000	1380000	HSIP (Section 148)	Urban Principal Arterial - Other	34300	0	City of Municipal Highway Agency	Intersections	
DENVER 2011 HES SIGNAL RPLMT PCKG 2	Intersection traffic control Modify traffic signal - modernization/replacement	1 Numbers	1242000	1380000	HSIP (Section 148)	Urban Principal Arterial - Other	34300	0	City of Municipal Highway Agency	Intersections	
SH 66 Roadway/Intersection	Intersection geometry Auxiliary lanes - add	1 Numb	1860000	3619136	HSIP (Section	Rural Minor	7700	0	State Highway	Intersections	

Improvements	left-turn lane	ers			148)	Arterial			Agency		
SH 82 and JW Drive Improvements	Intersection geometry Intersection geometrics - miscellaneous/other/unspecified	1 Numbers	2134000	6808387	HSIP (Section 148)	Urban Principal Arterial - Other	29000	0	State Highway Agency	Intersections	
SH 82 Cedar Drive Improvements	Alignment Horizontal curve realignment	1 Numbers	1169893	1299882	HSIP (Section 148)	Rural Minor Collector	172	0	City of Municipal Highway Agency	Roadway Departure	
SIGNALS:SH 121,128, 88, C470	Intersection traffic control Modify traffic signal - miscellaneous/other/unspecified	4 Numbers	1145059	1299632	HSIP (Section 148)	Urban Principal Arterial - Other	45000	0	State Highway Agency	Intersections	
COLO BLVD:120TH IMP	Intersection geometry Auxiliary lanes - add left-turn lane	1 Numbers	1920600	2134000	HSIP (Section 148)	Urban Minor Arterial	45000	0	City of Municipal Highway Agency	Intersections	
I-25: US 36 TO 120TH AVENUE	Advanced technology and ITS Congestion detection / traffic	5.97 Miles	8500000	71374563	HSIP (Section	Urban Principal Arterial -	150000	0	State Highway	Managed Lanes, Automated	

(CDOT)	monitoring system				148)	Interstate			Agency	traffic Management	
PECOS ST:OVER I-70 CM/GC Procurement Me	Interchange design Interchange design - other	1 Numbers	2237992	2630139	HSIP (Section 148)	Urban Principal Arterial - Interstate	119000	0	State Highway Agency	Intersections	
RAMP METERING	Interchange design Ramp metering	4 Numbers	663033	750194	HSIP (Section 148)	Urban Principal Arterial - Interstate	135000	0	State Highway Agency	Crash reduction through congestion mitigation	
IMPROVEMENTS AT SH83 AND WALKER	Intersection geometry Auxiliary lanes - add right-turn lane	1 Numbers	659715	770344	HSIP (Section 148)	Urban Principal Arterial - Other	5300	0	State Highway Agency	Intersections	
SH 66 at E County Line Road Signal	Intersection traffic control Modify traffic signal - modernization/replacement	1 Numbers	260916	838118	HSIP (Section 148)	Rural Minor Arterial	16000	0	State Highway Agency	Intersections	
US6 Bridges Design-Build	Roadway Roadway widening - travel lanes	1 Miles	9496276	69491631	HSIP (Section 148)	Urban Principal Arterial - Other Freeways and	136000	0	State Highway Agency	Lane Departure	

						Expressways					
I-70 Wildlife Fencing MP 87-110	Animal-related	16 Miles	2700000	3697751	HSIP (Section 148)	Rural Principal Arterial - Interstate	20000	0	State Highway Agency	Effective crash countermeasure for common crash type on facility	
West JCT US 160/US 550 CFI	Intersection geometry Intersection geometry - other	1 Numbers	1889537	6691860	HSIP (Section 148)	Urban Principal Arterial - Other	23500	0	State Highway Agency	Intersections	
ITS VM SIGNS ON I-25 AND C470	Advanced technology and ITS Dynamic message signs	1 Numbers	667885	799885	HSIP (Section 148)	Urban Principal Arterial - Interstate	165000	0	State Highway Agency	Advanced signing for crash mitigation	
INTERSECTION IMPROV @ US24 & ELLICOTT	Intersection geometry Auxiliary lanes - add left-turn lane	1 Numbers	1610611	1824619	HSIP (Section 148)	Rural Principal Arterial - Other	4700	0	State Highway Agency	Intersections	
SH285: MEDIAN CABLE RAIL	Roadside Barrier - cable	8 Miles	1176549	1324348	HSIP (Section 148)	Rural Principal Arterial - Other	23000	0	State Highway Agency	Lane Departure	
RAYNOLDS AND US50	Intersection geometry Auxiliary lanes - add	1 Numb	27000	30000	HSIP (Secti	Rural Principal	2000	0	State Highwa	Intersections	

IMPROVEMENTS	left-turn lane	ers	0	0	on 148)	Arterial - Other	0		y Agency		
US 6 & I-70 EB Aux Lane & Chain Sta	Roadway Roadway widening - add lane(s) along segment	3.46 Miles	27900	31000	HSIP (Section 148)	Rural Principal Arterial - Interstate	27500	0	State Highway Agency	Making truck travel safer	
US160A SAFETY IMPROVEMENTS PROJECT	Roadway Rumble strips - edge or shoulder	25.43 Miles	1661738	1875888	HSIP (Section 148)	Rural Principal Arterial - Other	4000	0	State Highway Agency	Roadway Departure	
I-70 Guardrail Upgrades	Roadside Barrier - cable	2 Miles	1582544	1798646	HSIP (Section 148)	Urban Principal Arterial - Interstate	18400	0	State Highway Agency	Roadway Departure	
SIGNALS: SH88@Evans & SH95@SH40	Intersection traffic control Modify traffic signal - modernization/replacement	2 Numbers	1147500	1275000	HSIP (Section 148)	Urban Principal Arterial - Other	34000	0	City of Municipal Highway Agency	Intersections	
88TH AVE & COLORADO BLVD-INTERSECTION IM	Intersection geometry Auxiliary lanes - add left-turn lane	1 Numbers	637875	708750	HSIP (Section 148)	Urban Principal Arterial - Other	14000	0	City of Municipal Highway	Intersections	

									Agency		
112TH & KING TRAFFIC SIGNAL	Intersection traffic control Intersection traffic control - other	1 Numbers	279756	310840	HSIP (Section 148)	Urban Major Collector	18500	0	City of Municipal Highway Agency	Intersections	
TWO INTERSECTION IMPROVEMENTS IN C. S.	Intersection traffic control Modify control - two-way stop to roundabout	2 Numbers	108000	736786	HSIP (Section 148)	Urban Minor Arterial	10000	0	City of Municipal Highway Agency	Intersections	
14TH AVE & LAMAR ST ROUNDABOUT	Intersection traffic control Modify control - two-way stop to roundabout	1 Numbers	990000	1100000	HSIP (Section 148)	Urban Minor Collector	3100	0	City of Municipal Highway Agency	Intersections	
FEDERAL BLVD SAFETY/PED IMPROVEMENTS	Pedestrians and bicyclists Pedestrian signal - install new at intersection	8 Numbers	2330160	2630633	HSIP (Section 148)	Urban Principal Arterial - Other	36000	0	State Highway Agency	Pedestrians	
I-70 EB VMS & Blankout Sign	Advanced technology and ITS Dynamic	1 Numb	694562	785104	HSIP (Section	Rural Principal Arterial -	18000	0	State Highway	Increasing driver safety awareness -	

Project	message signs	ers			148)	Interstate			Agency	adverse weather crash mitigation	
US 160/491 SL TO TOWAOC	Lighting Intersection lighting	1 Numbers	109800	20913517	HSIP (Section 148)	Rural Principal Arterial - Other	4700	0	State Highway Agency	Intersections	
SOUTH NEVADA AVENUE & I25 RAMPS	Intersection geometry Intersection geometrics - miscellaneous/other/unspecified	1 Numbers	320558	885731	HSIP (Section 148)	Urban Principal Arterial - Other	35000	0	City of Municipal Highway Agency	Intersections	
SH 82 & El Jebel Road Intersection Impr	Intersection geometry Intersection geometrics - miscellaneous/other/unspecified	1 Numbers	504001	560000	HSIP (Section 148)	Urban Principal Arterial - Other	21000	0	County Highway Agency	Intersections	
TELLER CR 1 HES IN CRIPPLE CREEK	Roadway Roadway - other	0.4 Miles	459752	510836	HSIP (Section 148)	Urban Local Road or Street	2000	0	Town or Township Highway Agency	Intersections	

REGION 2 FY 13 ITS PROJECT	Advanced technology and ITS Advanced technology and ITS - other	5 Miles	604058	1673728	HSIP (Section 148)	Urban Principal Arterial - Interstate	58000	0	State Highway Agency	Increasing driver safety awareness	
SH88/JORDAN RD RECON.& SIGNAL UPGRADE	Intersection traffic control Modify traffic signal - modernization/replacement	1 Numbers	290690	328762	HSIP (Section 148)	Urban Principal Arterial - Other	57000	0	State Highway Agency	Intersections	
SH392 & WCR43 Intersection Imprvts	Intersection traffic control Intersection signing - add enhanced regulatory sign (double-up and/or oversize)	1 Numbers	171028	190028	HSIP (Section 148)	Rural Principal Arterial - Other	3800	0	State Highway Agency	Intersections	
STRATEGIC HIGHWAY SAFETY PLAN	Non-infrastructure Transportation safety planning	1 Numbers	450000	500000	HSIP (Section 148)	Statewide Facilities	0	0	State Highway Agency	Statewide collaborative effort to reduce traffic crashes	
SH83 @ CROWN CREST, DECEL LANE	Intersection geometry Auxiliary lanes - add right-turn lane	1 Numbers	177672	209784	HSIP (Section 148)	Urban Principal Arterial - Other	46000	0	State Highway Agency	Intersections	
FY14 SH12 SAFETY	Roadway Rumble strips	70.5	16484	18632	HSIP (Secti	Rural Major	1600	0	State Highwa	Roadway	

IMPROVEMENT PROJECT	- center	Miles	18	99	on 148)	Collector			y Agency	Departure	
SH21-ACCEL/DECEL LANES MP 141.7-148.7	Intersection geometry Auxiliary lanes - extend acceleration/deceleration lane	2.00 Miles	2685000	3900000	HSIP (Section 148)	Urban Principal Arterial - Other Freeways and Expressways	53000	0	State Highway Agency	Intersections	
POWERS BLVD. AUXILIARY LANE (Part II)	Intersection geometry Auxiliary lanes - extend acceleration/deceleration lane	2.00 Miles	3162172	3961604	HSIP (Section 148)	Urban Principal Arterial - Other Freeways and Expressways	53000	0	State Highway Agency	Intersections	
LOCAL AGENCY SAFETY STUDIES	Non-infrastructure Road safety audits	1 Numbers	144000	160000	HSIP (Section 148)	Various Facilities	0	0	State Highway Agency	Safety outreach to small towns/municiplaities	
US285 D SAFETY IMPROVEMENT	Advanced technology and ITS Dynamic message signs	38.98 Miles	872599	1191183	HSIP (Section	Rural Principal Arterial -	3900	0	State Highway	Roadway Departure	

					148)	Other			Agency		
SH165A SAFETY IMPROVEMENTS	Roadway Rumble strips - edge or shoulder	8.3 Miles	45000	50000	HSIP (Section 148)	Rural Major Collector	3600	0	State Highway Agency	Roadway Departure	
US 40 Steamboat East & West Resurfacing	Intersection traffic control Modify traffic signal - modernization/replacement	1 Numbers	820000	7946777	HSIP (Section 148)	Urban Principal Arterial - Other	25000	0	State Highway Agency	Intersections	
SH 172/CR 307 INTERSECTION IMPROVEMENT	Intersection geometry Auxiliary lanes - add right-turn lane	1 Numbers	45000	50000	HSIP (Section 148)	Rural Major Collector	7000	0	State Highway Agency	Intersections	
SH 151 CR 521 INTERSECTION IMPROVEMENTS	Intersection geometry Auxiliary lanes - miscellaneous/other/unspecified	1 Numbers	45000	50000	HSIP (Section 148)	Rural Major Collector	3300	0	State Highway Agency	Intersections	
Signal IMP @SH88 Hampden/I-70 @Chambers	Intersection traffic control Modify traffic signal - modernization/replacement	2 Numbers	758389	855519	HSIP (Section 148)	Urban Principal Arterial - Other	24000	0	State Highway Agency	Intersections	
VISION ZERO SUITE	Non-infrastructure	1 Numb	45000	50000	HSIP (Secti	Safety improve	0	0	State Highwa	Data	

SOFTWARE	Data/traffic records	ers			on 148)	ment on statewide facilities			y Agency		

Progress in Achieving Safety Performance Targets

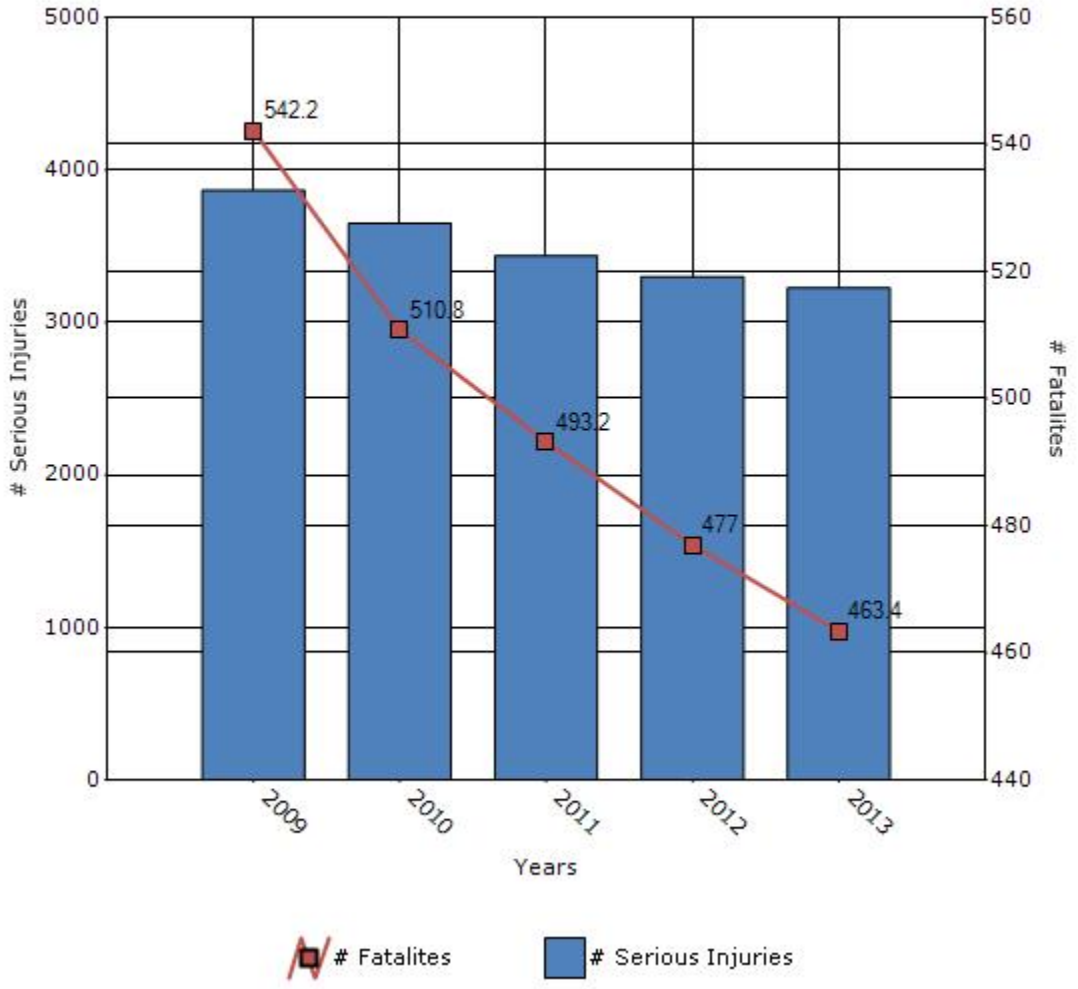
Overview of General Safety Trends

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

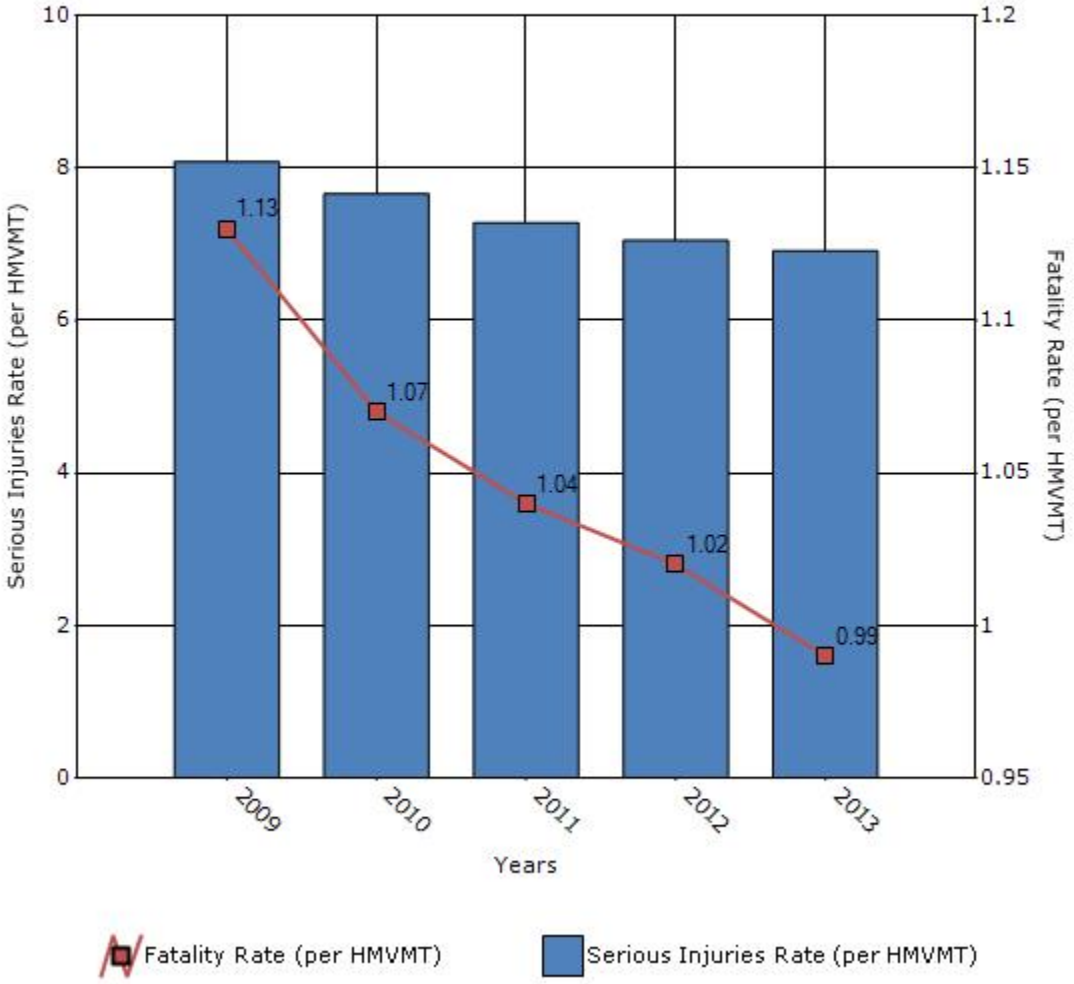
Performance Measures*	2009	2010	2011	2012	2013
Number of fatalities	542.2	510.8	493.2	477	463.4
Number of serious injuries	3865.2	3649.6	3438	3300	3226.4
Fatality rate (per HMVMT)	1.13	1.07	1.04	1.02	0.99
Serious injury rate (per HMVMT)	8.08	7.66	7.28	7.05	6.91

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

Number of Fatalities and Serious injuries for the Last Five Years



Rate of Fatalities and Serious injuries for the Last Five Years

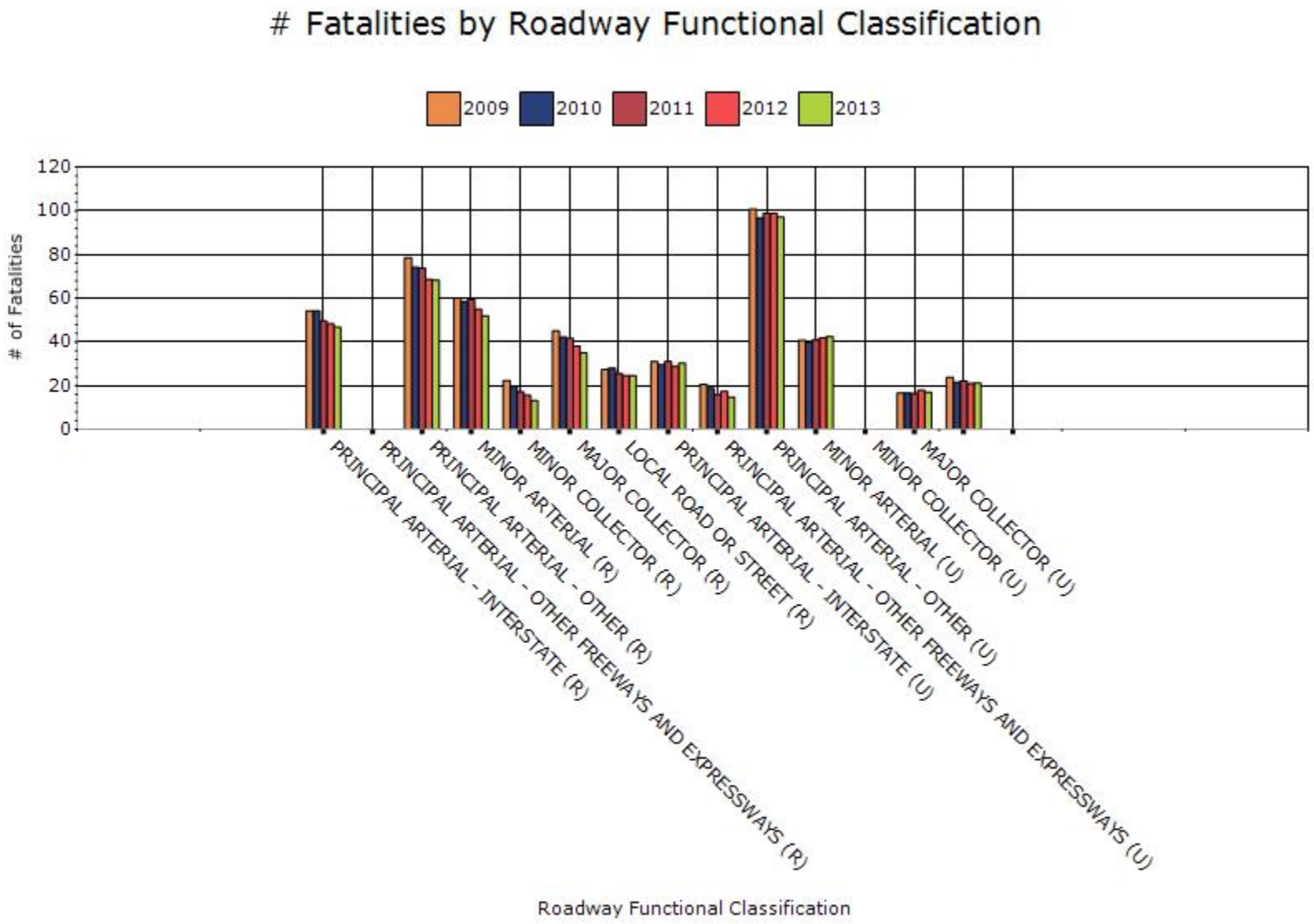


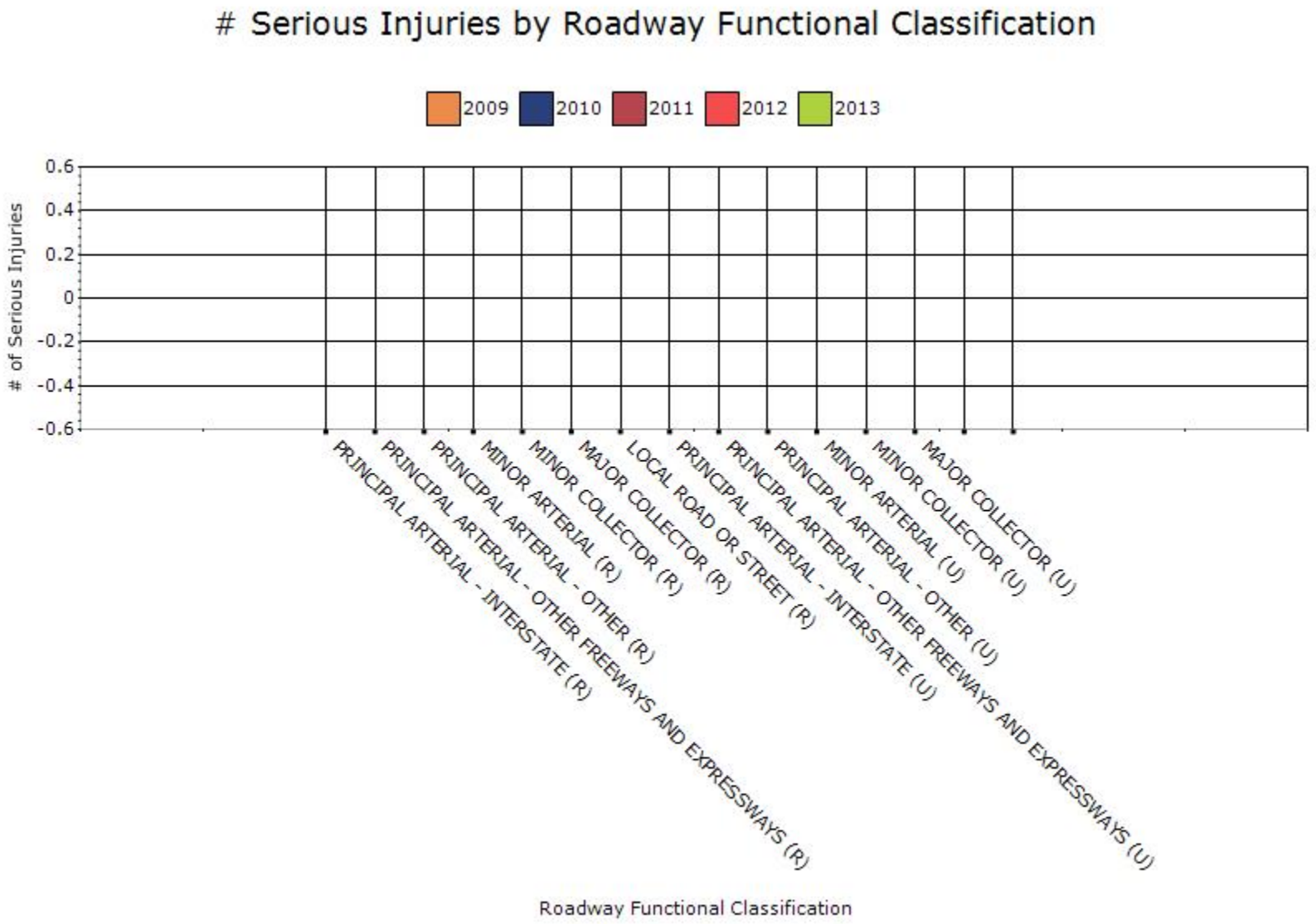
To the maximum extent possible, present performance measure* data by functional classification and ownership.

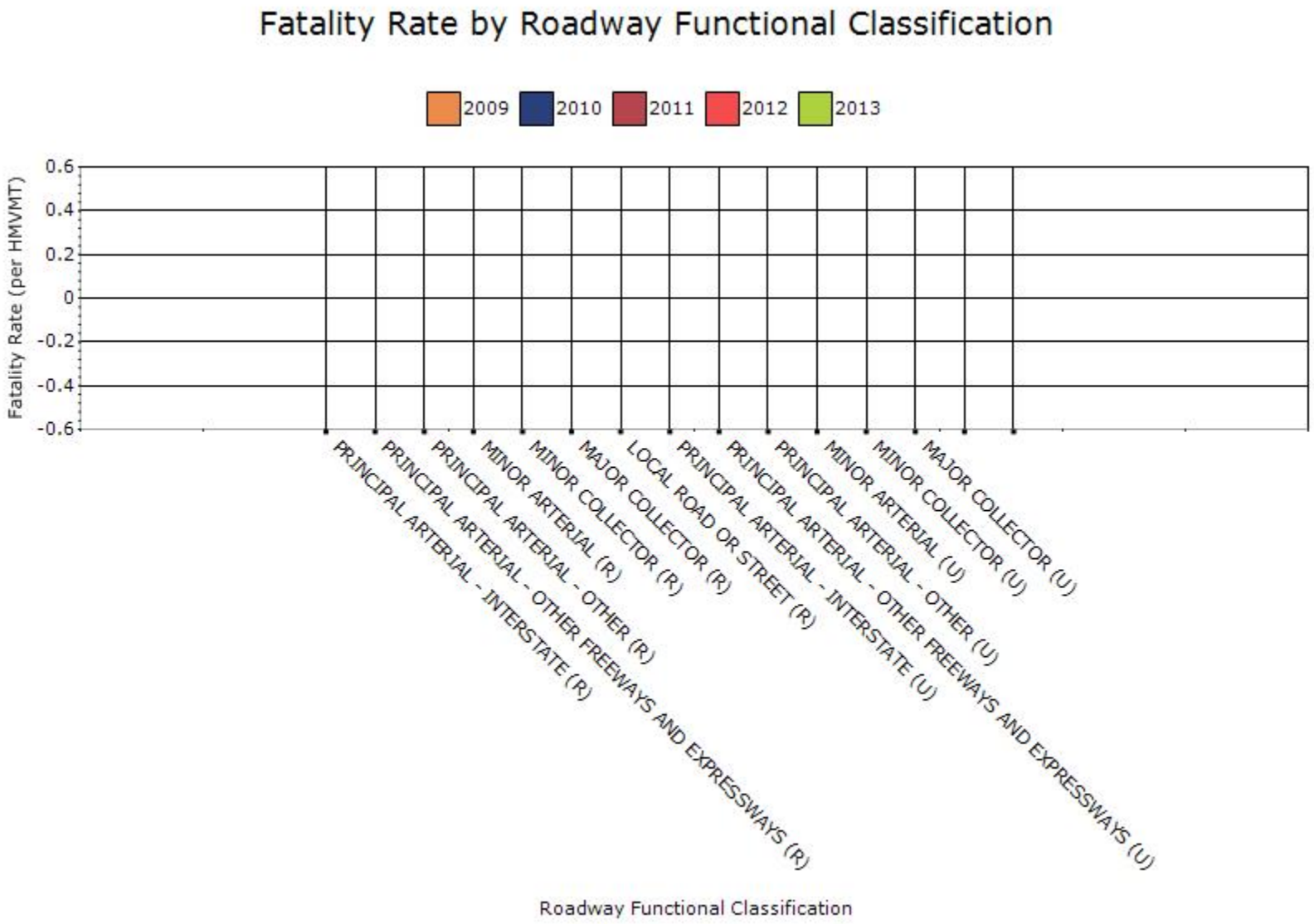
Year - 2013

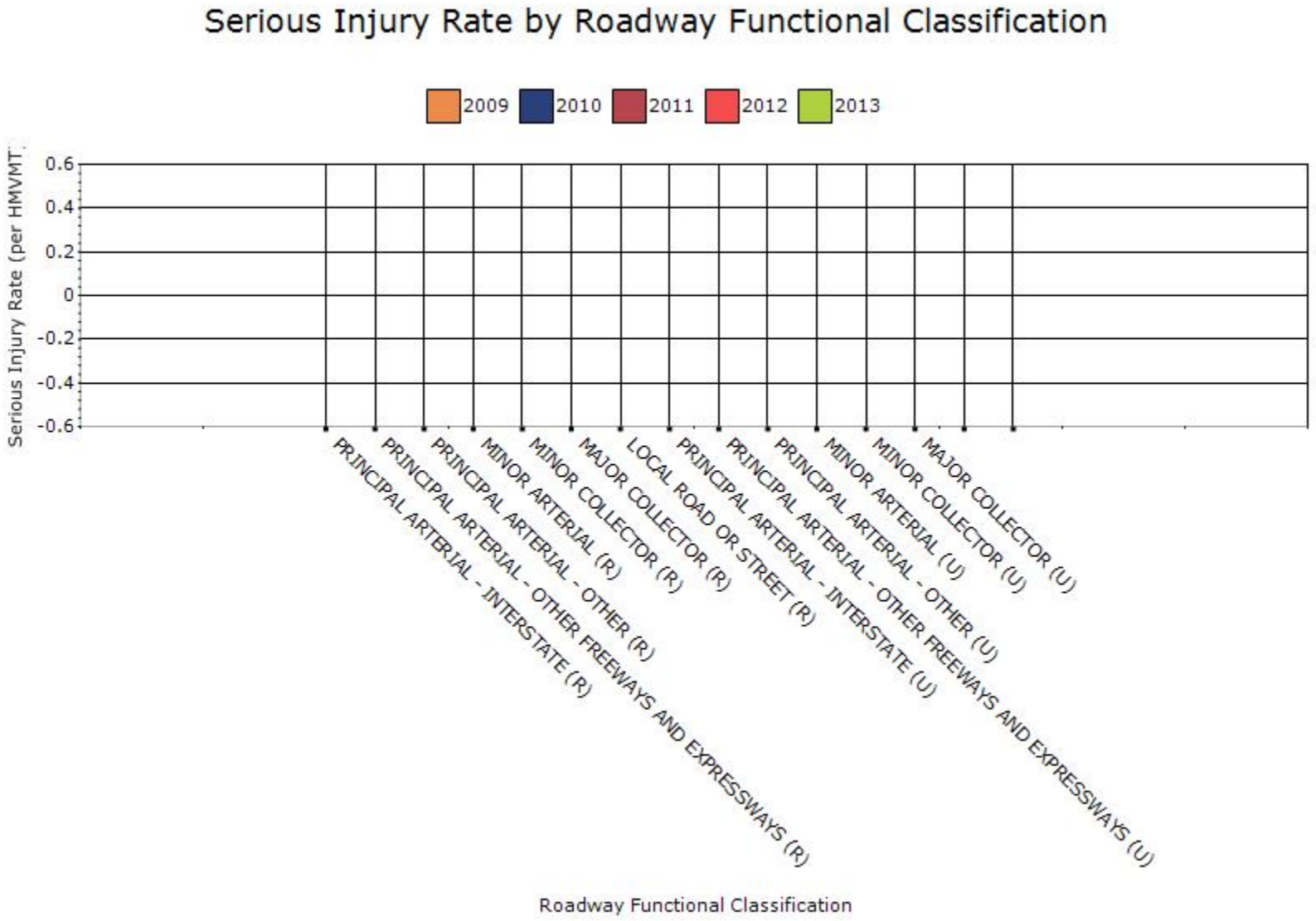
Function Classification	Number of fatalities	Number of serious injuries	Fatality rate (per HMVMT)	
RURAL PRINCIPAL ARTERIAL - INTERSTATE	46.8	0	0	0
RURAL PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXPRESSWAYS	0	0	0	
RURAL PRINCIPAL ARTERIAL - OTHER	68.2	0	0	0
RURAL MINOR ARTERIAL	52	0	0	
RURAL MINOR COLLECTOR	13.2	0	0	0
RURAL MAJOR COLLECTOR	35	0	0	
RURAL LOCAL ROAD OR STREET	24.6	0	0	0
URBAN PRINCIPAL	30.2	0	0	

ARTERIAL - INTERSTATE				
URBAN PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXPRESSWAYS	14.8	0	0	0
URBAN PRINCIPAL ARTERIAL - OTHER	97.2	0	0	0
URBAN MINOR ARTERIAL	42.4	0	0	0
URBAN MINOR COLLECTOR	0	0	0	0
URBAN MAJOR COLLECTOR	17	0	0	0
URBAN LOCAL ROAD OR STREET	21.2	0	0	0
	0	0	0	0


Fatalities by Roadway Functional Classification
2009
2010
2011
2012
2013
# of Fatalities
120
100
80
60
40
20
0
PRINCIPAL ARTERIAL - INTERSTATE (R)
PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXPRESSWAYS (R)
PRINCIPAL ARTERIAL - OTHER (R)
MINOR ARTERIAL (R)
MINOR COLLECTOR (R)
MAJOR COLLECTOR (R)
LOCAL ROAD OR STREET (R)
PRINCIPAL ARTERIAL - INTERSTATE (U)
PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXPRESSWAYS (U)
PRINCIPAL ARTERIAL - OTHER (U)
MINOR ARTERIAL (U)
MINOR COLLECTOR (U)
MAJOR COLLECTOR (U)
Roadway Functional Classification

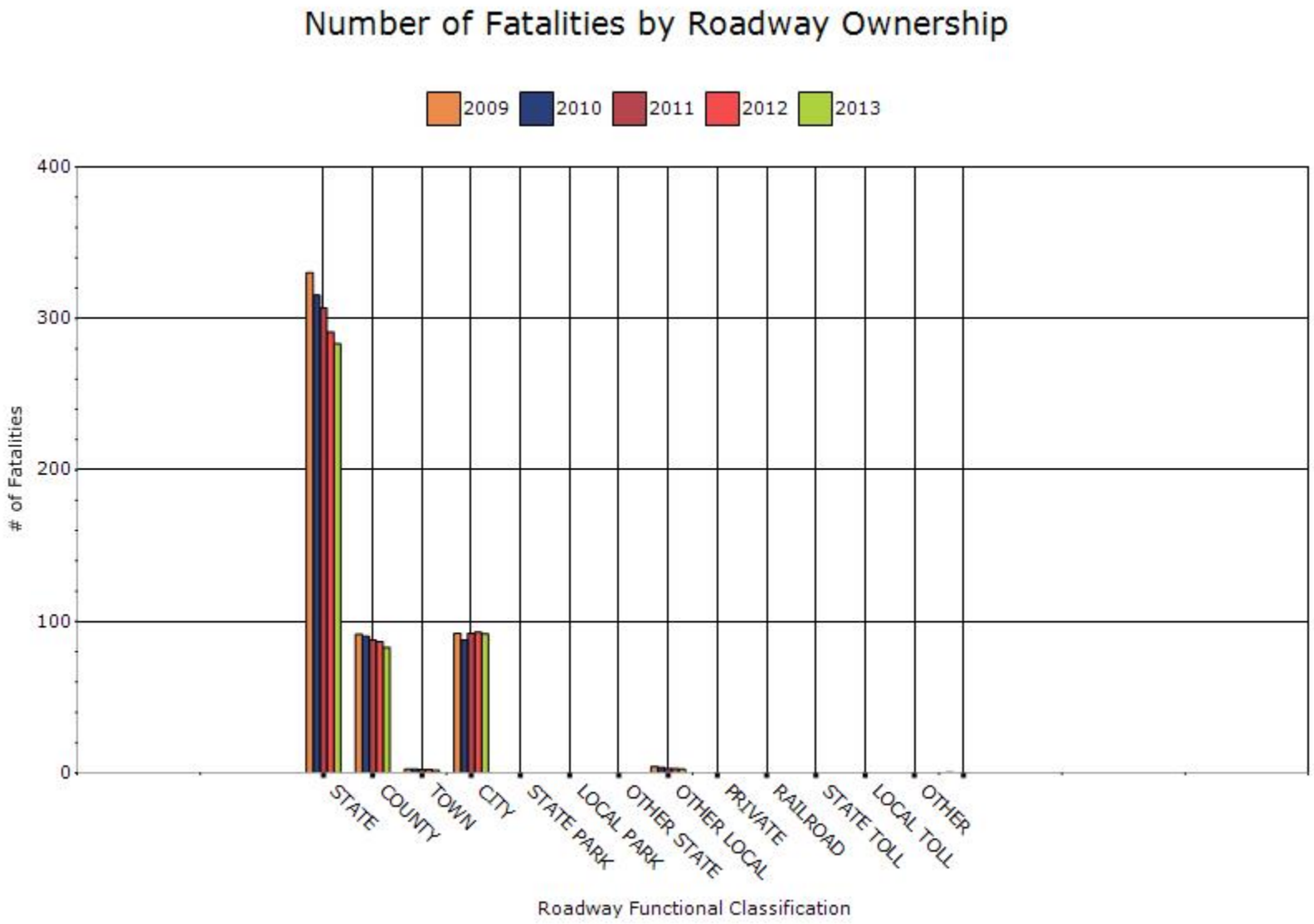

Serious Injuries by Roadway Functional Classification
2009
2010
2011
2012
2013
# of Serious Injuries
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
PRINCIPAL ARTERIAL - INTERSTATE (R)
PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXPRESSWAYS (R)
PRINCIPAL ARTERIAL - OTHER (R)
MINOR ARTERIAL (R)
MINOR COLLECTOR (R)
MAJOR COLLECTOR (R)
LOCAL ROAD OR STREET (R)
PRINCIPAL ARTERIAL - INTERSTATE (U)
PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXPRESSWAYS (U)
PRINCIPAL ARTERIAL - OTHER (U)
MINOR ARTERIAL (U)
MINOR COLLECTOR (U)
MAJOR COLLECTOR (U)
Roadway Functional Classification

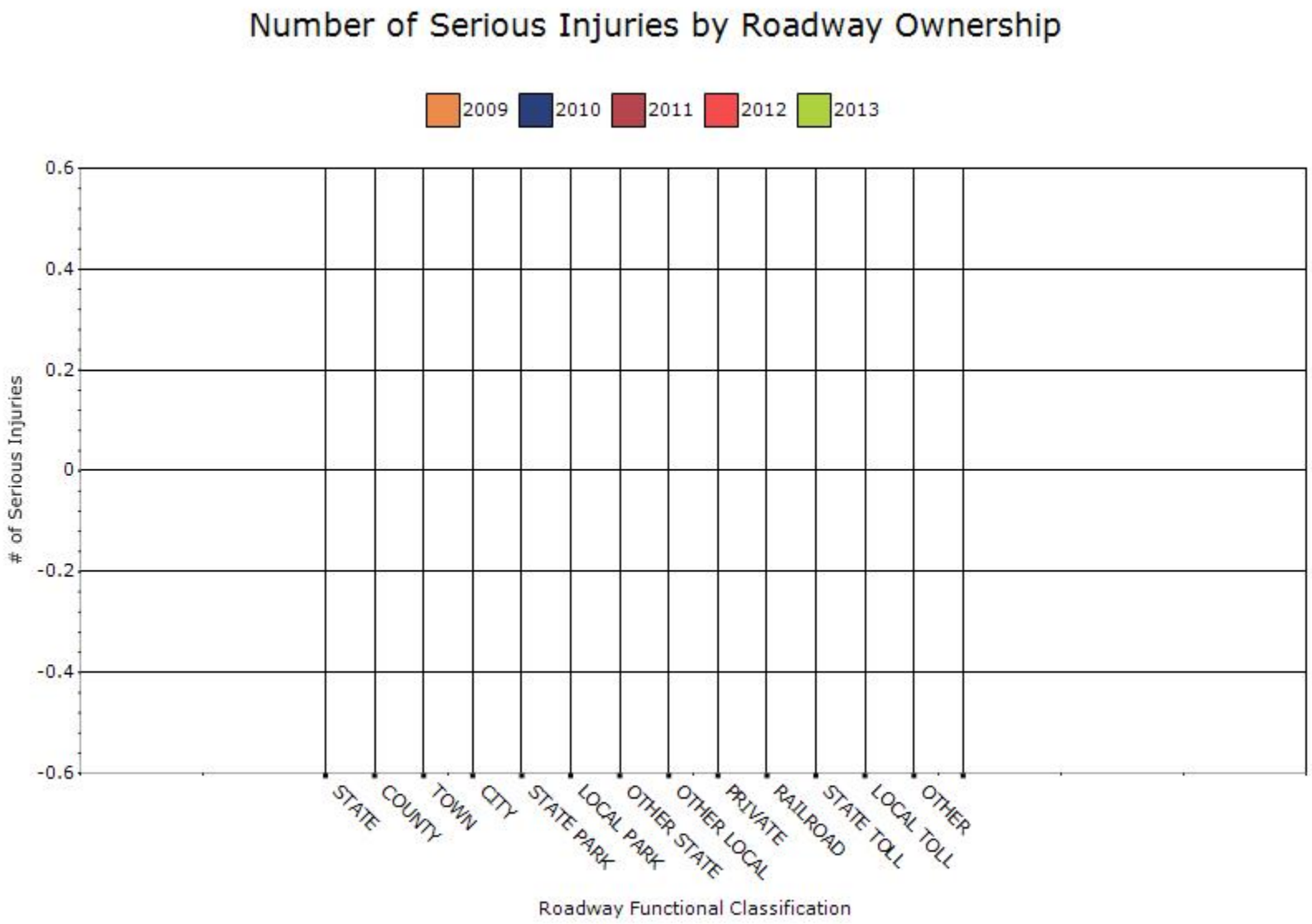

Fatality Rate by Roadway Functional Classification
2009
2010
2011
2012
2013
Fatality Rate (per HMVMT)
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
PRINCIPAL ARTERIAL - INTERSTATE (R)
PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXPRESSWAYS (R)
PRINCIPAL ARTERIAL - OTHER (R)
MINOR ARTERIAL (R)
MINOR COLLECTOR (R)
MAJOR COLLECTOR (R)
LOCAL ROAD OR STREET (R)
PRINCIPAL ARTERIAL - INTERSTATE (U)
PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXPRESSWAYS (U)
PRINCIPAL ARTERIAL - OTHER (U)
MINOR ARTERIAL (U)
MINOR COLLECTOR (U)
MAJOR COLLECTOR (U)
Roadway Functional Classification


Serious Injury Rate by Roadway Functional Classification
2009
2010
2011
2012
2013
Serious Injury Rate (per HMVMT)
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
PRINCIPAL ARTERIAL - INTERSTATE (R)
PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXPRESSWAYS (R)
PRINCIPAL ARTERIAL - OTHER (R)
MINOR ARTERIAL (R)
MINOR COLLECTOR (R)
MAJOR COLLECTOR (R)
LOCAL ROAD OR STREET (R)
PRINCIPAL ARTERIAL - INTERSTATE (U)
PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXPRESSWAYS (U)
PRINCIPAL ARTERIAL - OTHER (U)
MINOR ARTERIAL (U)
MINOR COLLECTOR (U)
MAJOR COLLECTOR (U)
Roadway Functional Classification

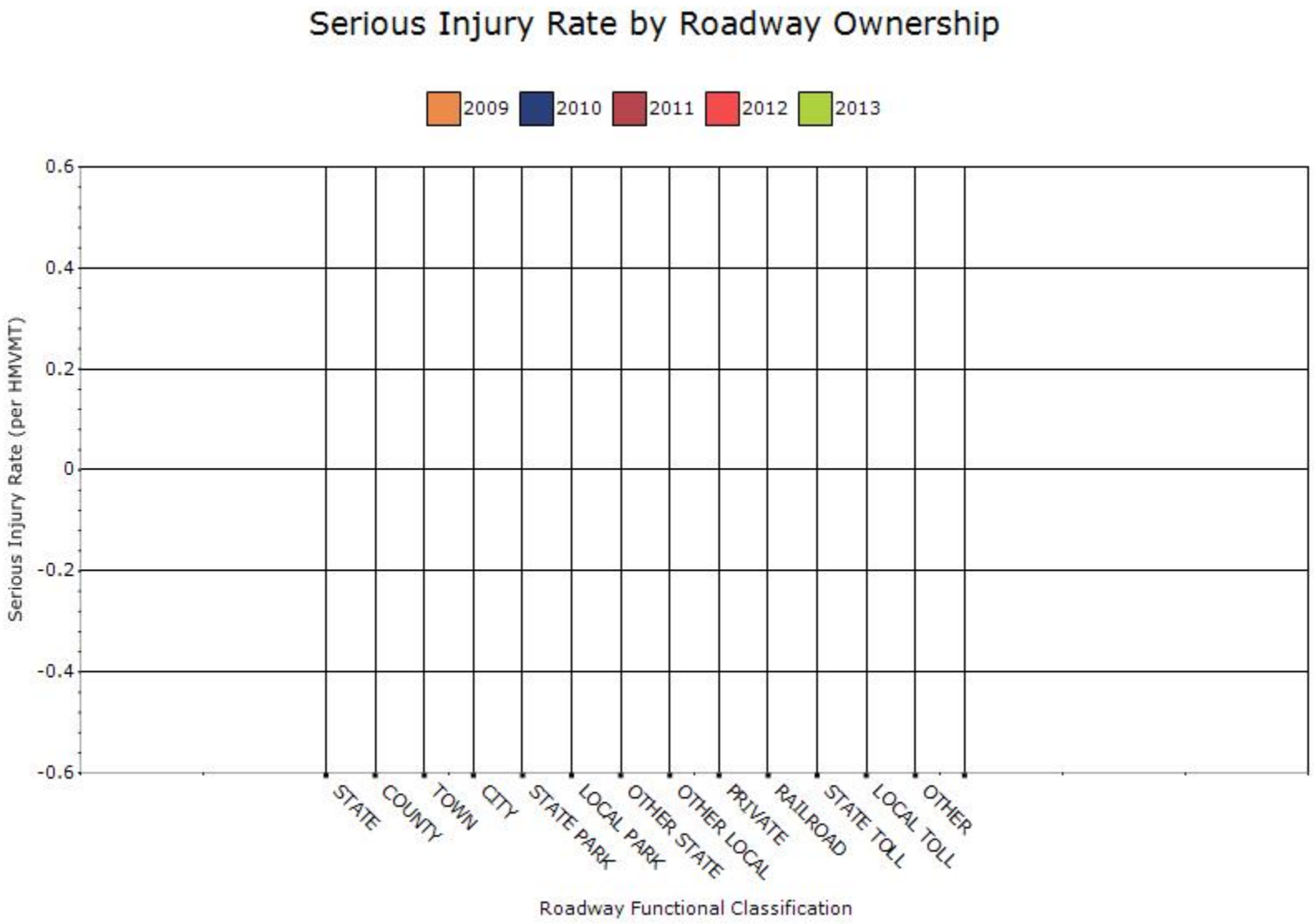
Year - 2013

Roadway Ownership	Number of fatalities	Number of serious injuries	Fatality rate (per HMVMT)	Serious injury rate (per HMVMT)
STATE HIGHWAY AGENCY	283.4	0	0	0
COUNTY HIGHWAY AGENCY	83	0	0	0
TOWN OR TOWNSHIP HIGHWAY AGENCY	1.8	0	0	0
CITY OF MUNICIPAL HIGHWAY AGENCY	91.8	0	0	0
STATE PARK, FOREST, OR RESERVATION AGENCY	0	0	0	0
LOCAL PARK, FOREST OR RESERVATION AGENCY	0	0	0	0
OTHER STATE AGENCY	0	0	0	0
OTHER LOCAL AGENCY	2.6	0	0	0
PRIVATE (OTHER THAN RAILROAD)	0	0	0	0
RAILROAD	0	0	0	0
STATE TOLL AUTHORITY	0	0	0	0
LOCAL TOLL AUTHORITY	0	0	0	0
OTHER PUBLIC INSTRUMENTALITY (E.G. AIRPORT, SCHOOL, UNIVERSITY)	0	0	0	0
OTHER	0	0	0	0


Number of Fatalities by Roadway Ownership
2009
2010
2011
2012
2013
400
300
200
100
0
# of Fatalities
STATE
COUNTY
TOWN
CITY
STATE PARK
LOCAL PARK
OTHER STATE
OTHER LOCAL
PRIVATE
RAILROAD
STATE TOLL
LOCAL TOLL
OTHER
Roadway Functional Classification


Number of Serious Injuries by Roadway Ownership
2009
2010
2011
2012
2013
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
# of Serious Injuries
STATE
COUNTY
TOWN
CITY
STATE PARK
LOCAL PARK
OTHER STATE
OTHER LOCAL
PRIVATE
RAILROAD
STATE TOLL
LOCAL TOLL
OTHER
Roadway Functional Classification


Fatality Rate by Roadway Ownership
2009
2010
2011
2012
2013
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
Fatality Rate (per HMVMT)
STATE
COUNTY
TOWN
CITY
STATE PARK
LOCAL PARK
OTHER STATE
OTHER LOCAL
PRIVATE
RAILROAD
STATE TOLL
LOCAL TOLL
OTHER
Roadway Functional Classification


Serious Injury Rate by Roadway Ownership
2009
2010
2011
2012
2013
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
Serious Injury Rate (per HMVMT)
STATE
COUNTY
TOWN
CITY
STATE PARK
LOCAL PARK
OTHER STATE
OTHER LOCAL
PRIVATE
RAILROAD
STATE TOLL
LOCAL TOLL
OTHER
Roadway Functional Classification

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

The general trend in fatal crash reduction experienced on Colorado roadways has continued in the most recent reporting period. In recent years the numbers of fatalities from crashes has fallen from 743 in 2003 to less than 500 per year since 2009. This positive outcome can be, in part, attributed to the FHWA's focus on improving transportation safety and their support and promotion of this goal through the HSIP funding. Results of a recent study by the National Cooperative Highway Research Program confirm the benefits of FHWA's safety funding for Colorado - "…The National Cooperative Highway Research Program (NCHRP) Project 20-24(37C) compared Colorado's safety performance results to other states in the US from the period 2000-2002 with those in 2005-2007. This draft report shows how Colorado has emerged as a leader in roadway safety: • 22 percent decrease in total fatalities • 31 percent decrease in fatalities per 100 million VMT • 35 percent decrease in speeding-related fatalities • 30 percent decrease in young driver involvement in fatal crashes • 20 percent decrease in alcohol-related fatalities (driver blood-alcohol content greater than 0.08) • 35 percent decrease in unrestrained passenger fatalities, all seat positions • 22 percent decrease in pedestrian fatalities…"

Application of Special Rules

Present the rate of traffic fatalities and serious injuries per capita for drivers and pedestrians over the age of 65.

Older Driver Performance Measures	2009	2010	2011	2012	2013
Fatality rate (per capita)	0.51	0.516	0.51	0.496	0.478
Serious injury rate (per capita)	1.904	1.868	1.798	1.816	1.86
Fatality and serious injury rate (per capita)	2.416	2.384	2.308	2.31	2.338

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

65 and Older Drivers or Pedestrians by Year:

2013 = 63 FAT, 250 INJ, 123 CAPITA
2012 = 52 FAT, 242 INJ, 118 CAPITA
2011 = 47 FAT, 202 INJ, 112 CAPITA
2010 = 52 FAT, 178 INJ, 109 CAPITA
2009 = 57 FAT, 190 INJ, 106 CAPITA
2008 = 62 FAT, 188 INJ, 104 CAPITA
2007 = 52 FAT, 198 INJ, 101 CAPITA

2006 = 45 FAT, 215 INJ, 100 CAPITA
2005 = 44 FAT, 176 INJ, 97 CAPITA

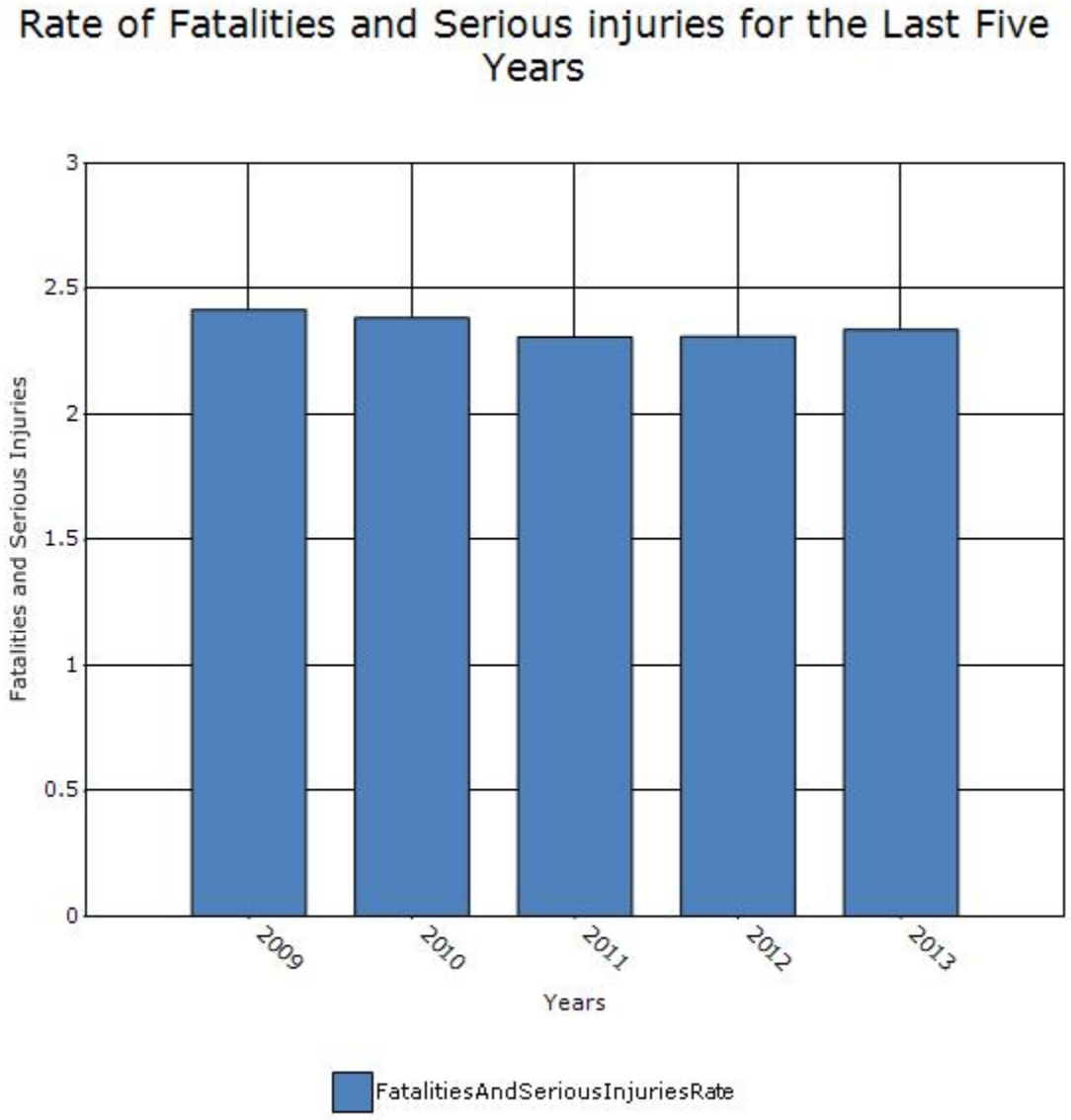
Calculate Rate for 2012

(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) + (F+SI 2009 Drivers and Pedestrians 65 years of age and older/2009 Population Figure) + (F+SI 2008 Drivers and Pedestrians 65 years of age and older/2008 Population Figure) / 5

Calculate Rate for 2010

(F+SI 2010 Drivers and Pedestrians 65 years of age and older/2010 Population Figure) + (F+SI 2009 Drivers and Pedestrians 65 years of age and older/2009 Population Figure) + (F+SI 2008 Drivers and Pedestrians 65 years of age and older/2008 Population Figure) + (F+SI 2007 Drivers and Pedestrians 65 years of age and older/2007 Population Figure) + (F+SI 2006 Drivers and Pedestrians 65 years of age and over/2006 Population Figure) / 5

Compare



Does the older driver special rule apply to your state?

No

Assessment of the Effectiveness of the Improvements (Program

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

☐ None

☐ Benefit/cost

☐ Policy change

☒ Other: Other-Decreasing trend of fatalities and serious injuries

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

☐ Shift Focus to Fatalities and Serious Injuries

☐ Include Local Roads in Highway Safety Improvement Program

☒ Organizational Changes

☐ None

☐ Other:

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

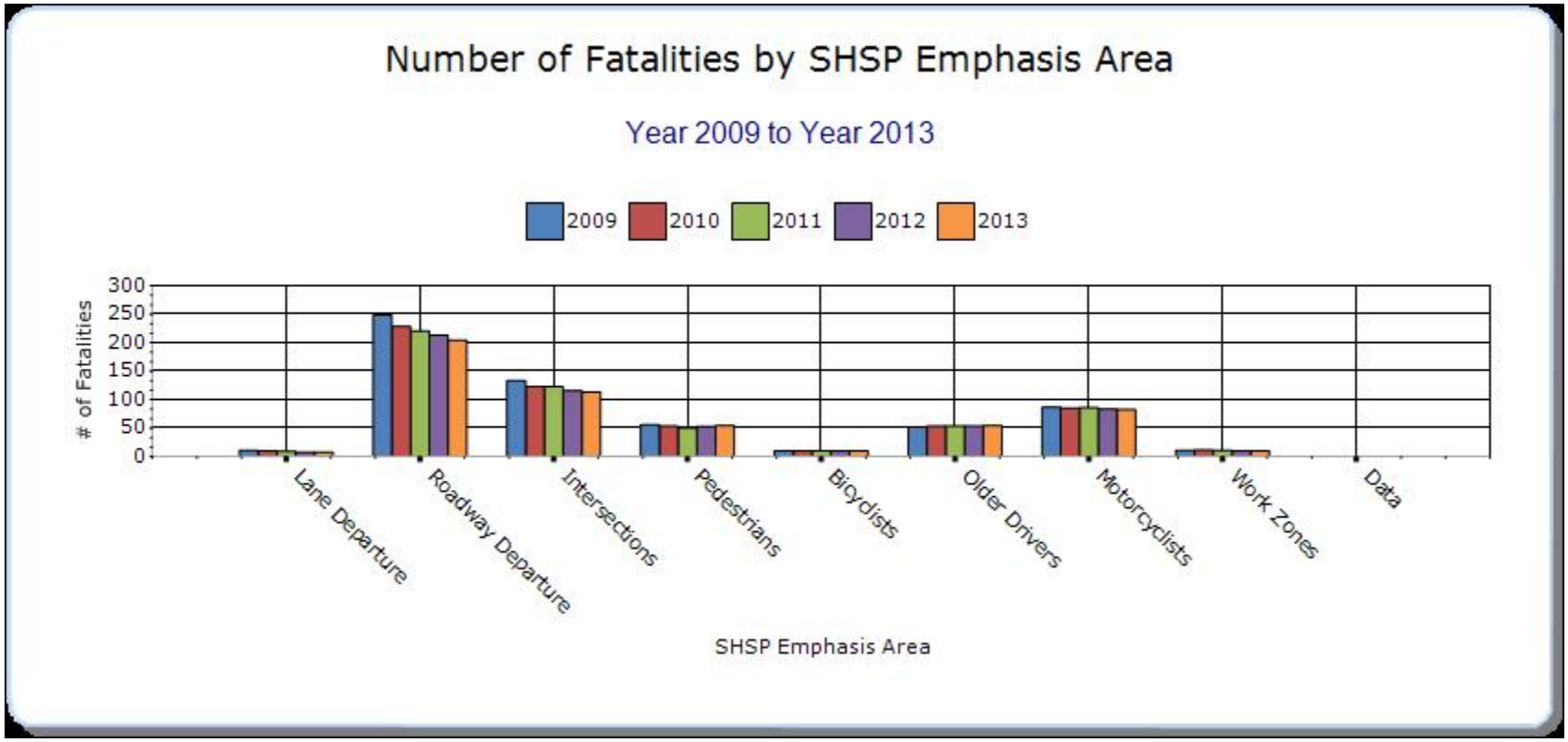
At the beginning of FY 2014, the CDOT Safety and Traffic Engineering Branch (which administers the HSIP program) was reorganized under a new CDOT division: Transportation Systems Management & Operations.

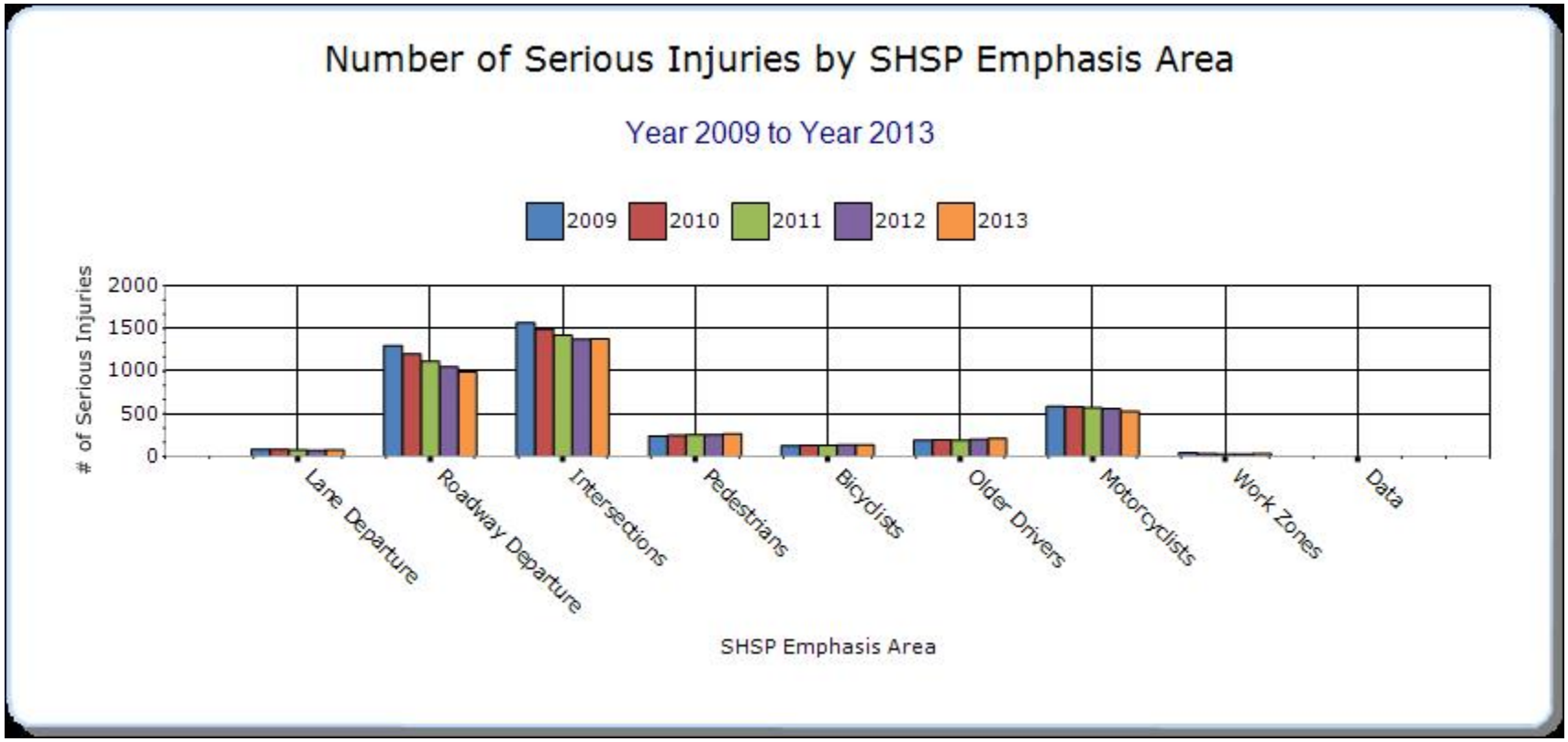
SHSP Emphasis Areas

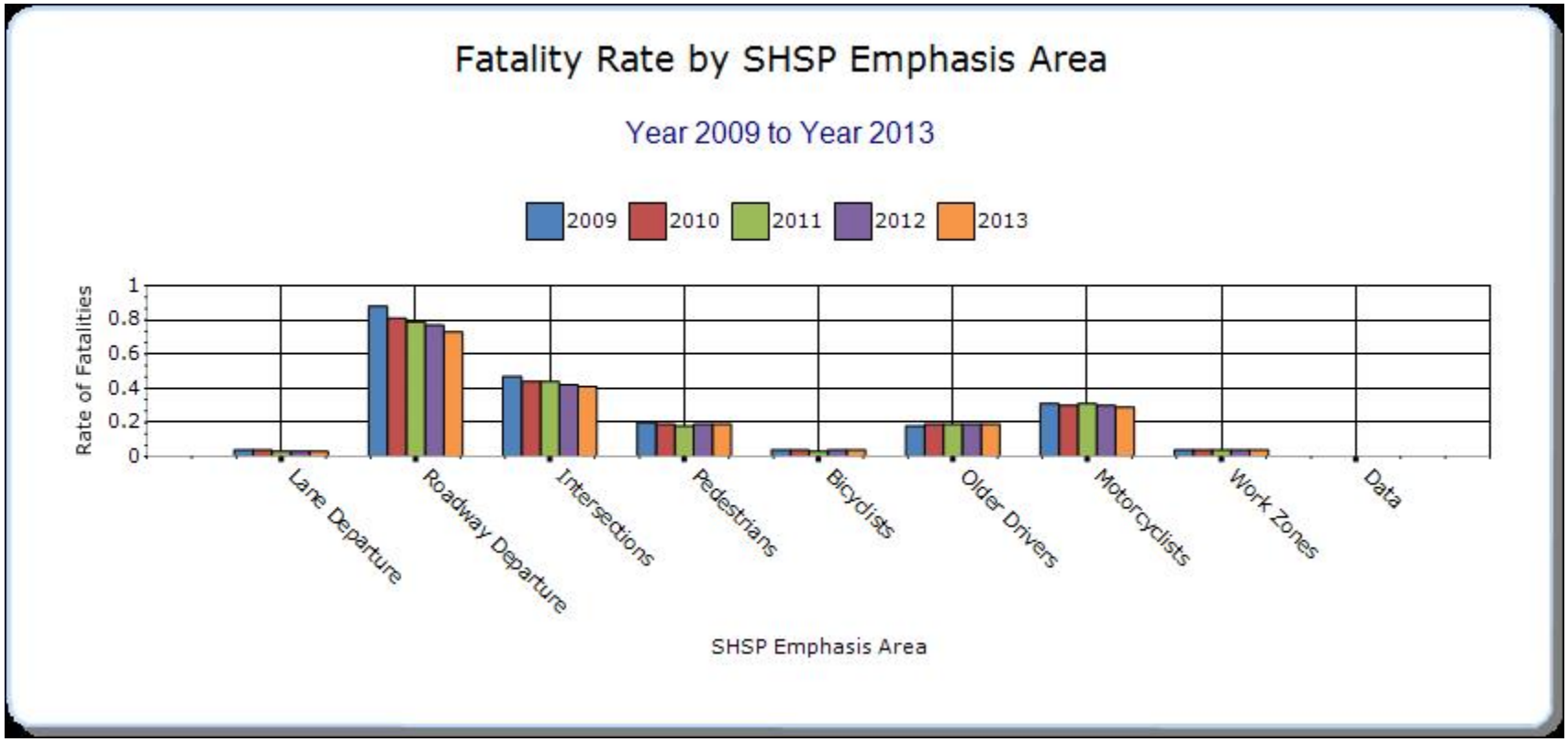
For each SHSP emphasis area that relates to the HSIP, present trends in emphasis area performance measures.

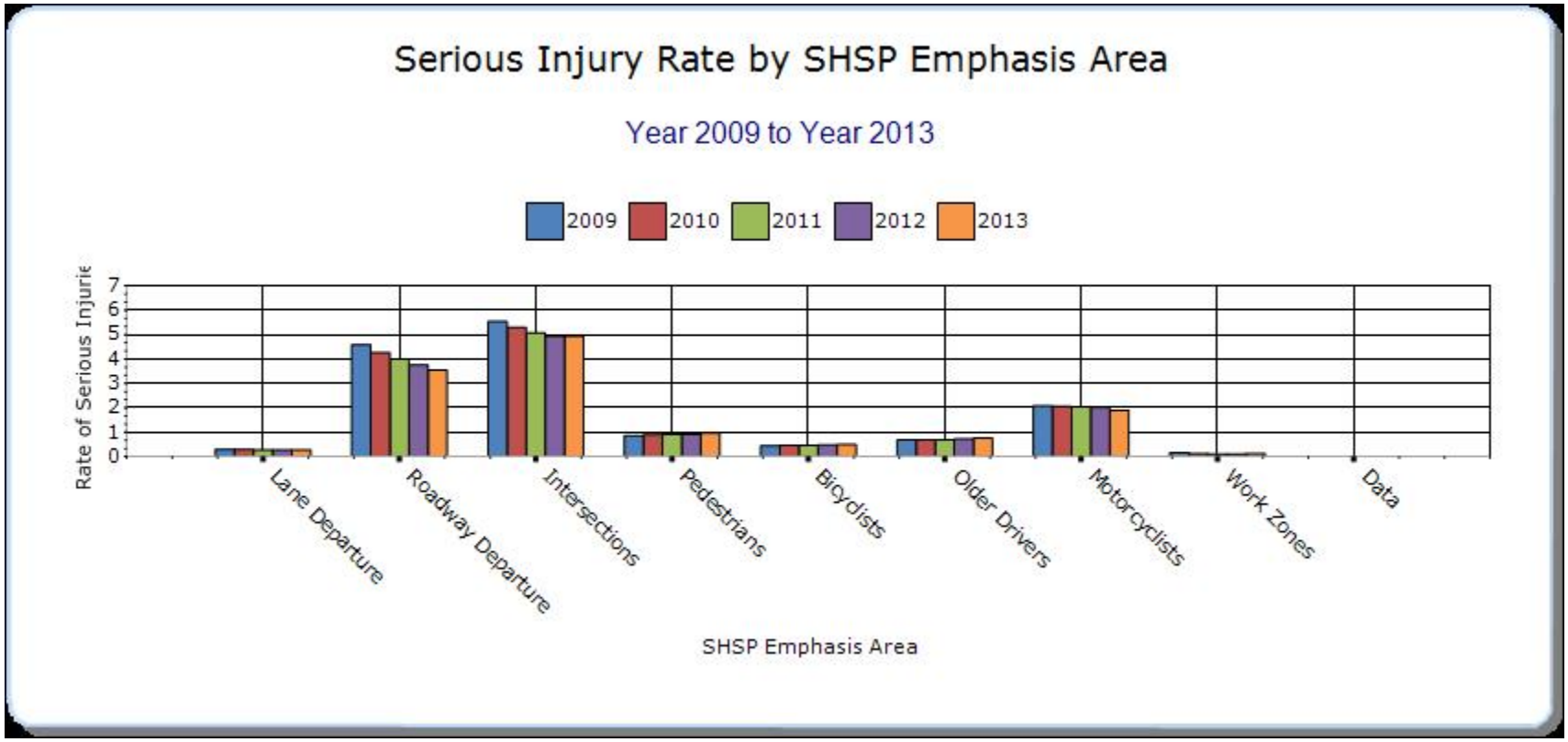
Year - 2013

HSIP-related SHSP Emphasis Areas	Target Crash Type	Number of fatalities	Number of serious injuries	Fatality rate (per HMVMT)	Serious injury rate (per HMVMT)	Other-1	Other-2	Other-3
Lane Departure	Sideswipe	7.6	79	0.03	0.28	0	0	0
Roadway Departure	Run-off-road	204.6	991.2	0.73	3.55	0	0	0
Intersections	Intersection Related	113.2	1377	0.41	4.93	0	0	0
Pedestrians	Vehicle/pedestrian	54.2	268.6	0.19	0.96	0	0	0
Bicyclists	Vehicle/bicycle	10.2	137.6	0.04	0.49	0	0	0
Older Drivers	65 or Older	54.2	212.4	0.19	0.76	0	0	0
Motorcyclists	Motorcycle	82.4	532.2	0.29	1.9	0	0	0
Work Zones	Construction Zone	10.2	35.2	0.04	0.13	0	0	0


Number of Fatalities by SHSP Emphasis Area
Year 2009 to Year 2013
2009
2010
2011
2012
2013
# of Fatalities
300
250
200
150
100
50
0
Lane Departure
Roadway Departure
Intersections
Pedestrians
Bicyclists
Older Drivers
Motorcyclists
Work Zones
Data
SHSP Emphasis Area


Number of Serious Injuries by SHSP Emphasis Area
Year 2009 to Year 2013
2009
2010
2011
2012
2013
# of Serious Injuries
2000
1500
1000
500
0
Lane Departure
Roadway Departure
Intersections
Pedestrians
Bicyclists
Older Drivers
Motorcyclists
Work Zones
Data
SHSP Emphasis Area

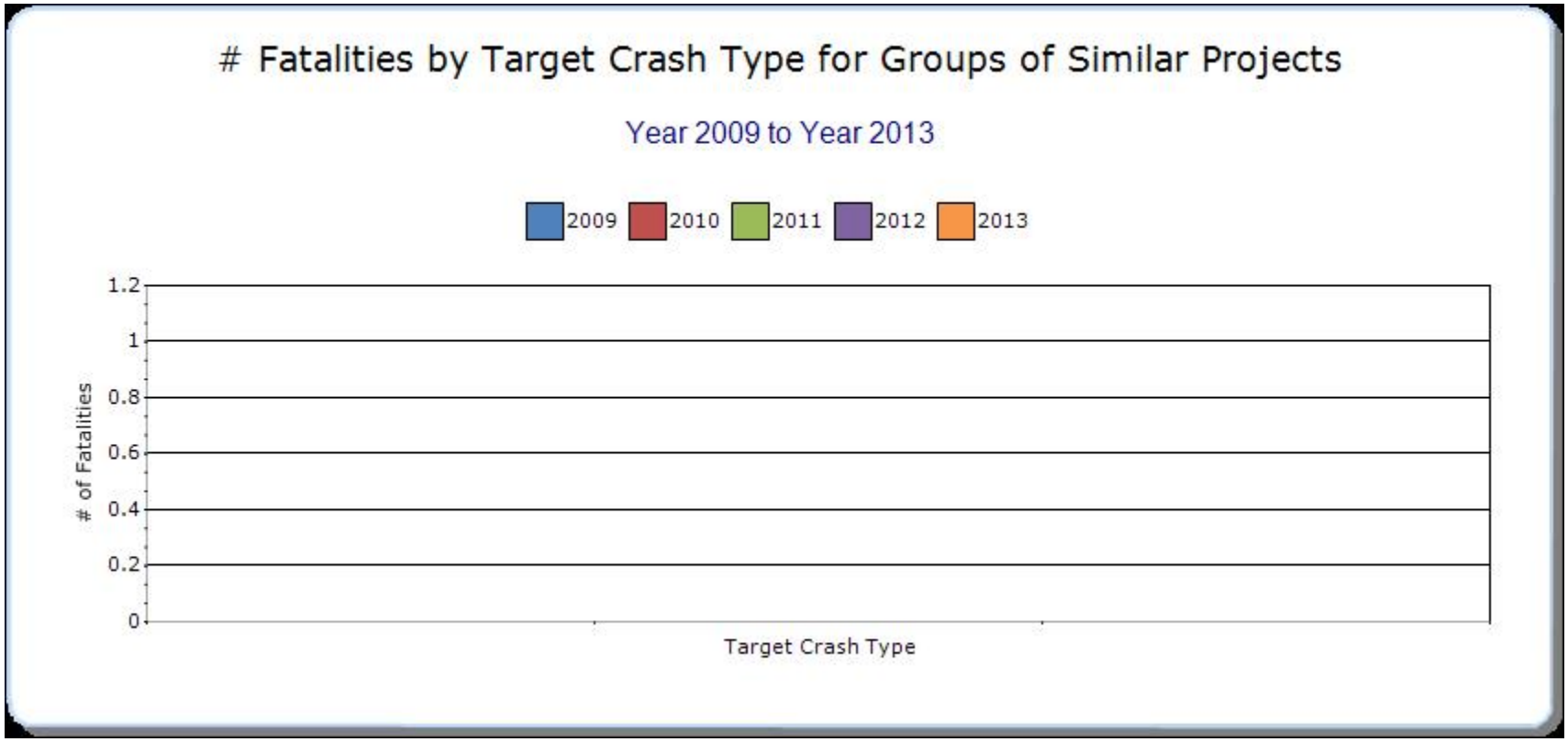

Fatality Rate by SHSP Emphasis Area
Year 2009 to Year 2013
2009
2010
2011
2012
2013
Rate of Fatalities
1
0.8
0.6
0.4
0.2
0
Lane Departure
Roadway Departure
Intersections
Pedestrians
Bicyclists
Older Drivers
Motorcyclists
Work Zones
Data
SHSP Emphasis Area

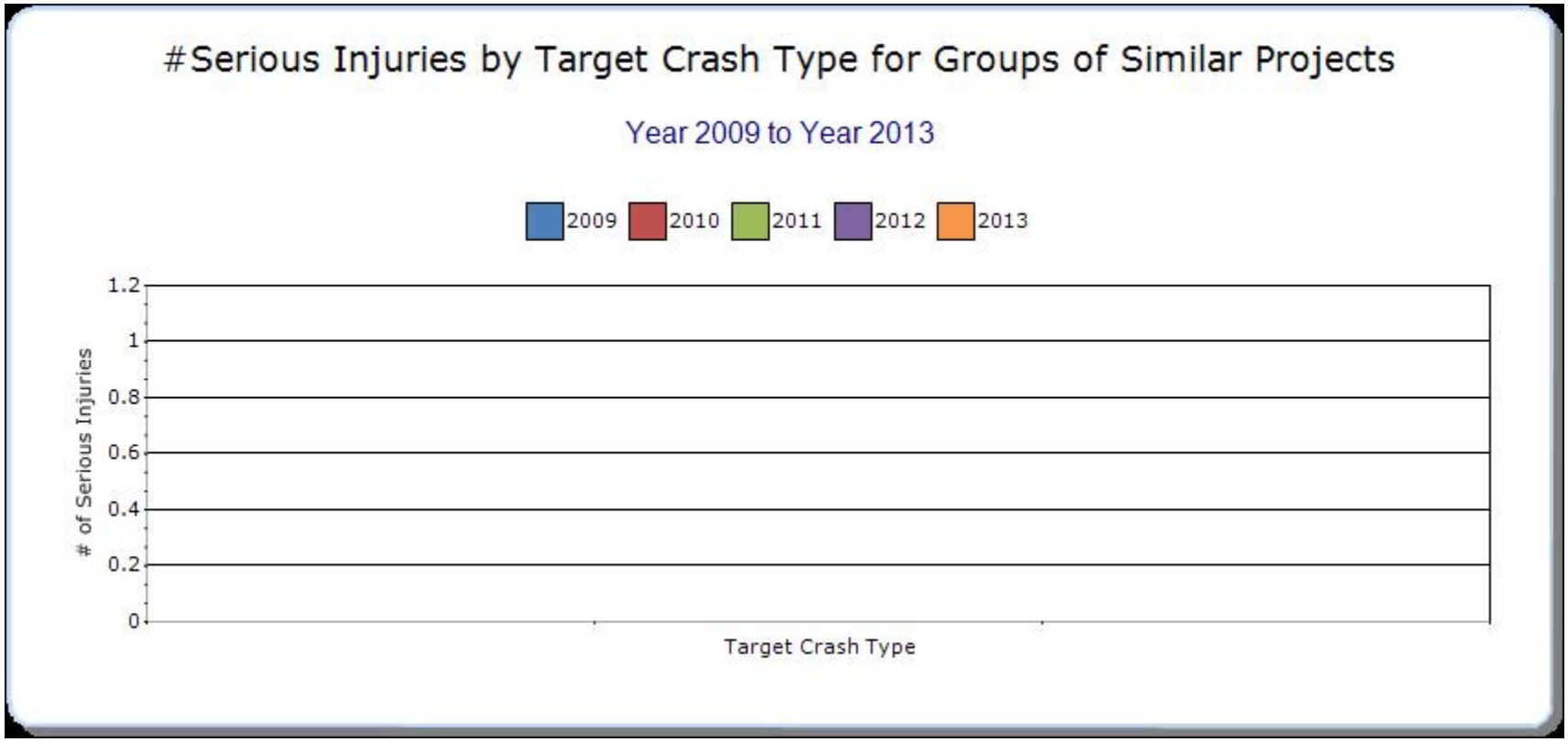

Serious Injury Rate by SHSP Emphasis Area
Year 2009 to Year 2013
2009
2010
2011
2012
2013
Rate of Serious Injurie
7
6
5
4
3
2
1
0
Lane Departure
Roadway Departure
Intersections
Pedestrians
Bicyclists
Older Drivers
Motorcyclists
Work Zones
Data
SHSP Emphasis Area

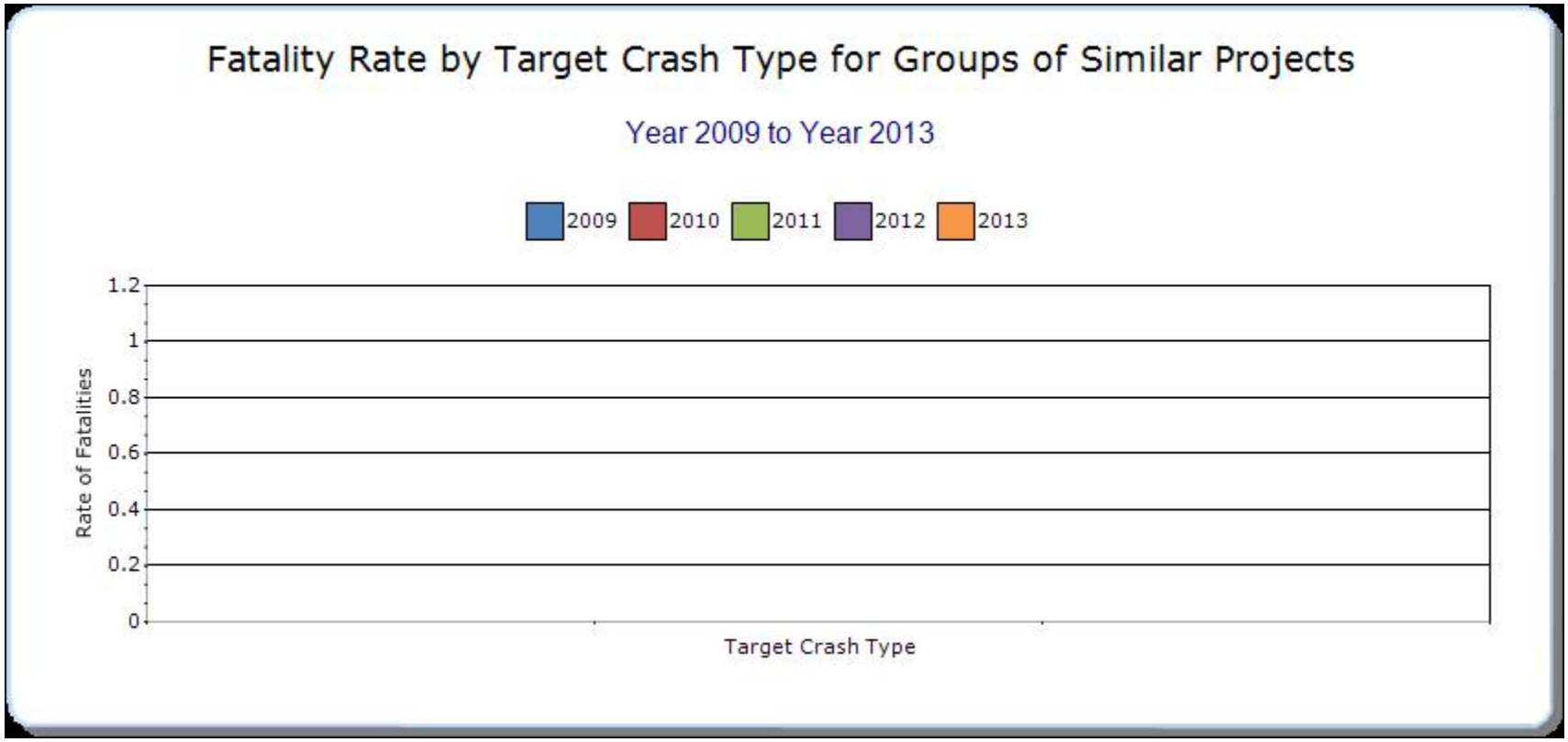
Groups of similar project types

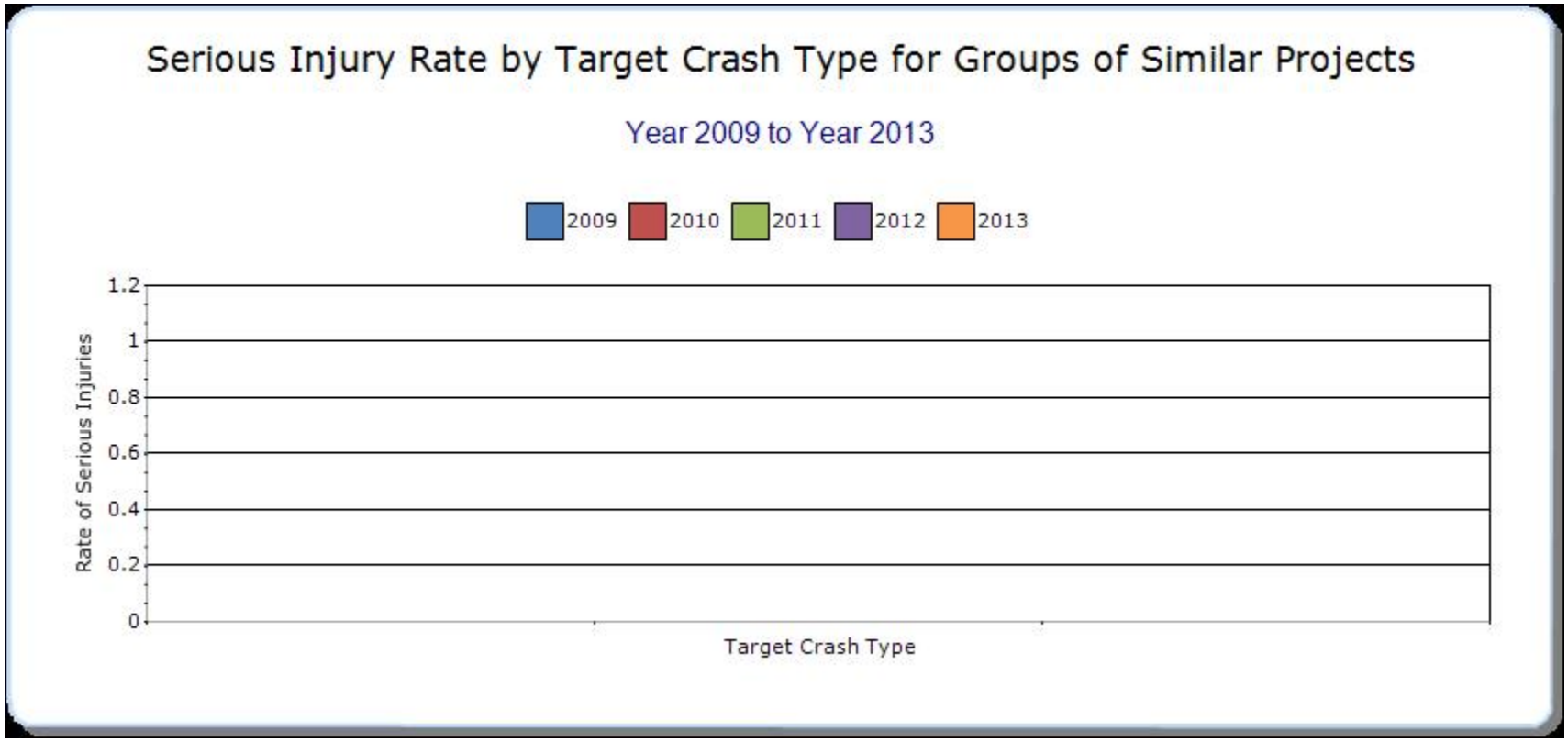
Present the overall effectiveness of groups of similar types of projects.

HSIP Sub-program Types	Target Crash Type	Number of fatalities	Number of serious injuries	Fatality rate (per HMVMT)	Serious injury rate (per HMVMT)	Other-1	Other-2	Other-3


Fatalities by Target Crash Type for Groups of Similar Projects
Year 2009 to Year 2013
2009
2010
2011
2012
2013
1.2
1
0.8
0.6
0.4
0.2
0
# of Fatalities
Target Crash Type


#Serious Injuries by Target Crash Type for Groups of Similar Projects
Year 2009 to Year 2013
2009
2010
2011
2012
2013
1.2
1
0.8
0.6
0.4
0.2
0
# of Serious Injuries
Target Crash Type


Fatality Rate by Target Crash Type for Groups of Similar Projects
Year 2009 to Year 2013
2009
2010
2011
2012
2013
1.2
1
0.8
0.6
0.4
0.2
0
Rate of Fatalities
Target Crash Type

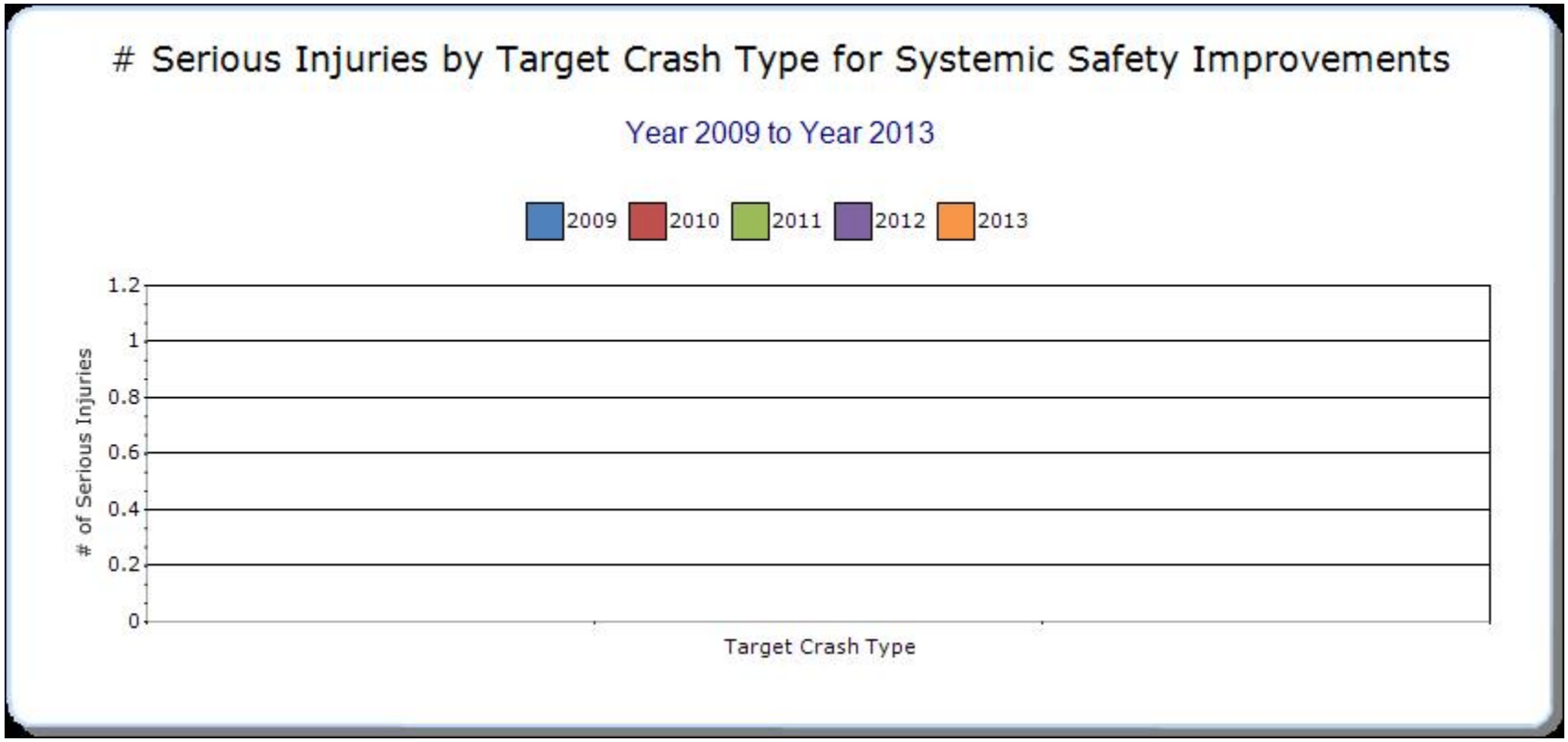

Serious Injury Rate by Target Crash Type for Groups of Similar Projects
Year 2009 to Year 2013
2009
2010
2011
2012
2013
1.2
1
0.8
0.6
0.4
0.2
0
Rate of Serious Injuries
Target Crash Type

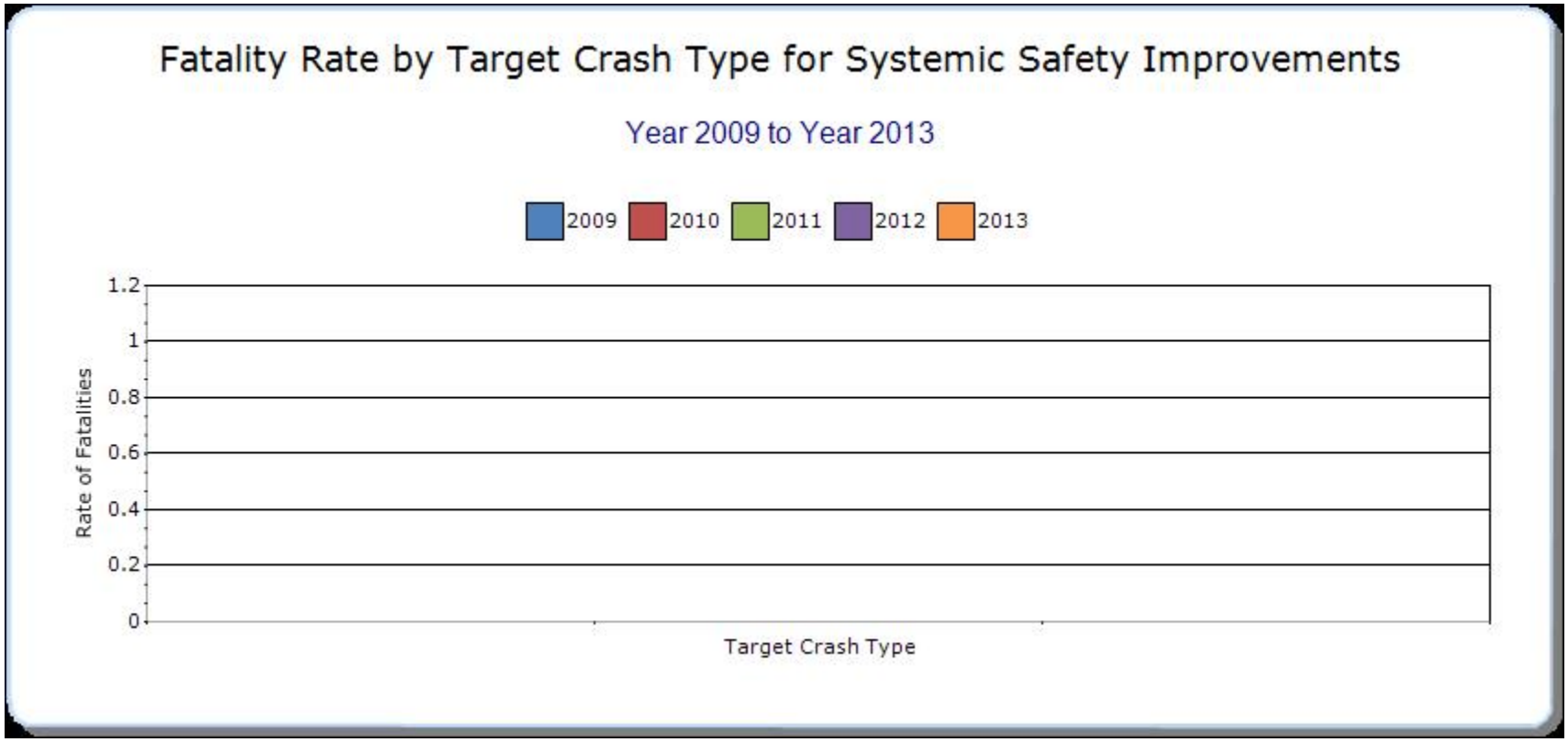
Systemic Treatments

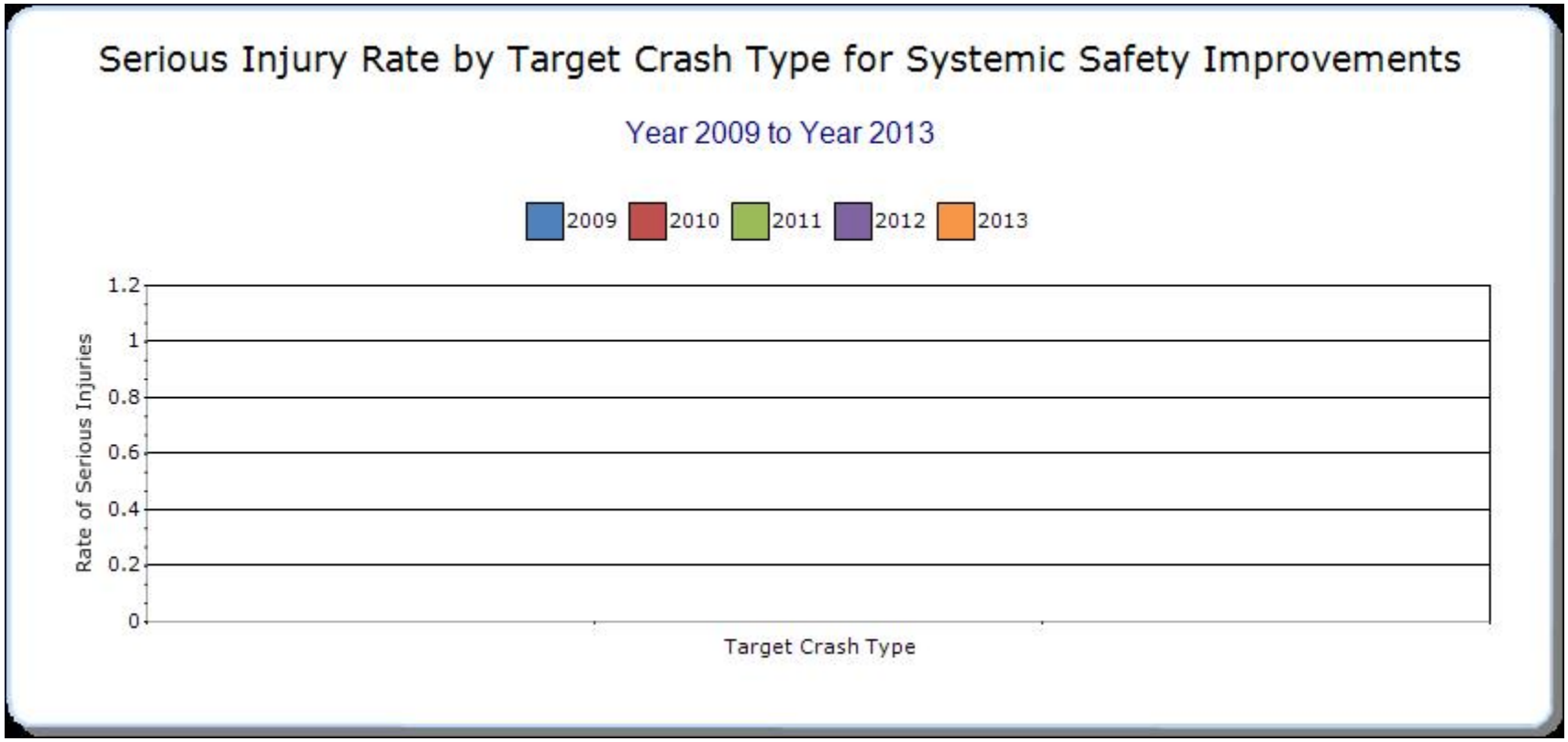
Present the overall effectiveness of systemic treatments.

Systemic improvement	Target Crash Type	Number of fatalities	Number of serious injuries	Fatality rate (per HMVMT)	Serious injury rate (per HMVMT)	Other-1	Other-2	Other-3


Fatalities by Target Crash Type for Systemic Safety Improvements
Year 2009 to Year 2013
2009
2010
2011
2012
2013
1.2
1
0.8
0.6
0.4
0.2
0
# of Fatalities
Target Crash Type


Serious Injuries by Target Crash Type for Systemic Safety Improvements
Year 2009 to Year 2013
2009
2010
2011
2012
2013
1.2
1
0.8
0.6
0.4
0.2
0
# of Serious Injuries
Target Crash Type


Fatality Rate by Target Crash Type for Systemic Safety Improvements
Year 2009 to Year 2013
2009
2010
2011
2012
2013
1.2
1
0.8
0.6
0.4
0.2
0
Rate of Fatalities
Target Crash Type


Serious Injury Rate by Target Crash Type for Systemic Safety Improvements
Year 2009 to Year 2013
2009
2010
2011
2012
2013
1.2
1
0.8
0.6
0.4
0.2
0
Rate of Serious Injuries
Target Crash Type

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

HSIP funding has helped Colorado see a major decreasing trend in all crash types over the last ten years, not just serious injuries and fatalities. With the help of sustained funding and a renewed focus provided by an updated SHSP, it is the goal of CDOT to facilitate the continuation of these downward trends in Colorado.

Provide project evaluation data for completed projects (optional).

Location	Functional Class	Improvement Category	Improvement Type	Bef-Fatal	Bef-Serious Injury	Bef-Other Injury	Bef-PDO	Bef-Total	Aft-Fatal	Aft-Serious Injury	Aft-Other Injury	Aft-PDO	Aft-Total	Evaluation Results (Benefit/ Cost Ratio)
I-225 MP 3.95-7.91	Urban Principal Arterial - Interstate	Roadside	Barrier - cable	1	9	8	7	25	0	1	2	0	3	3.38

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.

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.