

FMCSA Safety Program Effectiveness Measurement: Roadside Intervention Effectiveness Model, Fiscal Year 2013



U.S. Department of Transportation
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FOREWORD

The Federal Motor Carrier Safety Administration (FMCSA), in cooperation with the John A. Volpe National Transportation Systems Center, has developed an analytic model to measure the effectiveness of roadside inspections and traffic enforcement inspections in terms of the number of crashes prevented, injuries prevented, and lives saved. Traffic enforcement inspections and roadside inspections are considered interventions; this analytic model is known as the Roadside Intervention Effectiveness Model (RIEM). This model provides FMCSA management with the information needed to address the requirements of the GPRA Modernization Act of 2010, which requires Federal agencies to measure the effectiveness of their programs as part of the budget cycle process. It also provides FMCSA and State safety program managers with a quantitative basis for optimizing the allocation of safety resources in the field.

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16. Abstract The Federal Motor Carrier Safety Administration (FMCSA), in cooperation with the John A. Volpe National Transportation Systems Center, has developed an analytic model to measure the effectiveness of roadside inspections and traffic enforcements in terms of crashes prevented, injuries prevented, and lives saved. Traffic enforcements and roadside inspections are considered interventions, and this analytic model is known as the Roadside Intervention Effectiveness Model (RIEM). This model provides FMCSA management with information to address the requirements of the GPRA Modernization Act of 2010, which requires Federal agencies to measure the effectiveness of their programs as part of the budget cycle process. It also provides FMCSA and State safety program managers with a quantitative basis for optimizing the allocation of safety resources in the field. This report discusses the results of the Roadside Intervention Effectiveness Model for fiscal year 2013.			
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SI* (MODERN METRIC) CONVERSION FACTORS

APPROXIMATE CONVERSIONS TO SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
LENGTH				
In	Inches	25.4	Millimeters	mm
Ft	Feet	0.305	Meters	m
Yd	Yards	0.914	Meters	m
Mi	Miles	1.61	Kilometers	km
AREA				
in ²	square inches	645.2	square millimeters	mm ²
ft ²	square feet	0.093	square meters	m ²
yd ²	square yards	0.836	square meters	m ²
Ac	Acres	0.405	Hectares	ha
mi ²	square miles	2.59	square kilometers	km ²
VOLUME				
fl oz	fluid ounces	29.57	1000 L shall be shown in m ³ Milliliters	mL
Gal	Gallons	3.785	Liters	L
ft ³	cubic feet	0.028	cubic meters	m ³
yd ³	cubic yards	0.765	cubic meters	m ³
MASS				
Oz	Ounces	28.35	Grams	g
Lb	Pounds	0.454	Kilograms	kg
T	short tons (2000 lb)	0.907	megagrams (or "metric ton")	Mg (or "t")
TEMPERATURE				
°F	Fahrenheit	$5 \times (F-32) \div 9$ or $(F-32) \div 1.8$	Temperature is in exact degrees Celsius	°C
ILLUMINATION				
Fc	foot-candles	10.76	Lux	lx
Fl	foot-Lamberts	3.426	candela/m ²	cd/m ²
Force and Pressure or Stress				
Lbf	Poundforce	4.45	Newtons	N
lbf/in ²	poundforce per square inch	6.89	Kilopascals	kPa

APPROXIMATE CONVERSIONS FROM SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
LENGTH				
Mm	Millimeters	0.039	inches	in
M	Meters	3.28	feet	ft
M	Meters	1.09	yards	yd
Km	Kilometers	0.621	miles	mi
AREA				
mm ²	square millimeters	0.0016	square inches	in ²
m ²	square meters	10.764	square feet	ft ²
m ²	square meters	1.195	square yards	yd ²
Ha	Hectares	2.47	acres	ac
km ²	square kilometers	0.386	square miles	mi ²
VOLUME				
mL	Milliliters	0.034	fluid ounces	fl oz
L	Liters	0.264	gallons	gal
m ³	cubic meters	35.314	cubic feet	ft ³
m ³	cubic meters	1.307	cubic yards	yd ³
MASS				
G	Grams	0.035	ounces	oz
Kg	Kilograms	2.202	pounds	lb
Mg (or "t")	megagrams (or "metric ton")	1.103	short tons (2000 lb)	T
TEMPERATURE				
°C	Celsius	$1.8c + 32$	Temperature is in exact degrees Fahrenheit	°F
ILLUMINATION				
Lx	Lux	0.0929	foot-candles	fc
cd/m ²	candela/m ²	0.2919	foot-Lamberts	fl
Force & Pressure Or Stress				
N	Newtons	0.225	poundforce	lbf
kPa	Kilopascals	0.145	poundforce per square inch	lbf/in ²

* SI is the symbol for the International System of Units. Appropriate rounding should be made to comply with Section 4 of ASTM E380. (Revised March 2003, Section 508-accessible version September 2009.)

TABLE OF CONTENTS

EXECUTIVE SUMMARY	VII
1. INTRODUCTION.....	1
1.1 BACKGROUND	1
2. METHODOLOGY	3
2.1 ASSIGNMENT OF CRASH RISK REDUCTION PROBABILITIES.....	3
2.2 CALCULATION OF BENEFITS	5
3. FISCAL YEAR 2013 ROADSIDE INTERVENTION EFFECTIVENESS MODEL RESULTS	7
3.1 NATIONAL LEVEL ESTIMATES	7
3.2 ESTIMATES BY DOMICILE OF CARRIER AND BY REPORTING STATE.....	11
3.2.1 Estimates by Country of Domicile (United States versus Non-United States)	11
3.2.2 Estimates by Reporting State	12
3.2.3 Estimates by Carrier State of Domicile	17
3.3 CONCLUSION.....	22

LIST OF APPENDICES

APPENDIX A: VIOLATION CRASH RISK REDUCTION AND NUMBER OF VIOLATIONS BY VIOLATION GROUP	23
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LIST OF FIGURES

Figure 1. Bar graph. Trends in crashes prevented and lives saved.	9
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LIST OF TABLES

Table 1. Program activity from FY 2011 to FY 2013.....	ix
Table 2. Program effectiveness from FY 2011 to FY 2013 using the RIEM Version 3.0.	x
Table 3. Program activity from FY 2011 to FY 2013.....	7
Table 4. Program effectiveness from FY 2011 to FY 2013 using the RIEM Version 3.0.	8
Table 5. Historical results for RIEM, CY 2001–FY 2013.....	10
Table 6. FY 2013 program exposure of U.S.-domiciled versus non-U.S.-domiciled carriers.....	11
Table 7. FY 2013 program effectiveness for U.S.-domiciled versus non-U.S.-domiciled carriers.	12
Table 8. Roadside Inspection Program estimated benefits by reporting State, FY 2013.	13
Table 9. Traffic Enforcement Program estimated benefits by reporting State, FY 2013.	15
Table 10. Roadside Inspection Program estimated benefits by domicile State and country, FY 2013.	18
Table 11. Traffic Enforcement Program estimated benefits by domicile State and country, FY 2013.	20
Table 12. Violation crash risk reduction and number of violations by violation group.	23

ABBREVIATIONS AND ACRONYMS

Acronym	Definition
BASIC	Behavior Analysis and Safety Improvement Category
CMV	commercial motor vehicle
CSA	Compliance, Safety, Accountability
CVSA	Commercial Vehicle Safety Alliance
CY	calendar year
FMCSA	Federal Motor Carrier Safety Administration
FY	fiscal year
MCMIS	Motor Carrier Management Information System
MCSAP	Motor Carrier Safety Assistance Program
RIEM	Roadside Intervention Effectiveness Model
SMS	Safety Measurement System
USDOT	U.S. Department of Transportation

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EXECUTIVE SUMMARY

BACKGROUND

Two of the Federal Motor Carrier Safety Administration's (FMCSA's) key safety programs are the Roadside Inspection and Traffic Enforcement programs. These programs allow for inspections to be conducted on commercial motor vehicles operating on our highways by qualified safety inspectors. These inspections follow the North American Standard guidelines, which were developed by FMCSA and the Commercial Vehicle Safety Alliance (CVSA). Most roadside inspections are conducted by the States under the Motor Carrier Safety Assistance Program (MCSAP). Inspections are also conducted after a traffic stop by CVSA-certified enforcement personnel under the separate Traffic Enforcement Program. There are six levels of inspections that include a vehicle component, a driver component, or both. Any inspection that cites one or more of 26 select moving and non-moving driver violations is considered a traffic enforcement inspection.

FMCSA developed an analytic model to measure the effectiveness of roadside inspections and traffic enforcement inspections in terms of crashes prevented, injuries prevented, and lives saved. This model, formerly referred to as the Intervention Model, is currently known as the Roadside Intervention Effectiveness Model (RIEM). In this model, traffic enforcement inspections and roadside inspections are considered interventions.

The RIEM is based on the premise that roadside inspections and traffic enforcement inspections, which identify vehicle and driver violations, contribute to a reduction in crashes. The model associates each violation of the Federal Motor Carrier Safety Regulations with a specific crash probability. Using these probabilities, analysts can estimate the number of crashes prevented as a result of correcting these identified violations. Additionally, the RIEM provides FMCSA management with information to address the GPRA Modernization Act of 2010, which requires Federal agencies to measure the effectiveness of their programs as part of the budget cycle process. It also provides FMCSA and State safety program managers with a quantitative basis for optimizing the allocation of safety resources in the field.

The model can be combined with the Carrier Intervention Effectiveness Model to provide a powerful performance measurement tool for assessing FMCSA's safety programs.

Since the occurrence of a single violation implies—in the vast majority of instances—a certain degree of crash risk, each inspection that uncovers and prompts the correction of at least one violation is interpreted as having reduced crash risk. The model expresses this risk reduction in terms of crashes prevented as a result of each violation being corrected.

One fiscal year (FY) (defined as October 1 of the previous year through September 30 of the FY referenced) of intervention data is extracted from the Motor Carrier Management Information System (MCMIS) database. This database contains roadside inspection information compiled from Federal and State safety agencies, including violations (if any) cited during interventions. While inspections are not required to have violations associated with them, in practice, about two-thirds of all interventions do find one or more violations. The violation data are the key

component in the model, as they represent the defects identified and subsequently corrected as a result of the two programs.

The model employs three estimates in developing the crash risk reduction probability for a violation group:

- The **crash risk** of a violation group, where the “crash risk” is defined as the likelihood that the unsafe behavior associated with the violation group contributes to a crash during a commercial motor vehicle (CMV) daytrip, where a “daytrip” is defined as a CMV’s travel during 1 day.
- The **duration** of the reduction in crash risk, expressed in days, when an instance of that violation is corrected.
- The **correction** rate of violations in that violation group, defined as the percentage of the violations that are assumed corrected as a result of the intervention.

A preliminary crash risk reduction for a violation group is calculated from the product of the crash rate probability and the assumed duration of the remediation for violations in that group, once they are corrected. The preliminary crash risk reduction is then multiplied by a violation correction rate to produce the final crash risk reduction for each violation in the violation group. The violation correction rate adjusts for the reality that not all violations are corrected within the required time period. Current research performed at the John A. Volpe National Transportation Systems Center suggests that only 69.9 percent of Vehicle Maintenance violations and 68.8 percent of Driver Fitness violations are corrected within the allotted time. The violation correction rate thus decreases the magnitude of the crash risk reduction used in the model to account for violations not corrected.

CALCULATION OF BENEFITS

To produce an estimate of the annual number of crashes prevented due to inspections, the model first determines the number of inspections for each violation group in which a violation was recorded during the FY. The inspection count is then multiplied by the final crash risk reduction associated with the violation group, yielding the estimate of annual crashes prevented. Finally, the estimated crashes prevented are added up across all violation groups to produce an estimate of the total annual crashes prevented during the FY.

Once the number of crashes prevented is totaled for all inspections during the year, the model then computes the number of lives saved and injuries prevented as a result of those crashes prevented. Average numbers of fatalities per crash, injuries per crash, and injuries per fatal crash are computed using MCMIS data for all crashes in the United States for the last 2 years. These averages are then multiplied by the number of crashes prevented to estimate the number of lives saved and injuries prevented due to the inspections.

FY 2013 RIEM RESULTS

Total crashes prevented, total lives saved, and total injuries prevented as a result of roadside inspection and traffic enforcement activities performed during FY 2013 were estimated by the RIEM. The results are presented at the national and State levels. Beginning in FY 2006, the RIEM has been implemented to estimate benefits from roadside interventions by FY; benefits for previous years were estimated by the model by calendar year (CY). As a result, estimates of benefits for years 2005 and earlier are shown by CY. For the FY 2013 report, the list of traffic enforcement violations used in the model was updated to reflect the addition of mobile phone use and texting violations. This change was also applied to the FY 2012 results, resulting in slight differences from the FY 2012 report.

NATIONAL LEVEL ESTIMATES

Table 1 provides a breakdown of the program activity at the national level for the current analysis year (FY 2013) and the 2 years prior (FY 2011 and FY 2012). Overall program activity was slightly lower in FY 2013 than in FY 2012. The number of interventions performed decreased by about 2.5 percent from FY 2012, roadside inspections rose by 24,071 (0.8 percent), while traffic enforcements decreased by 113,834(22.1 percent).

Table 1. Program activity from FY 2011 to FY 2013.

Interventions*	FY 2011	FY 2012	FY 2013
Roadside Inspections	3,021,002	3,065,689	3,089,760
Traffic Enforcements	580,939	516,211	402,377
Total	3,601,941	3,581,900	3,492,137

* The December 2014 MCMIS data snapshot was used for this report.

Table 2 presents the estimated benefits of the programs over the past 3 years. The model estimates that the Roadside Inspection Program prevented 9,904 crashes in FY 2013, while the Traffic Enforcement Program prevented 4,015, for a total of 13,919 crashes prevented. The number of crashes prevented decreased from FY 2012 to FY 2013. The proportion of inspections resulting in no violations remained the same (39 percent).

Table 2. Program effectiveness from FY 2011 to FY 2013 using the RIEM Version 3.0.

Intervention Benefits	FY 2011	FY 2012*	FY 2013*
Crashes prevented due to roadside inspections	8,311	8,585	9,904
Crashes prevented due to traffic enforcements	6,468	5,936	4,015
Total Crashes Prevented	14,779	14,521	13,919
Injuries prevented due to roadside inspections	5,106	5,257	6,012
Injuries prevented due to traffic enforcements	3,974	3,635	2,438
Total Injuries Prevented	9,080	8,892	8,450
Lives saved due to roadside inspections	272	281	319
Lives saved due to traffic enforcements	212	194	129
Total Lives Saved	484	475	448

* The FY 2012 results are slightly revised from the *Roadside Intervention Effectiveness Model, Fiscal Year 2012* report to incorporate an updated list of traffic enforcement violations consistent with the FMCSA Traffic Enforcement program. The revised Traffic Enforcement violation list is used for FY 2013 as well.

CONCLUSION

The Roadside Inspection and Traffic Enforcement programs are two of FMCSA's most powerful safety tools. By continually examining the results of these programs, FMCSA can ensure that they are being executed effectively and producing the desired safety benefits. Results for individual states can be examined and compared to provide guidance on how to allocate safety resources. The total national activities show the scale of the Roadside Inspection and Traffic Enforcement programs and the resulting estimated number of lives saved shows the magnitude of their effects on highway safety. In 2013, these programs are estimated to have saved about 450 lives and prevented about 8,500 injuries by averting approximately 14,000 crashes. Over the past 11 years, it is estimated that these two programs have saved more than 7,500 lives.

1. INTRODUCTION

1.1 BACKGROUND

Two of the Federal Motor Carrier Safety Administration's (FMCSA's) key safety programs are the Roadside Inspection and Traffic Enforcement programs. These programs allow for inspections to be conducted on commercial motor vehicles operating on our highways by qualified safety inspectors. These inspections follow the North American Standard guidelines, which were developed by FMCSA and the Commercial Vehicle Safety Alliance (CVSA). Most roadside inspections are conducted by the States under the Motor Carrier Safety Assistance Program (MCSAP). Inspections are also conducted after a traffic stop by CVSA-certified enforcement personnel under the separate Traffic Enforcement Program. There are six levels of inspections that include a vehicle component, a driver component, or both. Any inspection that cites one or more of 26 select moving and non-moving driver violations is considered a traffic enforcement inspection.

An analytic model has been developed to measure the effectiveness of roadside inspections and traffic enforcement inspections in terms of the number of crashes prevented, injuries prevented, and lives saved. Traffic enforcement inspections and roadside inspections are considered interventions; this analytic model, formerly referred to as the Intervention Model, is currently known as the Roadside Intervention Effectiveness Model (RIEM). This model provides FMCSA management with the information needed to address the requirements of the GPRA Modernization Act of 2010, which requires Federal agencies to measure the effectiveness of their programs as part of the budget cycle process. It also provides FMCSA and State safety program managers with a quantitative basis for optimizing the allocation of safety resources in the field.

The RIEM is based on the premise that interventions—specifically roadside inspections and traffic enforcement inspections—that identify and lead to the correction of vehicle and driver violations contribute to a reduction in crashes. The model associates each violation of the Federal Motor Carrier Safety Regulations with a specific crash probability. Using these probabilities, analysts can estimate the number of crashes prevented as a result of correcting these violations.

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2. METHODOLOGY

This model is based on the premise that the Roadside Inspection and Traffic Enforcement programs contribute to the reduction of crashes. The idea is that vehicle and/or driver violations are discovered during inspections and then corrected. By prompting the correction of the identified violations, these interventions reduce the probability that the inspected vehicles or drivers will be involved in subsequent crashes for a period of time.

Conceptually, the approach at the heart of the model is straightforward. Since the occurrence of a single violation implies—in the vast majority of instances—a certain degree of crash risk, each inspection that uncovers at least one correctable violation is interpreted as having reduced crash risk. The model expresses this risk reduction in terms of crashes prevented as a result of each violation being corrected.

To calculate crash risk, the model relies on crash risks estimated by examining the incidence of particular violations found during post-crash roadside inspections compared to those found during non-crash-related inspections. Each roadside violation is classified into a specific “violation group,” containing related violations assigned the same crash risk. The model also relies on estimates of the rate at which detected violations are corrected, as well as for the length of time that corrected violations remain corrected, based on analysis of inspection data.

For an individual intervention, the reduction in crash risk depends on the number and type of violations found. By combining the crash risk probabilities for violations uncovered by all inspections, the model estimates the number of crashes prevented as a result of the Roadside Inspection and Traffic Enforcement programs.

Intervention data are extracted from the Motor Carrier Management Information System (MCMIS) database by fiscal year (FY). One FY is defined as October 1 of the previous year through September 30 of the FY referenced. The MCMIS database contains roadside inspection information collected from Federal and State safety agencies, including details on any violations cited during the inspections. While inspections are not required to have associated violations, in practice about two-thirds of them do have one or more associated violations. The violation data are the key components in the model as they represent the defects that were identified and subsequently corrected as a part of the program.

2.1 ASSIGNMENT OF CRASH RISK REDUCTION PROBABILITIES

The model assumes that observed deficiencies (i.e., violations) discovered at the time of the intervention can be converted into crash risk probabilities. This assumption is based on the premise that detected violations represent varying degrees of mechanical or judgmental faults and, further, that some are more likely than others to play a contributory role in motor carrier crashes.

An improved method for determining the crash risk associated with violations was developed and implemented in RIEM Version 3.0 in FY 2008.¹ The improved methodology builds upon research performed for FMCSA's Compliance, Safety, Accountability (CSA) initiative. The revised methodology is based on sound safety data and statistical approaches, relying—to the minimum degree possible—on expert opinion and assumptions when empirical data are not available.

The Version 3.0 methodology introduced the concept of a violation group as developed by the CSA initiative.² A violation group is defined as a set of related violations assigned equal crash risks. The model assumes that correcting a violation associated with a particular violation group during an intervention reduces the risk of a subsequent crash by a finite amount equal to the crash risk probability associated with that group.

The model employs three separate estimates in developing the crash risk reduction associated with finding a violation in each violation group:

- The **crash risk** of a violation group, where the “crash risk” is defined as the likelihood that the unsafe behavior associated with the violation group contributes to a crash during a commercial motor vehicle (CMV) daytrip, where a “daytrip” is defined as a CMV's travel during 1 day.
- The **duration** of the reduction in crash risk, expressed in days, when an instance of that violation is corrected.
- The **correction rate** of violations in that violation group, defined as the percentage of the violations that are assumed corrected as a result of the intervention.

A preliminary crash risk reduction for a violation group is calculated from the product of the crash rate probability and the assumed duration of the remediation for violations in that group, once they are corrected. The preliminary reduction is then multiplied by a violation correction factor to produce the final crash risk reduction for the violation group. The violation correction factor is based on the results of research as to whether or not all violations were corrected within the regulatory time period.

Current research performed at the John A. Volpe National Transportation Systems Center suggests that only 69.9 percent of Vehicle Maintenance violations and 68.8 percent of Driver Fitness violations are corrected within the allotted time. The violation correction factor thus reduces the magnitude of the crash risk reduction to account for violations that are not corrected. (Appendix A contains the violation groups, along with their associated crash risk reductions, correction rates, and the number of violations in each group in FY 2012.) The model results for FY 2012 are based upon the CSA Behavioral Analysis and Safety Improvement Category (BASIC) definitions that were in place during the period

¹ For a complete explanation of methodology improvements, see Appendix A of the Safety Program Effectiveness Measurements: Roadside Intervention Model - Fiscal Year 2009 at <https://ai.fmcsa.dot.gov/CarrierResearchResults/PDFs/13-039-Intervention-FY-2009.pdf>

² For more information about how the CSA initiative groups safety violations, see the Safety Measurement System (SMS) Methodology at <http://csa.fmcsa.dot.gov/Documents/SMSMethodology.pdf>.

of study. Future model runs will be enhanced to reflect the updated BASIC definition for Hazardous Materials.

2.2 CALCULATION OF BENEFITS

To produce an estimate of the annual number of crashes prevented due to inspections, the model first determines for each violation group the number of inspections during the year that recorded a violation within that group. Next, the count is multiplied by the violation group's crash risk reduction value to yield the estimated annual crashes prevented.

After the number of crashes prevented is totaled for all inspections during the year, the model computes the number of lives saved and injuries prevented as a result of those crashes prevented. State-reported crash data in MCMIS are used to determine the shares of fatal, injury, and tow-away crashes. The same data source is used to calculate average numbers of fatalities per crash, injuries per injury crash, and injuries per fatal crash for all crashes in the United States. To smooth out yearly fluctuations, the RIEM uses a 2-year average to compute these statistics. These averages are then multiplied by the number of crashes prevented to estimate the number of lives saved and injuries prevented due to the inspections.

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3. FISCAL YEAR 2013 ROADSIDE INTERVENTION EFFECTIVENESS MODEL RESULTS

The RIEM was implemented to estimate the crashes prevented, injuries prevented, and lives saved as a result of activities performed during FY 2013 (October 1, 2012, to September 30, 2013). The results are presented at the national and State levels. For the FY 2013 report, the list of traffic enforcement violations used in the model was updated to reflect the addition of mobile phone use and texting violations. This change was also applied to the FY 2012 model, resulting in slight differences from the previously published FY 2012 results.

3.1 NATIONAL LEVEL ESTIMATES

Table 3 provides a breakdown of the program activity at the national level for the current analysis year (FY 2013) and the 2 years prior (FY 2011 and FY 2012). Overall program activity was slightly lower in FY 2013 than in 2012. The number of interventions performed decreased by about 2.5 percent from FY 2012, with roadside inspections rising by 24,071 (0.8 percent) and traffic enforcements decreasing by 113,834 (22.1 percent).

Table 3. Program activity from FY 2011 to FY 2013.

Interventions	FY 2011	FY 2012	FY 2013
Roadside Inspections	3,021,002	3,065,689	3,089,760
Traffic Enforcement Inspections	580,939	516,211	402,377
Total	3,601,941	3,581,900	3,492,137

Table 4 presents the estimated benefits of the two programs over the past 3 years. The Roadside Inspection Program is estimated to have prevented 9,904 crashes and 6,012 injuries in FY 2013, while saving 319 lives. The Traffic Enforcement Program is estimated to have prevented 4,015 crashes and 2,438 injuries, while saving 129 lives in the same year. In total, 13,919 crashes and 8,450 injuries were prevented, and 448 lives saved.

Table 4. Program effectiveness from FY 2011 to FY 2013 using the RIEM Version 3.0.

Intervention Benefits	FY 2011	FY 2012*	FY 2013*
Crashes prevented due to roadside inspections	8,311	8,585	9,904
Crashes prevented due to traffic enforcement inspections	6,468	5,936	4,015
Total Crashes Prevented	14,779	14,521	13,919
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Lives saved due to roadside inspections	272	281	319
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Total Lives Saved	484	475	448

* The FY 2012 results are slightly revised from the *Roadside Intervention Effectiveness Model, Fiscal Year 2012* report to incorporate an updated list of traffic enforcement violations consistent with the FMCSA Traffic Enforcement program. The revised Traffic Enforcement violation list is used for FY 2013 as well.

Figure 1 displays the trends in estimated crashes prevented and lives saved from CY 2005 to FY 2013. All estimates prior to FY 2009 were recalculated for this report using RIEM Version 3.0 to provide a historical time series compatible with FY 2009, FY 2010, FY 2011, FY 2012, and FY 2013 estimates for analytical purposes.³ In FY 2013, the number of crashes prevented and lives saved decreased from FY 2012. Complete model results from CY 2001 are presented in Table 5.

³ The majority of these changes were implemented with the release of RIEM Version 3.0 as documented in the FY 2009 report: <http://ai.fmcsa.dot.gov/CarrierResearchResults/PDFs/13-039-Intervention-FY-2009.pdf>.

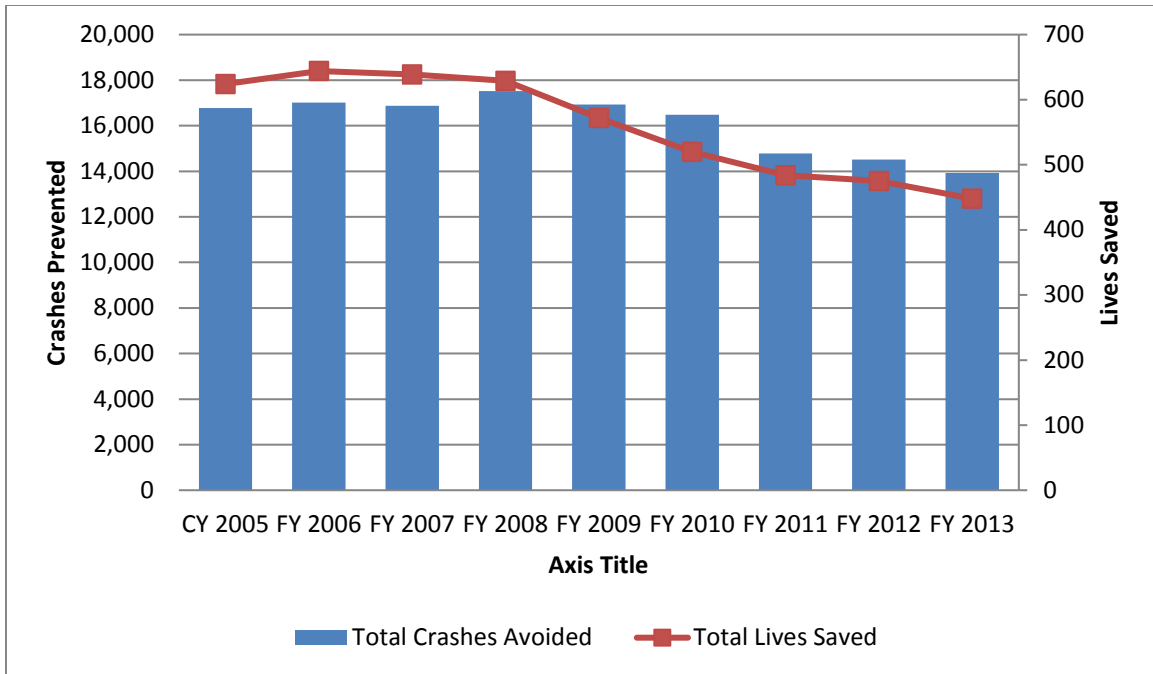


Figure 1. Bar graph. Trends in crashes prevented and lives saved.

Table 5. Historical results for RIEM, CY 2001–FY 2013.

Intervention Results	CY 2001	CY 2002	CY 2003	CY 2004	CY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012*	FY 2013*
Number of roadside inspections	2,050,786	2,253,070	2,215,669	2,210,842	2,193,954	2,372,802	2,616,868	2,723,576	2,788,728	2,849,350	3,021,002	3,065,689	3,089,760
Number of traffic enforcement inspections	695,619	760,094	791,116	802,798	826,951	900,260	752,649	756,169	730,916	710,983	580,939	516,211	402,377
Total Number of Interventions	2,746,405	3,013,164	3,006,785	3,013,640	3,020,905	3,273,062	3,369,517	3,479,745	3,519,644	3,560,333	3,601,941	3,581,900	3,492,137
Crashes prevented due to roadside inspections	6,658	7,218	7,176	7,353	7,575	7,593	8,101	8,464	8,149	8,154	8,311	8,585	9,904
Crashes prevented due to traffic enforcement inspections	7,263	8,115	8,251	8,467	9,205	9,422	8,769	9,053	8,789	8,330	6,468	5,936	4,015
Total Crashes Prevented	13,921	15,333	15,427	15,820	16,780	17,015	16,870	17,517	16,938	16,484	14,779	14,521	13,919
Injuries prevented due to roadside inspections	5,050	5,458	5,456	5,362	5,252	5,090	5,222	5,381	5,206	5,129	5,106	5,257	6,012
Injuries prevented due to traffic enforcement inspections	5,509	6,136	6,274	6,174	6,382	6,316	5,652	5,755	5,615	5,240	3,974	3,635	2,438
Total Injuries Prevented	10,559	11,594	11,730	11,535	11,634	11,405	10,874	11,136	10,821	10,369	9,080	8,892	8,450
Lives saved due to roadside inspections	331	346	317	284	282	287	307	304	276	258	272	281	319
Lives saved due to traffic enforcement inspections	361	389	364	327	342	357	332	325	297	263	212	194	139
Total Lives Saved	691	735	681	611	624	644	639	629	573	521	484	475	448

* The FY 2012 results are slightly revised from the *Roadside Intervention Effectiveness Model, Fiscal Year 2012* report to incorporate an updated list of traffic enforcement violations consistent with the FMCSA Traffic Enforcement program. The revised Traffic Enforcement violation list is used for FY 2013 as well.

3.2 ESTIMATES BY DOMICILE OF CARRIER AND BY REPORTING STATE

The RIEM's flexibility lends itself to finer divisions of examination, such as benefits by reporting State or by carrier domicile State. State level totals are presented by both reporting State and State of domicile, as well as by country of domicile (United States versus non-United States).

3.2.1 Estimates by Country of Domicile (United States versus Non-United States)

This section summarizes a comparison between carriers domiciled in the United States and carriers domiciled outside the United States. Table 6 presents the number of roadside inspections and traffic enforcement inspections performed in FY 2013 on U.S.-domiciled carriers and on those domiciled outside of the United States. Non-U.S.-domiciled carriers account for approximately 10 percent of Roadside Inspections and 2.5 percent of Traffic Enforcement inspections.

Table 6. FY 2013 program exposure of U.S.-domiciled versus non-U.S.-domiciled carriers.

Interventions	U.S.-Domiciled	Non-U.S.-Domiciled
Roadside Inspections	2,795,243	294,517
Traffic Enforcement Inspections	392,787	9,590
Total Interventions	3,188,030	304,107

Table 7 compares the effectiveness of roadside interventions conducted in FY 2013 on carriers domiciled in the United States to the effectiveness of these interventions conducted on non-U.S.-domiciled carriers. The table includes the estimated program benefits per 1,000 interventions. These values reflect the severity or seriousness of the violations found in carriers domiciled in the United States versus those found for non-U.S.-domiciled carriers.

U.S. carriers had many more inspections than non-U.S. carriers; therefore, the numbers of crashes and injuries prevented and lives saved are much higher. When comparing the estimated program benefits per 1,000 interventions, the rate of crashes prevented for roadside inspections of U.S. carriers is lower than that for inspections of non-U.S. carriers (2.89 compared to 4.85), while the rate of crashes prevented per traffic enforcement inspection is similar for U.S.-domiciled and non-U.S.-domiciled carriers (11.01 and 10.24, respectively). The injuries and fatalities prevented per roadside intervention in U.S. versus non-U.S. carriers exhibit a similar relationship.

Table 7. FY 2013 program effectiveness for U.S.-domiciled versus non-U.S.-domiciled carriers.

Types of Benefits	Benefits: U.S.- Domiciled	Benefits: Non-U.S.- Domiciled	Benefits per 1,000 Interventions: U.S.-Domiciled	Benefits per 1,000 Interventions: Non-U.S.- Domiciled
Crashes prevented due to roadside inspections	8,070	1,427	2.89	4.85
Crashes prevented due to traffic enforcement inspections	4,323	98	11.01	10.24
Total Crashes Prevented*	12,394	1,526	3.89	5.02
Injuries prevented due to roadside inspections	4,899	866	1.75	2.94
Injuries prevented due to traffic enforcement inspections	2,624	60	6.68	6.21
Total Injuries Prevented*	7,524	926	2.36	3.05
Lives saved due to roadside inspections	260	46	0.09	0.16
Lives saved due to traffic enforcement inspections	139	3	0.35	0.33
Total Lives Saved*	399	49	0.13	0.16

* Total numbers may not be the sum of estimated benefits due to rounding.

3.2.2 Estimates by Reporting State

Table 8 provides roadside inspection results and Table 9 provides traffic enforcement inspection results, by reporting State, for interventions conducted by State roadside inspectors from all 50 States, the District of Columbia, the U.S. territories combined (American Samoa, Guam, the Northern Mariana Islands, the U.S. Virgin Islands, and Puerto Rico), and by Federal personnel.⁴ These tables provide intervention counts and total estimated benefits (crashes prevented, injuries prevented, lives saved).

Since activity levels vary widely from State to State, these tables include the estimated benefits per 1,000 roadside interventions (per 1,000 roadside inspections in Table 8; per 1,000 traffic enforcement inspections in Table 9). Per-intervention benefits can illuminate differences in the effectiveness of interventions from State to State. For example, Nevada and Wisconsin reported approximately the same number of roadside inspections, but their rates of crashes prevented per 1,000 roadside inspections are very different. In Wisconsin, the rate of crashes prevented—5.98—is higher than the national average of 3.07, and in Nevada the rate is lower, at 2.12.

Roadside inspections and traffic enforcement inspections performed by Federal staff are highly effective, with 6.33 crashes prevented per 1,000 roadside inspections (compared to the national average of 3.07) and 18.91 crashes prevented per 1,000 traffic enforcements (compared to the national average of 10.99).

⁴ Federal personnel conducting inspections include Border Inspectors and other certified Federal inspectors.

Table 8. Roadside Inspection Program estimated benefits by reporting State, FY 2013.

Reporting State	Total Roadside Interventions Initiated	Number of Roadside Inspections	Est. Crashes Prevented	Est. Injuries Prevented	Est. Lives Saved	Est. Crashes Prevented per 1,000 Inspections	Est. Injuries Prevented per 1,000 Inspections	Est. Lives Saved per 1,000 Inspections
Alabama	38,758	34,817	97.91	59.44	3.15	2.81	1.71	0.09
Alaska	6,872	6,622	16.13	9.79	0.52	2.44	1.48	0.08
Arizona	70,844	60,443	260.10	157.90	8.36	4.30	2.61	0.14
Arkansas	38,596	32,920	112.13	68.07	3.61	3.41	2.07	0.11
California	516,719	476,895	753.88	457.65	24.24	1.58	0.96	0.05
Colorado	38,353	33,164	113.87	69.13	3.66	3.43	2.08	0.11
Connecticut	20,474	13,730	74.19	45.04	2.39	5.40	3.28	0.17
Delaware	6,127	4,432	9.81	5.96	0.32	2.21	1.34	0.07
District of Columbia	5,232	4,133	8.13	4.94	0.26	1.97	1.20	0.06
Florida	111,284	102,298	278.28	168.93	8.95	2.72	1.65	0.09
Georgia	83,667	76,690	235.97	143.25	7.59	3.08	1.87	0.10
Hawaii	3,626	3,359	3.87	2.35	0.12	1.15	0.70	0.04
Idaho	10,584	7,228	40.25	24.43	1.29	5.57	3.38	0.18
Illinois	61,945	44,847	138.62	84.15	4.46	3.09	1.88	0.10
Indiana	70,325	43,459	193.55	117.50	6.22	4.45	2.70	0.14
Iowa	58,133	48,077	212.61	129.07	6.84	4.42	2.68	0.14
Kansas	55,583	51,001	118.05	71.66	3.80	2.31	1.41	0.07
Kentucky	84,219	72,734	166.25	100.92	5.35	2.29	1.39	0.07
Louisiana	59,657	49,886	243.45	147.79	7.83	4.88	2.96	0.16
Maine	15,773	14,823	41.23	25.03	1.33	2.78	1.69	0.09
Maryland	121,730	106,977	280.81	170.47	9.03	2.62	1.59	0.08
Massachusetts	17,145	9,542	41.23	25.03	1.33	4.32	2.62	0.14
Michigan	52,797	37,707	181.38	110.11	5.83	4.81	2.92	0.15
Minnesota	36,825	30,888	154.73	93.93	4.98	5.01	3.04	0.16
Mississippi	58,071	56,854	75.52	45.85	2.43	1.33	0.81	0.04
Missouri	87,431	81,674	279.68	169.78	8.99	3.42	2.08	0.11

Reporting State	Total Roadside Interventions Initiated	Number of Roadside Inspections	Est. Crashes Prevented	Est. Injuries Prevented	Est. Lives Saved	Est. Crashes Prevented per 1,000 Inspections	Est. Injuries Prevented per 1,000 Inspections	Est. Lives Saved per 1,000 Inspections
Montana	39,720	37,428	69.89	42.43	2.25	1.87	1.13	0.06
Nebraska	30,780	25,847	84.09	51.05	2.70	3.25	1.98	0.10
Nevada	33,957	28,671	60.66	36.82	1.95	2.12	1.28	0.07
New Hampshire	10,700	8,391	27.99	16.99	0.90	3.34	2.02	0.11
New Jersey	37,930	31,835	101.57	61.66	3.27	3.19	1.94	0.10
New Mexico	85,777	68,919	117.48	71.32	3.78	1.70	1.03	0.05
New York	106,555	91,940	228.84	138.92	7.36	2.49	1.51	0.08
North Carolina	85,415	78,992	160.01	97.14	5.15	2.03	1.23	0.07
North Dakota	13,724	12,345	25.72	15.61	0.83	2.08	1.26	0.07
Ohio	78,534	66,531	185.68	112.72	5.97	2.79	1.69	0.09
Oklahoma	24,643	16,493	61.56	37.37	1.98	3.73	2.27	0.12
Oregon	52,194	49,598	129.61	78.68	4.17	2.61	1.59	0.08
Pennsylvania	127,276	109,646	266.85	161.99	8.58	2.43	1.48	0.08
Rhode Island	3,024	2,248	10.50	6.37	0.34	4.67	2.83	0.15
South Carolina	48,148	39,129	155.90	94.64	5.01	3.98	2.42	0.13
South Dakota	27,346	25,294	57.46	34.88	1.85	2.27	1.38	0.07
Tennessee	82,785	74,149	181.26	110.04	5.83	2.44	1.48	0.08
Texas	472,745	455,695	1869.28	1134.77	60.11	4.10	2.49	0.13
Utah	36,558	32,957	99.23	60.24	3.19	3.01	1.83	0.10
Vermont	5,762	4,569	20.78	12.61	0.67	4.55	2.76	0.15
Virginia	31,065	27,898	112.70	68.42	3.62	4.04	2.45	0.13
Washington	107,420	90,073	229.90	139.56	7.39	2.55	1.55	0.08
West Virginia	29,273	25,338	44.01	26.72	1.42	1.74	1.05	0.06
Wisconsin	30,911	25,681	153.45	93.15	4.93	5.98	3.63	0.19
Wyoming	18,551	15,848	53.10	32.23	1.71	3.35	2.03	0.11
U.S. Territories	8,101	7,514	26.26	15.94	0.84	3.49	2.12	0.11
Federal	132,473	131,531	832.38	505.31	26.77	6.33	3.84	0.20
Total	3,492,137	3,089,760	9,498	5,766	305	3.07	1.87	0.10

Table 9. Traffic Enforcement Program estimated benefits by reporting State, FY 2013.

Reporting State	Total Roadside Interventions Initiated	Number of Traffic Enforcement Inspections	Est. Crashes Prevented	Est. Injuries Prevented	Est. Lives Saved	Est. Crashes Prevented per 1,000 Inspections	Est. Injuries Prevented per 1,000 Inspections	Est. Lives Saved per 1,000 Inspections
Alabama	38,758	3,941	39.31	23.86	1.26	9.97	6.05	0.32
Alaska	6,872	250	4.36	2.65	0.14	17.44	10.60	0.56
Arizona	70,844	10,401	151.36	91.88	4.87	14.55	8.83	0.47
Arkansas	38,596	5,676	64.02	38.86	2.06	11.28	6.85	0.36
California	516,719	39,824	288.60	175.20	9.28	7.25	4.40	0.23
Colorado	38,353	5,189	39.38	23.91	1.27	7.59	4.61	0.24
Connecticut	20,474	6,744	96.08	58.33	3.09	14.25	8.65	0.46
Delaware	6,127	1,695	11.12	6.75	0.36	6.56	3.98	0.21
District Of Columbia	5,232	1,099	12.52	7.60	0.40	11.39	6.92	0.36
Florida	111,284	8,986	107.67	65.36	3.46	11.98	7.27	0.39
Georgia	83,667	6,977	89.08	54.08	2.86	12.77	7.75	0.41
Hawaii	3,626	267	2.16	1.31	0.07	8.09	4.91	0.26
Idaho	10,584	3,356	36.08	21.90	1.16	10.75	6.53	0.35
Illinois	61,945	17,098	164.47	99.84	5.29	9.62	5.84	0.31
Indiana	70,325	26,866	195.97	118.97	6.30	7.29	4.43	0.23
Iowa	58,133	10,056	122.01	74.07	3.92	12.13	7.37	0.39
Kansas	55,583	4,582	61.96	37.61	1.99	13.52	8.21	0.43
Kentucky	84,219	11,485	179.31	108.85	5.77	15.61	9.48	0.50
Louisiana	59,657	9,771	96.64	58.67	3.11	9.89	6.00	0.32
Maine	15,773	950	15.08	9.15	0.48	15.87	9.63	0.51
Maryland	121,730	14,753	182.48	110.78	5.87	12.37	7.51	0.40
Massachusetts	17,145	7,603	116.37	70.64	3.74	15.31	9.29	0.49
Michigan	52,797	15,090	150.30	91.24	4.83	9.96	6.05	0.32
Minnesota	36,825	5,937	91.18	55.35	2.93	15.36	9.32	0.49
Mississippi	58,071	1,217	16.79	10.19	0.54	13.80	8.37	0.44
Missouri	87,431	5,757	82.90	50.33	2.67	14.40	8.74	0.46

Reporting State	Total Roadside Interventions Initiated	Number of Traffic Enforcement Inspections	Est. Crashes Prevented	Est. Injuries Prevented	Est. Lives Saved	Est. Crashes Prevented per 1,000 Inspections	Est. Injuries Prevented per 1,000 Inspections	Est. Lives Saved per 1,000 Inspections
Montana	39,720	2,292	30.93	18.78	0.99	13.49	8.19	0.43
Nebraska	30,780	4,933	43.61	26.47	1.40	8.84	5.37	0.28
Nevada	33,957	5,286	61.15	37.12	1.97	11.57	7.02	0.37
New Hampshire	10,700	2,309	36.00	21.85	1.16	15.59	9.46	0.50
New Jersey	37,930	6,095	75.87	46.06	2.44	12.45	7.56	0.40
New Mexico	85,777	16,858	169.64	102.98	5.46	10.06	6.11	0.32
New York	106,555	14,615	176.60	107.21	5.68	12.08	7.34	0.39
North Carolina	85,415	6,423	100.31	60.89	3.23	15.62	9.48	0.50
North Dakota	13,724	1,379	14.75	8.95	0.47	10.70	6.49	0.34
Ohio	78,534	12,003	95.20	57.79	3.06	7.93	4.81	0.25
Oklahoma	24,643	8,150	67.07	40.72	2.16	8.23	5.00	0.27
Oregon	52,194	2,596	27.61	16.76	0.89	10.64	6.46	0.34
Pennsylvania	127,276	17,630	220.32	133.75	7.09	12.50	7.59	0.40
Rhode Island	3,024	776	15.01	9.11	0.48	19.34	11.74	0.62
South Carolina	48,148	9,019	97.29	59.06	3.13	10.79	6.55	0.35
South Dakota	27,346	2,052	28.04	17.02	0.90	13.66	8.29	0.44
Tennessee	82,785	8,636	82.56	50.12	2.65	9.56	5.80	0.31
Texas	472,745	17,050	202.19	122.74	6.50	11.86	7.20	0.38
Utah	36,558	3,601	55.09	33.44	1.77	15.30	9.29	0.49
Vermont	5,762	1,193	11.71	7.11	0.38	9.82	5.96	0.32
Virginia	31,065	3,167	40.39	24.52	1.30	12.75	7.74	0.41
Washington	107,420	17,347	205.86	124.97	6.62	11.87	7.20	0.38
West Virginia	29,273	3,935	24.49	14.87	0.79	6.22	3.78	0.20
Wisconsin	30,911	5,230	59.27	35.98	1.91	11.33	6.88	0.37
Wyoming	18,551	2,703	35.30	21.43	1.14	13.06	7.93	0.42
U.S. Territories	8,101	587	10.11	6.13	0.33	17.22	10.44	0.56
Federal	132,473	942	17.81	10.81	0.57	18.91	11.48	0.61
Total	3,492,137	402,377	4,421	2,684	142	10.99	6.67	0.35

3.2.3 Estimates by Carrier State of Domicile

Table 10 and Table 11 provide detailed results for roadside inspections and traffic enforcement inspections, respectively, organized by carrier domicile for interventions conducted on carriers registered in all 50 States, the District of Columbia, and the U.S. territories, as well as Canada, Mexico, and other countries. Estimated benefits per 1,000 interventions (per 1,000 roadside inspections in Table 10; per 1,000 traffic enforcement inspections in Table 11) are again included to provide a scale for comparison between States with different levels of activity. The two States with the highest number of roadside inspections were Texas (358,494) and California (440,024). However, the estimated benefits per 1,000 inspections for each State's registered carriers were substantially different. The estimated number of crashes prevented per 1,000 inspections for Texas-domiciled carriers was 3.85, slightly higher than the average for all carriers (3.07), while California-domiciled carriers had a lower-than-average rate of 1.95 crashes prevented.

Table 10 and Table 11 also provide details on the effectiveness of roadside inspections and traffic enforcement inspections on U.S.- versus non-U.S.-domiciled carriers. Roadside inspections on U.S.-domiciled carriers resulted in an estimated 2.89 crashes prevented per 1,000 inspections, compared to 5.88 crashes prevented for Mexico-domiciled carriers and 1.74 for Canada-domiciled carriers. Inspections conducted on carriers domiciled outside of North America prevented an average of 5.84 crashes for every 1,000 inspections.

Traffic Enforcement inspections on Mexican carriers similarly resulted in a higher rate of crashes prevented per 1,000 traffic enforcements than that of U.S carriers, 15.83 versus 11.01. For every 1,000 traffic enforcement inspections on Canadian carriers, an average of 9.16 crashes was prevented. The value for carriers domiciled outside North America is based on just nine traffic enforcements, too few to yield meaningful findings.

Table 10. Roadside Inspection Program estimated benefits by domicile State and country, FY 2013.

Carrier State	Total Roadside Interventions Initiated	Number of Roadside Inspections	Est. Crashes Prevented	Est. Injuries Prevented	Est. Lives Saved	Est. Crashes Prevented per 1,000 Inspections	Est. Injuries Prevented per 1,000 Inspections	Est. Lives Saved per 1,000 Inspections
Alabama	54,518	48,569	136.40	82.80	4.39	2.81	1.70	0.09
Alaska	5,176	4,920	14.21	8.63	0.46	2.89	1.75	0.09
Arizona	77,236	68,283	181.08	109.93	5.82	2.65	1.61	0.09
Arkansas	50,857	44,059	114.59	69.56	3.68	2.60	1.58	0.08
California	485,638	440,024	857.34	520.46	27.57	1.95	1.18	0.06
Colorado	37,148	32,516	113.05	68.63	3.64	3.48	2.11	0.11
Connecticut	12,554	9,132	35.41	21.50	1.14	3.88	2.35	0.12
Delaware	6,224	5,287	16.94	10.28	0.54	3.20	1.94	0.10
District Of Columbia	1,503	1,233	3.25	1.97	0.10	2.64	1.60	0.08
Florida	159,305	143,416	445.80	270.63	14.34	3.11	1.89	0.10
Georgia	95,201	84,012	252.36	153.20	8.12	3.00	1.82	0.10
Hawaii	3,336	3,087	3.76	2.28	0.12	1.22	0.74	0.04
Idaho	17,846	15,409	48.20	29.26	1.55	3.13	1.90	0.10
Illinois	141,660	118,983	355.17	215.61	11.42	2.99	1.81	0.10
Indiana	71,817	59,951	166.45	101.05	5.35	2.78	1.69	0.09
Iowa	58,881	49,150	153.34	93.09	4.93	3.12	1.89	0.10
Kansas	36,724	31,832	93.81	56.95	3.02	2.95	1.79	0.09
Kentucky	51,335	44,249	115.25	69.96	3.71	2.60	1.58	0.08
Louisiana	42,836	37,349	163.31	99.14	5.25	4.37	2.65	0.14
Maine	9,393	8,193	28.42	17.25	0.91	3.47	2.11	0.11
Maryland	62,183	53,871	149.37	90.68	4.80	2.77	1.68	0.09
Massachusetts	28,500	20,848	65.60	39.82	2.11	3.15	1.91	0.10
Michigan	72,654	59,774	204.69	124.26	6.58	3.42	2.08	0.11
Minnesota	65,008	54,946	201.52	122.34	6.48	3.67	2.23	0.12
Mississippi	33,330	30,076	83.64	50.77	2.69	2.78	1.69	0.09
Missouri	70,599	60,732	163.51	99.26	5.26	2.69	1.63	0.09
Montana	14,112	12,632	33.02	20.05	1.06	2.61	1.59	0.08
Nebraska	43,885	37,466	103.46	62.81	3.33	2.76	1.68	0.09
Nevada	15,050	13,435	38.48	23.36	1.24	2.86	1.74	0.09
New Hampshire	7,891	6,023	22.24	13.50	0.72	3.69	2.24	0.12

Carrier State	Total Roadside Interventions Initiated	Number of Roadside Inspections	Est. Crashes Prevented	Est. Injuries Prevented	Est. Lives Saved	Est. Crashes Prevented per 1,000 Inspections	Est. Injuries Prevented per 1,000 Inspections	Est. Lives Saved per 1,000 Inspections
New Jersey	67,321	56,699	176.97	107.43	5.69	3.12	1.89	0.10
New Mexico	16,612	13,650	39.42	23.93	1.27	2.89	1.75	0.09
New York	72,369	60,650	199.48	121.10	6.41	3.29	2.00	0.11
North Carolina	84,722	75,767	192.66	116.96	6.20	2.54	1.54	0.08
North Dakota	11,941	10,464	30.14	18.30	0.97	2.88	1.75	0.09
Ohio	98,844	85,477	211.70	128.51	6.81	2.48	1.50	0.08
Oklahoma	40,812	34,216	112.17	68.09	3.61	3.28	1.99	0.11
Oregon	41,035	37,137	91.84	55.75	2.95	2.47	1.50	0.08
Pennsylvania	135,931	117,427	265.62	161.25	8.54	2.26	1.37	0.07
Rhode Island	4,167	3,115	13.51	8.20	0.43	4.34	2.63	0.14
South Carolina	37,858	32,778	121.63	73.84	3.91	3.71	2.25	0.12
South Dakota	11,583	9,990	29.91	18.16	0.96	2.99	1.82	0.10
Tennessee	84,168	73,553	170.55	103.53	5.48	2.32	1.41	0.07
Texas	384,633	358,494	1,378.73	836.97	44.34	3.85	2.33	0.12
Utah	44,577	38,877	115.29	69.99	3.71	2.97	1.80	0.10
Vermont	4,405	3,583	13.37	8.12	0.43	3.73	2.27	0.12
Virginia	41,905	35,920	110.05	66.81	3.54	3.06	1.86	0.10
Washington	76,896	65,872	179.67	109.07	5.78	2.73	1.66	0.09
West Virginia	17,920	16,033	35.21	21.37	1.13	2.20	1.33	0.07
Wisconsin	63,679	53,325	172.00	104.41	5.53	3.23	1.96	0.10
Wyoming	6,180	5,278	20.62	12.52	0.66	3.91	2.37	0.13
U.S. Territories	8,072	7,481	26.21	15.92	0.84	3.50	2.13	0.11
Total U.S.	3,188,030	2,795,243	8,070.42	4899.26	259.52	2.89	1.75	0.09
Canada	81,600	73,543	127.94	77.65	4.12	1.74	1.06	0.06
Mexico	220,911	219,411	1290.68	783.51	41.48	5.88	3.57	0.19
Non-North American	881	872	5.09	3.09	0.17	5.84	3.54	0.19
N/A	715	691	3.58	2.17	0.12	5.18	3.14	0.17
Total	3,492,137	3,089,760	9,498	5,766	305	3.07	1.87	0.10

Table 11. Traffic Enforcement Program estimated benefits by domicile State and country, FY 2013.

Carrier State	Total Roadside Interventions Initiated	Number of Traffic Enforcement Inspections	Est. Crashes Prevented	Est. Injuries Prevented	Est. Lives Saved	Est. Crashes Prevented per 1,000 Inspections	Est. Injuries Prevented per 1,000 Inspections	Est. Lives Saved per 1,000 Inspections
Alabama	54,518	5,949	59.54	36.14	1.91	10.01	6.07	0.32
Alaska	5,176	256	4.22	2.56	0.14	16.48	10.00	0.55
Arizona	77,236	8,953	104.59	63.49	3.36	11.68	7.09	0.38
Arkansas	50,857	6,798	64.1	38.91	2.06	9.43	5.72	0.30
California	485,638	45,614	407.87	247.6	13.12	8.94	5.43	0.29
Colorado	37,148	4,632	48.12	29.21	1.55	10.39	6.31	0.33
Connecticut	12,554	3,422	47.2	28.65	1.52	13.79	8.37	0.44
Delaware	6,224	937	11.83	7.18	0.38	12.63	7.66	0.41
District Of Columbia	1,503	270	3.12	1.89	0.1	11.56	7.00	0.37
Florida	159,305	15,889	186.59	113.27	6	11.74	7.13	0.38
Georgia	95,201	11,189	126.82	76.99	4.08	11.33	6.88	0.36
Hawaii	3,336	249	2.02	1.23	0.06	8.11	4.94	0.24
Idaho	17,846	2,437	30.84	18.72	0.99	12.65	7.68	0.41
Illinois	141,660	22,677	235.53	142.98	7.57	10.39	6.31	0.33
Indiana	71,817	11,866	115.49	70.11	3.71	9.73	5.91	0.31
Iowa	58,881	9,731	98.22	59.63	3.16	10.09	6.13	0.32
Kansas	36,724	4,892	53.85	32.69	1.73	11.01	6.68	0.35
Kentucky	51,335	7,086	91.5	55.55	2.94	12.91	7.84	0.41
Louisiana	42,836	5,487	60.28	36.59	1.94	10.99	6.67	0.35
Maine	9,393	1,200	17.1	10.38	0.55	14.25	8.65	0.46
Maryland	62,183	8,312	103.23	62.67	3.32	12.42	7.54	0.40
Massachusetts	28,500	7,652	120.41	73.1	3.87	15.74	9.55	0.51
Michigan	72,654	12,880	133.27	80.9	4.29	10.35	6.28	0.33
Minnesota	65,008	10,062	120.76	73.31	3.88	12.00	7.29	0.39
Mississippi	33,330	3,254	33.67	20.44	1.08	10.35	6.28	0.33
Missouri	70,599	9,867	108.95	66.14	3.5	11.04	6.70	0.35
Montana	14,112	1,480	17.95	10.9	0.58	12.13	7.36	0.39
Nebraska	43,885	6,419	58.05	35.24	1.87	9.04	5.49	0.29
Nevada	15,050	1,615	19.66	11.93	0.63	12.17	7.39	0.39

Carrier State	Total Roadside Interventions Initiated	Number of Traffic Enforcement Inspections	Est. Crashes Prevented	Est. Injuries Prevented	Est. Lives Saved	Est. Crashes Prevented per 1,000 Inspections	Est. Injuries Prevented per 1,000 Inspections	Est. Lives Saved per 1,000 Inspections
New Hampshire	7,891	1,868	28.41	17.25	0.91	15.21	9.23	0.49
New Jersey	67,321	10,622	131.96	80.11	4.24	12.42	7.54	0.40
New Mexico	16,612	2,962	31.96	19.4	1.03	10.79	6.55	0.35
New York	72,369	11,719	145.43	88.28	4.68	12.41	7.53	0.40
North Carolina	84,722	8,955	113.77	69.07	3.66	12.70	7.71	0.41
North Dakota	11,941	1,477	16.95	10.29	0.55	11.48	6.97	0.37
Ohio	98,844	13,367	128.13	77.78	4.12	9.59	5.82	0.31
Oklahoma	40,812	6,596	66.82	40.56	2.15	10.13	6.15	0.33
Oregon	41,035	3,898	44.64	27.1	1.44	11.45	6.95	0.37
Pennsylvania	135,931	18,504	208.56	126.61	6.71	11.27	6.84	0.36
Rhode Island	4,167	1,052	17.8	10.81	0.57	16.92	10.28	0.54
South Carolina	37,858	5,080	62.09	37.69	2	12.22	7.42	0.39
South Dakota	11,583	1,593	17.16	10.42	0.55	10.77	6.54	0.35
Tennessee	84,168	10,615	108.1	65.62	3.48	10.18	6.18	0.33
Texas	384,633	26,139	296.04	179.71	9.52	11.33	6.88	0.36
Utah	44,577	5,700	70.68	42.91	2.27	12.40	7.53	0.40
Vermont	4,405	822	9.68	5.88	0.31	11.78	7.15	0.38
Virginia	41,905	5,985	68.93	41.84	2.22	11.52	6.99	0.37
Washington	76,896	11,024	130.86	79.44	4.21	11.87	7.21	0.38
West Virginia	17,920	1,887	17.68	10.73	0.57	9.37	5.69	0.30
Wisconsin	63,679	10,354	101.21	61.44	3.25	9.77	5.93	0.31
Wyoming	6,180	902	11.38	6.91	0.37	12.62	7.66	0.41
U.S. Territories	8,072	591	10.15	6.16	0.33	17.17	10.42	0.56
Total U.S.	3,188,030	392,787	4323.17	2624.41	139.03	11.01	6.68	0.54
Canada	81,600	8,057	73.83	44.82	2.38	9.16	5.56	0.30
Mexico	220,911	1,500	23.74	14.4	0.76	15.83	9.60	0.51
Non-North American	881	9	0.26	0.15	0	28.89	16.67	0.00
N/A	715	24	0.39	0.23	0.01	16.25	9.58	0.42
Total	3,492,137	402,377	4,421.39	2,684.01	142.18	10.99	6.67	0.35

3.3 CONCLUSION

The Roadside Inspection and Traffic Enforcement programs are two of FMCSA's most powerful safety tools. In 2013, these programs are estimated to have saved approximately 450 lives and prevented 8,450 injuries by averting nearly 14,000 crashes. Since 2001, it is estimated that the two programs have saved more than 7,500 lives.

APPENDIX A: VIOLATION CRASH RISK REDUCTION AND NUMBER OF VIOLATIONS BY VIOLATION GROUP

Table 12. Violation crash risk reduction and number of violations by violation group.

BASIC	Violation Group	Crash Risk (per day trip)	Duration (days)	Crash Risk Reduction (Crash Risk x Duration)	Correction Rate (%)	Total # of Violations (FY 2013)
Unsafe	Careless Driving	0.000141	30	0.004224	100	72,519
Unsafe	Reckless Driving	0.000028	30	0.000834	100	878
Unsafe	Speeding related	0.000078	30	0.002341	100	139,123
Unsafe	HM related	0.000001	30	0.000029	100	740
Unsafe	Other Driver Violations	0.000401	30	0.012038	100	94,921
Unsafe	392.2 Driver	0.000524	30	0.015718	100	124,730
Fatigue	Hours	0.000104	30	0.003120	100	146,728
Fatigue	False Log	0.000212	30	0.006360	100	35,756
Fatigue	Incomplete/Wrong Log	0.000123	30	0.003690	100	156,299
Fatigue	Jumping OOS/Driving Fatigued	0.005741	30	0.172230	100	1,701
Fatigue	EOBR related	0.000123	30	0.003690	100	5,101
Fitness	Driver Qualification	0.000209	45	0.009405	71	107,668
Fitness	Endorsements & Vehicle Group	0.000178	45	0.008010	85	29,511
Fitness	Medical Certificate	0.000148	45	0.006660	64	129,984
Fitness	Physical	0.000092	45	0.004140	93	6,225
Fitness	Multiple License	0.000259	45	0.011655	93	167
Fitness	Fitness Jumping OOS	0.001463	45	0.065835	100	0
D&A	Alcohol	0.000871	90	0.078390	100	2,962
D&A	Drugs	0.000994	90	0.089460	100	1,401
D&A	Alcohol Jumping OOS	0.000563	90	0.050670	100	145
Vehicle	Brakes Out of Adjustment	0.000128	37	0.004736	70	210,727
Vehicle	Brakes, All Others	0.000077	37	0.002849	79	889,408
Vehicle	Coupling Devices	0.000249	7	0.001743	93	12,770
Vehicle	Exhaust Discharge	0.000058	37	0.002146	82	61,106

BASIC	Violation Group	Crash Risk (per day trip)	Duration (days)	Crash Risk Reduction (Crash Risk x Duration)	Correction Rate (%)	Total # of Violations (FY 2013)
Vehicle	Fuel Systems	0.000126	37	0.004662	92	16,151
Vehicle	Lighting	0.000093	7	0.000651	61	561,334
Vehicle	Steering Mechanism	0.000077	37	0.002849	82	59,410
Vehicle	Suspension	0.000125	37	0.004625	89	77,751
Vehicle	Tires	0.000136	7	0.000952	67	421,397
Vehicle	Wheels, Studs, Clamps, Etc.	0.000099	7	0.000693	71	251,239
Vehicle	Windshield/Glass/Makings	0.000100	7	0.000700	73	180,827
Vehicle	Cab, Body, Frame	0.000155	7	0.001085	91	78,048
Vehicle	Inspection Reports	0.000155	37	0.005735	70	177,296
Vehicle	Vehicle Jumping OOS	0.000238	37	0.008806	95	1,997
Vehicle	Other Vehicle Defect	0.000135	37	0.004995	65	226,910
Vehicle	Emergency Equipment	0.000095	37	0.003515	74	251,131
Vehicle	Tire vs. Load	0.000100	37	0.003700	93	26,572
Vehicle	Clearance Identification Lamps/Other	0.000082	7	0.000574	57	488,634
Vehicle	392.2 Vehicle	0.000106	37	0.003922	100	280,168
Cargo	Load Securement	0.000168	30	0.005040	100	130,281
Cargo	Other Cargo	0.000158	30	0.004740	100	249,975
Cargo	Fire Hazard	0.000080	30	0.002400	100	178
Cargo	Markings	0.000056	30	0.001680	100	138,755
Cargo	Cargo Protection	0.000153	30	0.004590	100	1,387
Cargo	Documentation	0.000067	30	0.002010	100	21,469
Cargo	HM Route	0.000149	30	0.004470	100	73
Cargo	Fraudulent Behavior	0.000000	30	0.000000	100	371
Cargo	Package Integrity	0.000083	30	0.002490	100	1,311
Cargo	HM Other	0.000074	30	0.002220	100	1,871
Cargo	Package Testing	0.000086	30	0.002580	100	1,434