FMCSA Safety Program
Effectiveness Measurement:
Roadside Intervention Effectiveness Model
Fiscal Year 2011

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 enforcements in terms of the number of crashes avoided, injuries prevented, and lives saved. Traffic enforcements 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 Government Performance and Results Act of 1993, 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.

NOTICE

QUALITY ASSURANCE STATEMENT

Technical Report Documentation Page

1. Report No. **RRA-15-002**	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle **FMCSA Safety Program Effectiveness Measurement: Roadside Intervention Effectiveness Model, Fiscal Year 2011**	5. Report Date **June 2015**	
	6. Performing Organization Code	
7. Author(s) **Horton, Suzanne; Segev, Eran; Meltzer, Neil**	8. Performing Organization Report No.	
9. Performing Organization Name and Address **John A. Volpe National Transportation Systems Center** **Safety Management Systems Technical Center** **Safety Measurement and Analysis Division** **55 Broadway** **Cambridge, MA 02142**	10. Work Unit No. (TRAIS)	
	11. Contract or Grant No.	
12. Sponsoring Agency Name and Address **U.S. Department of Transportation** **Federal Motor Carrier Safety Administration** **Office of Analysis, Research, and Technology** **1200 New Jersey Ave. SE** **Washington, DC 20590**	13. Type of Report and Period Covered **Final Report, Fiscal Year 2011**	
	14. Sponsoring Agency Code **FMCSA**	

15. Supplementary Notes
Contracting Officer's Representative: Richard Gruberg

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 the number of crashes avoided, injuries prevented, and lives saved. Traffic enforcements 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 Government Performance and Results Act of 1993, 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 RIEM for fiscal year (FY) 2011.**

17. Key Words **CMV, commercial motor vehicle, crash avoidance, enforcement, inspections, intervention, roadside**		18. Distribution Statement **No restrictions**		
19. Security Classif. (of this report) **Unclassified**	20. Security Classif. (of this page) **Unclassified**		21. No. of Pages **36**	22. Price

Form DOT F 1700.7 (8-72)   Reproduction of completed page authorized.

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				
in²	square inches	645.2	square millimeters	mm²
ft²	square feet	0.093	square meters	m²
yd²	square yards	0.836	square meters	m²
Ac	Acres	0.405	Hectares	ha
mi²	square miles	2.59	square kilometers	km²
VOLUME			1000 L shall be shown in m³	
fl oz	fluid ounces	29.57	Milliliters	mL
Gal	Gallons	3.785	Liters	L
ft³	cubic feet	0.028	cubic meters	m³
yd³	cubic yards	0.765	cubic meters	m³
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			Temperature is in exact degrees	
°F	Fahrenheit	5 × (F-32) ÷ 9 or (F-32) ÷ 1.8	Celsius	°C
ILLUMINATION				
Fc	foot-candles	10.76	Lux	lx
Fl	foot-Lamberts	3.426	candela/m²	cd/m²
Force and Pressure or Stress				
Lbf	Poundforce	4.45	Newtons	N
lbf/in²	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				
mm²	square millimeters	0.0016	square inches	in²
m²	square meters	10.764	square feet	ft²
m²	square meters	1.195	square yards	yd²
Ha	Hectares	2.47	acres	ac
km²	square kilometers	0.386	square miles	mi²
VOLUME				
mL	Milliliters	0.034	fluid ounces	fl oz
L	Liters	0.264	gallons	gal
m³	cubic meters	35.314	cubic feet	ft³
m³	cubic meters	1.307	cubic yards	yd³
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			Temperature is in exact degrees	
°C	Celsius	1.8c + 32	Fahrenheit	°F
ILLUMINATION				
Lx	Lux	0.0929	foot-candles	fc
cd/m²	candela/m²	0.2919	foot-Lamberts	fl
Force & Pressure Or Stress				
N	Newtons	0.225	poundforce	lbf
kPa	Kilopascals	0.145	poundforce per square inch	lbf/in²

* 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).

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ABBREVIATIONS AND ACRONYMS

Acronym	Definition
CMV	commercial motor vehicle
CSA	Compliance, Safety, Accountability
CY	calendar year
FMCSA	Federal Motor Carrier Safety Administration
FY	fiscal year
HM	hazardous materials
MCMIS	Motor Carrier Management Information System
OOS	out of service
RIEM	Roadside Intervention Effectiveness Model
SMS	Safety Measurement System

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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. The Roadside Inspection Program consists of roadside inspections performed by qualified safety inspectors. These inspections follow the guidelines of the North American Standard, which were developed by FMCSA and the Commercial Vehicle Safety Alliance. Most roadside inspections are conducted by the States under the Motor Carrier Safety Assistance Program. There are six levels of inspections that include a vehicle component, a driver component, or both. Separately, the Traffic Enforcement Program is composed of two distinct activities: a traffic stop as a result of a moving violation and a subsequent roadside inspection.

FMCSA developed an analytic model to measure the effectiveness of roadside inspections and traffic enforcements in terms of crashes avoided, 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 enforcements and roadside inspections are considered interventions.

The RIEM is based on the premise that roadside inspection and traffic enforcement interventions, which correct 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 avoided as a result of correcting these violations. Additionally, the RIEM provides FMCSA management with information to address the Government Performance and Results Act of 1993, 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[1] 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 corrects at least one violation is interpreted as having reduced crash risk. The model expresses this risk reduction in terms of crashes avoided as a result of each violation being corrected. Each roadside violation is classified into a specific "violation group," containing related violations that are assigned the same crash risk (the crash risk assigned to each violation group was estimated by the Agency by examining the incidence of particular violations found during post-crash roadside inspections, compared to those found during non-crash-related inspections). For an individual intervention, the reduction

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[1] http://ntl.bts.gov/lib/54000/54400/54484/RRA-14-011-CIEM_Summary_Report-FINAL-508C.pdf

in crash risk depends on the number and type of violations found. By summing the crash risk probabilities for all violations corrected over all inspections, the model estimates the number of crashes avoided as a result of the Roadside Inspection and Traffic Enforcement programs.

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 result in 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 to generate the incremental crash reduction associated with correcting a violation in a particular violation group:

- The **crash risk** of the 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 avoided 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 avoided. Finally, the estimated crashes avoided are added up across all violation groups to produce an estimate of the total annual crashes avoided during the FY.

Once the number of crashes avoided is totaled for all inspections during the year, the model then computes the number of lives saved and injuries avoided as a result of those crashes avoided. 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 avoided to estimate the number of lives saved and injuries avoided due to the inspections.

FY 2011 ROADSIDE INTERVENTION EFFECTIVENESS MODEL RESULTS

Total crashes avoided, total lives saved, and total injuries avoided as a result of roadside inspection and traffic enforcement activities performed during FY 2011 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 have been estimated by the model by calendar year (CY). As a result, estimates of benefits for years 2005 and earlier are shown by CY.

NATIONAL LEVEL ESTIMATES

Table 1 provides a breakdown of the program activity at the national level for the current analysis year (FY 2011) and the 2 years prior (FY 2009–10). Overall program activity was higher in FY 2011 than in the 2 previous years, with the number of performed interventions increasing by about 1.2 percent from FY 2010. However, while roadside inspections rose by 171,652 (6.0 percent), traffic enforcements decreased by 130,044 (18.3 percent).

Table 1. Program activity from FY 2009–11.

Interventions[+]	FY 2009	FY 2010	FY 2011
Roadside Inspections	2,788,728	2,849,350	3,021,002
Traffic Enforcements	730,916	710,983	580,939
Total	**3,519,644**	**3,560,333**	**3,601,941**

[+] The June 2013 MCMIS data snapshot was used for this report.

Table 2 presents the benefits of the two programs over the past 3 years. The Roadside Inspection Program prevented 8,311 crashes in FY 2011, while the Traffic Enforcement Program prevented 6,468, for a total of 14,779 crashes avoided. The number of crashes avoided decreased from FY 2010 to FY 2011, even as the total number of interventions increased. The proportion of inspections that found no violations increased (from 34 percent to 37 percent) and the average number of violations per inspection decreased from 1.91 in 2010 to 1.77 in 2011.

Table 2: Program effectiveness from FY 2009 to FY 2011 using the RIEM Version 3.0.

Intervention Benefits	FY 2009	FY 2010	FY 2011[+]
Crashes avoided due to roadside inspections	8,149	8,154	8,311
Crashes avoided due to traffic enforcements	8,789	8,330	6,468
Total Crashes Avoided	**16,938**	**16,484**	**14,779**
Injuries prevented due to roadside inspections	5,206	5,129	5,106
Injuries prevented due to traffic enforcements	5,615	5,240	3,974
Total Injuries Prevented	**10,821**	**10,369**	**9,080**
Lives saved due to roadside inspections	276	258	272
Lives saved due to traffic enforcements	297	263	212
Total Lives Saved	**573**	**521**	**484**

+ FY 2011 crash severity calculation methodology has been improved; while not identical to the calculations from earlier years, the results are comparable.

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 are 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 results show the scale of the Roadside Inspection and Traffic Enforcement programs and the magnitude of their effects on highway safety. In 2011, these programs are estimated to have saved 484 lives and prevented 9,080 injuries by averting 14,779 crashes; over the past 10 years, it is estimated that these programs have saved more than 6,000 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. The Roadside Inspection Program consists of roadside inspections performed by qualified safety inspectors. These inspections follow the guidelines of the North American Standard, which were developed by FMCSA and the Commercial Vehicle Safety Alliance. Most roadside inspections are conducted by the States under the Motor Carrier Safety Assistance Program. There are six levels of inspections that include a vehicle component, a driver component, or both. Separately, the Traffic Enforcement Program is composed of two distinct activities: a traffic stop as a result of a moving violation and a subsequent roadside inspection.

An analytic model has been developed to measure the effectiveness of roadside inspections and traffic enforcements in terms of the number of crashes avoided, injuries prevented, and lives saved. Traffic enforcements 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 Government Performance and Results Act of 1993, 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 enforcements—which correct 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 avoided 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 and then corrected as the result of interventions—specifically roadside inspections and traffic enforcements. In turn, these interventions reduce the probability that the previously identified vehicles or drivers will be involved in subsequent crashes.

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 and corrects at least one violation is interpreted as having reduced crash risk. The model expresses this risk reduction in terms of crashes avoided as a result of each violation being corrected. Each roadside violation is classified into a specific "violation group," containing related violations that are assigned the same crash risk (the crash risk assigned to each violation group was estimated by the Agency by examining the incidence of particular violations found during post-crash roadside inspections, compared to those found during non-crash-related inspections). For an individual intervention, the reduction in crash risk depends on the number and type of violations found. By summing the crash risk probabilities for all violations corrected over all inspections, the model estimates the number of crashes avoided as a result of the Roadside Inspection and Traffic Enforcement programs.

2.1 INPUT DATA SELECTION

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.

2.2 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. The improved methodology uses applicable results from related FMCSA research, including the Violation Severity Assessment Study,[2] as well as research performed for the Agency'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.[3] 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 to generate the incremental crash reduction associated with correcting a violation in a particular violation group:

- The **crash risk** of the 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 violations that are assumed corrected as a result of the intervention.

A preliminary potential crash reduction for a violation group is calculated from the product of the crash risk 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 2011.

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[2] http://www.regulations.gov/#!documentDetail;D=FMCSA-2004-18898-0210.
[3] 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

2.3 CALCULATION OF BENEFITS

To produce an estimate of the annual number of crashes avoided due to inspections, the model first determines for each violation group the count of inspections during the year in which a violation in that group was recorded. Next, the count is multiplied by the final crash reduction yielding the estimated annual crashes avoided.

After the number of crashes avoided 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 avoided. 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 avoided to estimate the number of lives saved and injuries prevented due to the inspections.

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3. FISCAL YEAR 2011 ROADSIDE INTERVENTION EFFECTIVENESS MODEL RESULTS

The RIEM was implemented to estimate the crashes avoided, injuries prevented, and lives saved as a result of activities performed during FY 2011 (October 1, 2010, to September 30, 2011.) The results are presented at the national and State levels.

3.1 NATIONAL-LEVEL ESTIMATES

Table 3 provides a breakdown of the program activity at the national level for the current analysis year (FY 2011) and the 2 years prior (FY 2009–10). Overall program activity was higher in FY 2011 than in the 2 previous years, with the number of performed interventions increasing by about 1.2 percent from FY 2010. However, while roadside inspections rose by 171,652 (6.0 percent), traffic enforcements decreased by 130,044 (18.3 percent).

Table 3. Program activity from FY 2009 to FY 2011.

Interventions	FY 2009	FY 2010	FY 2011
Roadside Inspections	2,788,728	2,849,350	3,021,002
Traffic Enforcements	730,916	710,983	580,939
Total	**3,519,644**	**3,560,333**	**3,601,941**

Table 4 presents the estimated benefits of the two programs over the past 3 years. The Roadside Inspection Program prevented 8,311 crashes in FY 2011, while the Traffic Enforcement Program prevented 6,468, for a total of 14,779 crashes avoided. The number of crashes avoided decreased from FY 2010 to 2011, even as the total number of interventions increased. The proportion of inspections that found no violations increased (from 34 percent to 37 percent), and the average number of violations per inspection decreased from 1.91 in 2010 to 1.77 in 2011.

Table 4. Program effectiveness from FY 2009 to FY 2011 using the RIEM Version 3.0.

Intervention Benefits	FY 2009	FY 2010	FY 2011[+]
Crashes avoided due to roadside inspections	8,149	8,154	8,311
Crashes avoided due to traffic enforcements	8,789	8,330	6,468
Total Crashes Avoided	**16,938**	**16,484**	**14,779**
Injuries prevented due to roadside inspections	5,206	5,129	5,106
Injuries prevented due to traffic enforcements	5,615	5,240	3,974
Total Injuries Prevented	**10,821**	**10,369**	**9,080**
Lives saved due to roadside inspections	276	258	272
Lives saved due to traffic enforcements	297	263	212
Total Lives Saved	**573**	**521**	**484**

+ FY 2011 crash severity calculation methodology has been improved; while not identical to the calculations from earlier years, the results are comparable.

Figure 1 displays the trends in estimated crashes avoided and lives saved from FY 2006 to FY 2011. All estimates prior to FY 2009 were recalculated for this report using the most recent version of the RIEM to provide a historical time series compatible with FY 2009, FY 2010, and FY 2011 estimates for analytical purposes.[4]
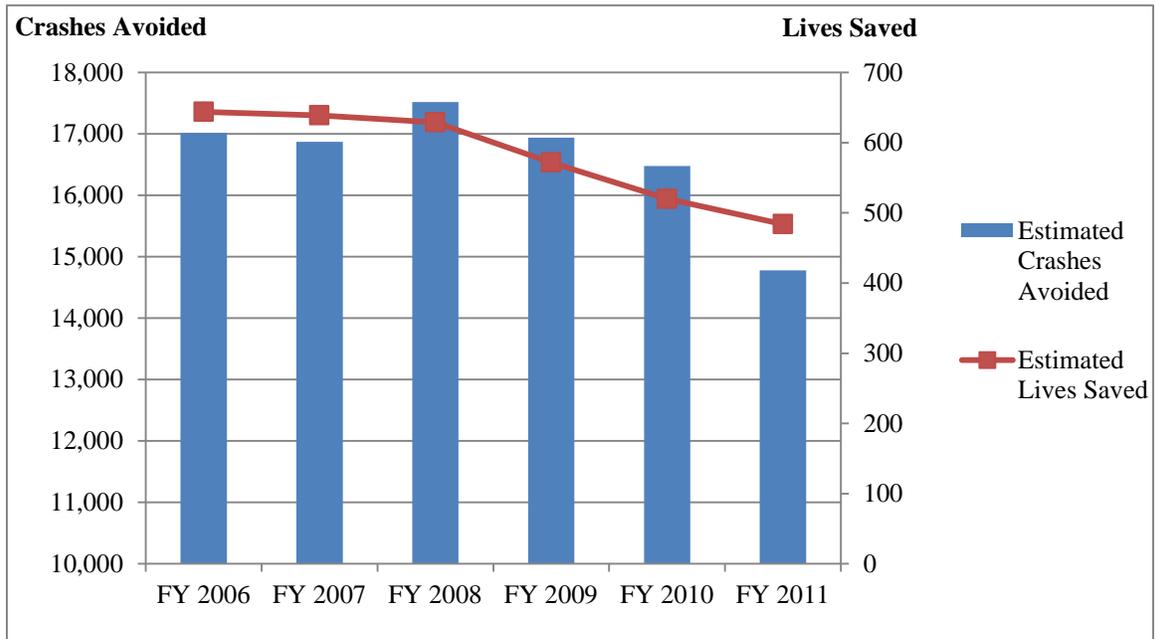
Figure 1. Bar chart. Trends in crashes avoided and lives saved.

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

The decrease in crashes avoided and lives saved in FY 2011 is largely driven by the more than 18 percent decrease in traffic enforcement inspections (see Table 3). In contrast, roadside inspections continued a gradual year over year rise. Complete Version 3.0 results from FY 2006 to FY 2011 are available in Table 5. Complete results from CY 2001 to FY 2011 are shown in Table 6.

Table 5. RIEM Version 3.0 estimated program benefits, FY 2006- FY 2011.

Intervention Results	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011[+]
Number of roadside inspections	2,372,802	2,616,868	2,723,576	2,788,728	2,849,350	3,021,002
Number of traffic enforcements	900,260	752,649	756,169	730,916	710,983	580,939
Total Number of Interventions	**3,273,062**	**3,369,517**	**3,479,745**	**3,519,644**	**3,560,333**	**3,601,941**
Crashes avoided due to roadside inspections	7,593	8,101	8,464	8,149	8,154	8,311
Crashes avoided due to traffic enforcements	9,422	8,769	9,053	8,789	8,330	6,468
Total Crashes Avoided	**17,015**	**16,870**	**17,517**	**16,938**	**16,484**	**14,779**
Injuries prevented due to roadside inspections	5,090	5,222	5,381	5,206	5,129	5,106
Injuries prevented due to traffic enforcements	6,316	5,652	5,755	5,615	5,240	3,974
Total Injuries Prevented	**11,405**	**10,874**	**11,136**	**10,821**	**10,369**	**9,080**
Lives saved due to roadside inspections	287	307	304	276	258	272
Lives saved due to traffic enforcements	357	332	325	297	263	212
Total Lives Saved	**644**	**639**	**629**	**573**	**521**	**484**

+ FY 2011 crash severity calculation methodology has been improved; while not identical to the calculations from earlier years, the results are comparable.

Table 6. Historical results for RIEM, CY 2001–FY 2011

Intervention Results	CY 2001	CY 2002	CY 2003	CY 2004	CY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011[+]
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
Number of traffic enforcements	695,619	760,094	791,116	802,798	826,951	900,260	752,649	756,169	730,916	710,983	580,939
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**
Crashes avoided 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
Crashes avoided due to traffic enforcements	7,263	8,115	8,251	8,467	9,205	9,422	8,769	9,053	8,789	8,330	6,468
Total Crashes Avoided	**13,921**	**15,333**	**15,427**	**15,820**	**16,780**	**17,015**	**16,870**	**17,517**	**16,938**	**16,484**	**14,779**
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
Injuries prevented due to traffic enforcements	5,509	6,136	6,274	6,174	6,382	6,316	5,652	5,755	5,615	5,240	3,974
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**
Lives saved due to roadside inspections	331	346	317	284	282	287	307	304	276	258	272
Lives saved due to traffic enforcements	361	389	364	327	342	357	332	325	297	263	212
Total Lives Saved	**691**	**735**	**681**	**611**	**624**	**644**	**639**	**629**	**573**	**521**	**484**

[+] FY 2011 crash severity calculation methodology has been improved; while not identical to the calculations from earlier years, the results are comparable.

3.2   STATE-LEVEL ESTIMATES

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 7 presents the number of roadside inspections and traffic enforcements performed on U.S.-domiciled carriers and on those domiciled outside of the United States in FY 2011.

Table 7. FY 2011 program exposure of U.S.-domiciled versus non-U.S.-domiciled carriers.

Interventions	U.S.-Domiciled	Non-U.S.-Domiciled
Roadside Inspections	2,720,063	300,939
Traffic Enforcements	566,995	13,944
Total Interventions	**3,287,058**	**314,883**

Table 8 compares the effectiveness of interventions conducted in FY 2011 on carriers domiciled in the United States to the effectiveness of 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.-domiciled carriers had many more inspections than non-U.S.-domiciled carriers; therefore, the numbers of crashes avoided, injuries prevented, and lives saved are much higher. When comparing the estimated program benefits per 1,000 interventions, U.S.-domiciled carriers have half the rate of crashes avoided for roadside inspections (2.50 compared to 5.02), while the rates of crashes avoided per traffic enforcement are similar for U.S.-domiciled and non-U.S.-domiciled carriers (11.12 and 11.67). The injuries and fatalities prevented per intervention in U.S.-domiciled versus non-U.S.-domiciled carriers exhibit a similar relationship.

Table 8. FY 2011 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 avoided due to roadside inspections	6,801	1,511	2.50	5.02
Crashes avoided due to traffic enforcements	6,305	163	11.12	11.67
Total Crashes Avoided*	**13,105**	**1,673**	**4.50**	**5.31**
Injuries prevented due to roadside inspections	4,178	928	1.54	3.08
Injuries prevented due to traffic enforcements	3,874	100	6.83	7.17
Total Injuries Prevented*	**8,052**	**1,028**	**2.76**	**3.26**
Lives saved due to roadside inspections	222	49	0.08	0.16
Lives saved due to traffic enforcements	206	5	0.36	0.38
Total Lives Saved*	**429**	**55**	**0.15**	**0.17**

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

3.2.2 Estimates by Reporting State

Table 9 provides roadside inspection results and Table 10 provides traffic enforcement results, by reporting State, for interventions conducted by inspectors from all 50 States, the District of Columbia, the U.S. territories combined (American Samoa, Guam, the Northern Mariana Islands, U.S. Virgin Islands, and Puerto Rico), and by Federal personnel.[5] These tables provide intervention counts and total estimated benefits (crashes avoided, injuries prevented, lives saved).

Since activity levels vary widely from State to State, these tables include the number of benefits provided per 1,000 interventions (per 1,000 roadside inspections in Table 9; per 1,000 traffic enforcements in Table 10). This analysis can illuminate interesting trends about the effectiveness of interventions in different States. For example, Georgia and Pennsylvania reported approximately the same number of roadside inspections, but the estimated numbers of crashes avoided per 1,000 roadside inspections are very different. In Georgia, the rate of 4.02 is higher than the national average of 2.75, and in Pennsylvania the rate is lower—2.29. Roadside inspections and traffic enforcements performed by Federal staff are highly effective, with 6.51 crashes avoided per 1,000 roadside inspections and 20.10 crashes avoided per 1,000 traffic enforcements (compared to the national average of 11.13).

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[5] Federal personnel conducting inspections include Border Inspectors and other certified Federal inspectors.

Table 9. FY 2011 Roadside Inspection Program benefits by reporting State.

Reporting State	Total Interventions Initiated	Number of Roadside Inspections	Est. Crashes Avoided	Est. Injuries Prevented	Est. Lives Saved	Est. Crashes Avoided per 1,000 Inspections	Est. Injuries Prevented per 1,000 Inspections	Est. Lives Saved per 1,000 Inspections
Alabama	40360	35371	82.63	50.77	2.70	2.34	1.44	0.08
Alaska	5954	5434	15.09	9.27	0.49	2.78	1.71	0.09
Arizona	73368	56376	206.21	126.69	6.75	3.66	2.25	0.12
Arkansas	43705	36685	117.73	72.33	3.85	3.21	1.97	0.10
California	605377	518075	595.20	365.69	19.47	1.15	0.71	0.04
Colorado	31085	24786	57.76	35.49	1.89	2.33	1.43	0.08
Connecticut	19461	12813	65.54	40.27	2.14	5.12	3.14	0.17
Delaware	4936	3117	5.13	3.15	0.17	1.65	1.01	0.05
District of Columbia	7181	5101	8.23	5.06	0.27	1.61	0.99	0.05
Federal	142719	140167	913.07	560.99	29.87	6.51	4.00	0.21
Florida	113607	98037	207.33	127.38	6.78	2.11	1.30	0.07
Georgia	94273	82208	330.61	203.13	10.82	4.02	2.47	0.13
Hawaii	4029	3593	3.70	2.27	0.12	1.03	0.63	0.03
Idaho	10506	6115	28.48	17.50	0.93	4.66	2.86	0.15
Illinois	65216	48158	124.08	76.23	4.06	2.58	1.58	0.08
Indiana	110952	59785	179.04	110.00	5.86	2.99	1.84	0.10
Iowa	54832	44656	181.17	111.31	5.93	4.06	2.49	0.13
Kansas	49015	43136	99.87	61.36	3.27	2.32	1.42	0.08
Kentucky	114121	98823	129.11	79.32	4.22	1.31	0.80	0.04
Louisiana	55318	43593	175.51	107.83	5.74	4.03	2.47	0.13
Maine	14338	12765	35.79	21.99	1.17	2.80	1.72	0.09
Maryland	103896	87131	180.79	111.08	5.91	2.07	1.27	0.07
Massachusetts	19431	7710	23.41	14.38	0.77	3.04	1.87	0.10
Michigan	53264	32677	122.18	75.07	4.00	3.74	2.30	0.12
Minnesota	33390	26403	89.18	54.79	2.92	3.38	2.08	0.11
Mississippi	85065	83377	84.97	52.21	2.78	1.02	0.63	0.03
Missouri	95759	67370	165.52	101.70	5.41	2.46	1.51	0.08

Reporting State	Total Interventions Initiated	Number of Roadside Inspections	Est. Crashes Avoided	Est. Injuries Prevented	Est. Lives Saved	Est. Crashes Avoided per 1,000 Inspections	Est. Injuries Prevented per 1,000 Inspections	Est. Lives Saved per 1,000 Inspections
Montana	36653	34353	67.75	41.63	2.22	1.97	1.21	0.06
Nebraska	30193	23612	63.77	39.18	2.09	2.70	1.66	0.09
Nevada	33464	25847	48.12	29.56	1.57	1.86	1.14	0.06
New Hampshire	11616	9468	27.16	16.69	0.89	2.87	1.76	0.09
New Jersey	38263	30447	80.41	49.40	2.63	2.64	1.62	0.09
New Mexico	97334	74906	107.77	66.21	3.53	1.44	0.88	0.05
New York	110670	97224	216.07	132.75	7.07	2.22	1.37	0.07
North Carolina	85834	76819	159.52	98.01	5.22	2.08	1.28	0.07
North Dakota	16073	14332	20.58	12.64	0.67	1.44	0.88	0.05
Ohio	79638	65864	165.61	101.75	5.42	2.51	1.54	0.08
Oklahoma	24001	16909	54.54	33.51	1.78	3.23	1.98	0.11
Oregon	50571	45425	128.63	79.03	4.21	2.83	1.74	0.09
Pennsylvania	101018	81933	187.35	115.11	6.13	2.29	1.40	0.07
Rhode Island	4008	2233	8.47	5.20	0.28	3.79	2.33	0.13
South Carolina	50915	41634	142.13	87.32	4.65	3.41	2.10	0.11
South Dakota	28672	25868	53.97	33.16	1.77	2.09	1.28	0.07
Tennessee	60789	50608	85.38	52.46	2.79	1.69	1.04	0.06
Texas	414006	398328	1870.93	1149.50	61.21	4.70	2.89	0.15
Utah	34436	29080	76.04	46.72	2.49	2.61	1.61	0.09
Vermont	7464	5595	17.65	10.84	0.58	3.15	1.94	0.10
Virginia	41321	34192	100.08	61.49	3.27	2.93	1.80	0.10
Washington	104508	80431	179.30	110.16	5.87	2.23	1.37	0.07
West Virginia	31494	25299	36.35	22.33	1.19	1.44	0.88	0.05
Wisconsin	31218	25393	122.29	75.13	4.00	4.82	2.96	0.16
Wyoming	18926	15030	49.47	30.39	1.62	3.29	2.02	0.11
U.S. Territories	7698	6710	14.42	8.86	0.47	2.15	1.32	0.07
Total	**3,601,941**	**3,021,002**	**8,311.09**	**5,106.29**	**271.91**	**2.75**	**1.69**	**0.09**

Table 10. FY 2011 Traffic Enforcement Program benefits by reporting State.

Reporting State	Total Interventions Initiated	Number of Traffic Enforcements	Est. Crashes Avoided	Est. Injuries Prevented	Est. Lives Saved	Est. Crashes Avoided per 1,000 Enforcements	Est. Injuries Prevented per 1,000 Enforcements	Est. Lives Saved per 1,000 Enforcements
Alabama	40360	4989	55.20	33.91	1.81	11.06	6.80	0.36
Alaska	5954	520	8.11	4.98	0.27	15.60	9.58	0.52
Arizona	73368	16992	195.96	120.40	6.41	11.53	7.09	0.38
Arkansas	43705	7020	83.62	51.38	2.74	11.91	7.32	0.39
California	605377	87302	646.01	396.91	21.13	7.40	4.55	0.24
Colorado	31085	6299	61.41	37.73	2.01	9.75	5.99	0.32
Connecticut	19461	6648	101.64	62.45	3.33	15.29	9.39	0.50
Delaware	4936	1819	13.49	8.29	0.44	7.42	4.56	0.24
District of Columbia	7181	2080	29.78	18.30	0.97	14.32	8.80	0.47
Federal	142719	2552	51.29	31.51	1.68	20.10	12.35	0.66
Florida	113607	15570	191.28	117.52	6.26	12.29	7.55	0.40
Georgia	94273	12065	154.51	94.93	5.05	12.81	7.87	0.42
Hawaii	4029	436	3.62	2.22	0.12	8.30	5.09	0.28
Idaho	10506	4391	47.26	29.04	1.55	10.76	6.61	0.35
Illinois	65216	17058	179.34	110.19	5.87	10.51	6.46	0.34
Indiana	110952	51167	439.34	269.93	14.37	8.59	5.28	0.28
Iowa	54832	10176	97.85	60.12	3.20	9.62	5.91	0.31
Kansas	49015	5879	81.60	50.13	2.67	13.88	8.53	0.45
Kentucky	114121	15298	224.15	137.72	7.33	14.65	9.00	0.48
Louisiana	55318	11725	142.32	87.44	4.66	12.14	7.46	0.40
Maine	14338	1573	22.11	13.58	0.72	14.06	8.63	0.46
Maryland	103896	16765	226.36	139.08	7.41	13.50	8.30	0.44
Massachusetts	19431	11721	159.89	98.24	5.23	13.64	8.38	0.45
Michigan	53264	20587	226.43	139.12	7.41	11.00	6.76	0.36
Minnesota	33390	6987	89.20	54.80	2.92	12.77	7.84	0.42
Mississippi	85065	1688	18.88	11.60	0.62	11.18	6.87	0.37
Missouri	95759	28389	450.95	277.06	14.75	15.88	9.76	0.52

Reporting State	Total Interventions Initiated	Number of Traffic Enforcements	Est. Crashes Avoided	Est. Injuries Prevented	Est. Lives Saved	Est. Crashes Avoided per 1,000 Enforcements	Est. Injuries Prevented per 1,000 Enforcements	Est. Lives Saved per 1,000 Enforcements
Montana	36653	2300	25.32	15.56	0.83	11.01	6.77	0.36
Nebraska	30193	6581	57.55	35.36	1.88	8.74	5.37	0.29
Nevada	33464	7617	84.46	51.89	2.76	11.09	6.81	0.36
New Hampshire	11616	2148	31.43	19.31	1.03	14.63	8.99	0.48
New Jersey	38263	7816	96.70	59.41	3.16	12.37	7.60	0.40
New Mexico	97334	22428	242.70	149.11	7.94	10.82	6.65	0.35
New York	110670	13446	155.46	95.51	5.09	11.56	7.10	0.38
North Carolina	85834	9015	146.85	90.22	4.80	16.29	10.01	0.53
North Dakota	16073	1741	21.25	13.06	0.70	12.21	7.50	0.40
Ohio	79638	13774	122.32	75.15	4.00	8.88	5.46	0.29
Oklahoma	24001	7092	73.13	44.93	2.39	10.31	6.34	0.34
Oregon	50571	5146	56.91	34.97	1.86	11.06	6.80	0.36
Pennsylvania	101018	19085	241.11	148.14	7.89	12.63	7.76	0.41
Rhode Island	4008	1775	28.77	17.68	0.94	16.21	9.96	0.53
South Carolina	50915	9281	134.30	82.51	4.39	14.47	8.89	0.47
South Dakota	28672	2804	39.64	24.35	1.30	14.14	8.68	0.46
Tennessee	60789	10181	109.51	67.28	3.58	10.76	6.61	0.35
Texas	414006	15678	144.17	88.58	4.72	9.20	5.65	0.30
Utah	34436	5356	76.64	47.09	2.51	14.31	8.79	0.47
Vermont	7464	1869	22.46	13.80	0.73	12.02	7.38	0.39
Virginia	41321	7129	97.23	59.74	3.18	13.64	8.38	0.45
Washington	104508	24077	292.54	179.74	9.57	12.15	7.47	0.40
West Virginia	31494	6195	38.29	23.53	1.25	6.18	3.80	0.20
Wisconsin	31218	5825	64.54	39.65	2.11	11.08	6.81	0.36
Wyoming	18926	3896	46.16	28.36	1.51	11.85	7.28	0.39
U.S. Territories	7698	988	16.62	10.21	0.55	16.82	10.33	0.56
Total	**3,601,941**	**580,939**	**6,467.66**	**3,973.72**	**211.60**	**11.13**	**6.84**	**0.36**

3.2.3 Estimates by Carrier State of Domicile

Table 11 and Table 12 provide detailed results (organized by carrier domicile State and country) for interventions conducted on carriers registered in all 50 States, the District of Columbia, and U.S. territories, as well as Canada, Mexico, and other countries. The number of benefits provided per 1,000 interventions (per 1,000 roadside inspections in Table 11; per 1,000 traffic enforcements in Table 12) is again included to provide a scale for comparison between States with different levels of activity. The two States with the most carriers receiving roadside inspections were Texas (319,339) and California (449,444). The estimated benefits per 1,000 inspections for each were dissimilar. The rate for crashes avoided for Texas-domiciled carriers was 4.05, higher than the average for all carriers (2.75), while the California-domiciled carriers had a lower-than-average rate of 1.45.

It is also possible, in Table 11 and Table 12, to see more details of the effectiveness of roadside inspections and traffic enforcements on non-U.S.-domiciled carriers. Table 12 confirms that the effectiveness of traffic enforcements is similar for U.S.-domiciled and non-U.S.-domiciled carriers. While the average for U.S.-domiciled carriers was 11.12, carriers domiciled in Canada had 10.19 crashes avoided per 1,000 enforcements. Mexican and non-North American carriers did have noticeably higher rates of crashes avoided per 1,000 enforcements, at 16.04 and 28.18, respectively. On the other hand, Table 11 shows some interesting differences in the results of roadside inspections on carriers domiciled in various non-U.S. countries. Mexico had 6.28 crashes avoided per 1,000 inspections, and other non-North American countries averaged 4.59 crashes avoided per 1,000 inspections, which is greater than the U.S.-domiciled average of 2.50 crashes avoided per 1,000 inspections. Conversely, Canada has a much lower average number of crashes avoided per 1,000 inspections: 1.53.

Table 11. FY 2011 Roadside Inspection Program benefits by domicile State and country.

Carrier State	Total Interventions Initiated	Number of Roadside Inspections	Est. Crashes Avoided	Est. Injuries Prevented	Est. Lives Saved	Est. Crashes Avoided per 1,000 Inspections	Est. Injuries Prevented per 1,000 Inspections	Est. Lives Saved per 1,000 Inspections
Alabama	57218	49463	114.92	70.61	3.76	2.32	1.43	0.08
Alaska	4734	4226	13.75	8.45	0.45	3.25	2.00	0.11
Arizona	80503	66985	154.33	94.82	5.05	2.30	1.42	0.08
Arkansas	57712	47829	109.13	67.05	3.57	2.28	1.40	0.07
California	539483	449444	652.88	401.13	21.36	1.45	0.89	0.05
Colorado	37770	30902	78.82	48.43	2.58	2.55	1.57	0.08
Connecticut	12425	8659	29.77	18.29	0.97	3.44	2.11	0.11
Delaware	5311	4155	10.12	6.22	0.33	2.44	1.50	0.08
District of Columbia	1996	1569	3.78	2.32	0.12	2.41	1.48	0.08
Florida	158759	134278	357.13	219.42	11.68	2.66	1.63	0.09
Georgia	106000	89687	290.18	178.29	9.49	3.24	1.99	0.11
Hawaii	3745	3336	3.64	2.24	0.12	1.09	0.67	0.04
Idaho	17220	13941	38.99	23.96	1.28	2.80	1.72	0.09
Illinois	133676	104407	264.71	162.64	8.66	2.54	1.56	0.08
Indiana	81438	62051	142.45	87.52	4.66	2.30	1.41	0.08
Iowa	61414	48944	129.71	79.69	4.24	2.65	1.63	0.09
Kansas	35483	27997	78.53	48.25	2.57	2.80	1.72	0.09
Kentucky	64836	54368	95.99	58.98	3.14	1.77	1.08	0.06
Louisiana	41881	35180	139.11	85.47	4.55	3.95	2.43	0.13
Maine	9536	7955	22.25	13.67	0.73	2.80	1.72	0.09
Maryland	54199	44939	97.57	59.95	3.19	2.17	1.33	0.07
Massachusetts	28298	18066	45.84	28.16	1.50	2.54	1.56	0.08
Michigan	81296	60678	175.58	107.88	5.74	2.89	1.78	0.09
Minnesota	63098	50342	121.15	74.43	3.96	2.41	1.48	0.08
Mississippi	36842	32166	71.00	43.62	2.32	2.21	1.36	0.07
Missouri	78193	61026	131.15	80.58	4.29	2.15	1.32	0.07
Montana	15016	13026	30.15	18.52	0.99	2.31	1.42	0.08
Nebraska	46823	37344	85.03	52.24	2.78	2.28	1.40	0.07

Carrier State	Total Interventions Initiated	Number of Roadside Inspections	Est. Crashes Avoided	Est. Injuries Prevented	Est. Lives Saved	Est. Crashes Avoided per 1,000 Inspections	Est. Injuries Prevented per 1,000 Inspections	Est. Lives Saved per 1,000 Inspections
Nevada	14910	12496	29.41	18.07	0.96	2.35	1.45	0.08
New Hampshire	8331	6243	19.44	11.94	0.64	3.11	1.91	0.10
New Jersey	66724	53826	143.01	87.87	4.68	2.66	1.63	0.09
New Mexico	16667	13080	34.37	21.12	1.12	2.63	1.61	0.09
New York	72222	58827	169.42	104.09	5.54	2.88	1.77	0.09
North Carolina	89100	76255	183.62	112.82	6.01	2.41	1.48	0.08
North Dakota	11785	9902	23.90	14.68	0.78	2.41	1.48	0.08
Ohio	105736	86710	184.36	113.27	6.03	2.13	1.31	0.07
Oklahoma	40072	32137	103.51	63.60	3.39	3.22	1.98	0.11
Oregon	43411	37500	83.85	51.52	2.74	2.24	1.37	0.07
Pennsylvania	127352	104817	209.37	128.64	6.85	2.00	1.23	0.07
Rhode Island	4587	2978	10.83	6.65	0.35	3.64	2.23	0.12
South Carolina	43804	36292	127.51	78.34	4.17	3.51	2.16	0.11
South Dakota	12359	10006	26.61	16.35	0.87	2.66	1.63	0.09
Tennessee	91093	75564	148.25	91.08	4.85	1.96	1.21	0.06
Texas	350403	319339	1,293.78	794.90	42.33	4.05	2.49	0.13
Utah	42097	33640	82.49	50.68	2.70	2.45	1.51	0.08
Vermont	4534	3598	10.18	6.25	0.33	2.83	1.74	0.09
Virginia	45169	36877	85.98	52.83	2.81	2.33	1.43	0.08
Washington	78970	63259	145.19	89.20	4.75	2.30	1.41	0.08
West Virginia	20036	17361	30.20	18.55	0.99	1.74	1.07	0.06
Wisconsin	68885	54918	136.40	83.80	4.46	2.48	1.53	0.08
Wyoming	6246	4803	16.84	10.35	0.55	3.51	2.15	0.11
U.S. Territories	7660	6672	14.34	8.81	0.47	2.15	1.32	0.07
Canada	89388	78965	121.02	74.37	3.95	1.53	0.94	0.05
Mexico	223414	220000	1,380.75	848.33	45.16	6.28	3.86	0.21
Non-North America	1320	1298	5.96	3.67	0.19	4.59	2.83	0.15
N/A	761	676	2.78	1.71	0.09	4.11	2.53	0.13
Total	**3,601,941**	**3,021,002**	**8,311.03**	**5,106.32**	**271.84**	**2.75**	**1.69**	**0.09**

Table 12. FY 2011 Traffic Enforcement Program benefits by domicile State and country.

Carrier State	Total Interventions Initiated	Number Traffic Enforcements	Est. Crashes Avoided	Est. Injuries Prevented	Est. Lives Saved	Est. Crashes Avoided per 1,000 Enforcements	Est. Injuries Prevented per 1,000 Enforcements	Est. Lives Saved per 1,000 Enforcements
Alabama	57218	7755	87.93	54.02	2.88	11.34	6.97	0.37
Alaska	4734	508	7.9	4.85	0.26	15.55	9.55	0.51
Arizona	80503	13518	147.24	90.46	4.82	10.89	6.69	0.36
Arkansas	57712	9883	107.06	65.78	3.5	10.83	6.66	0.35
California	539483	90039	763.04	468.81	24.96	8.47	5.21	0.28
Colorado	37770	6868	75.97	46.68	2.49	11.06	6.80	0.36
Connecticut	12425	3766	51.64	31.73	1.69	13.71	8.43	0.45
Delaware	5311	1156	15.1	9.28	0.49	13.06	8.03	0.42
District of Columbia	1996	427	5.89	3.62	0.19	13.79	8.48	0.44
Florida	158759	24481	300.92	184.88	9.84	12.29	7.55	0.40
Georgia	106000	16313	203.65	125.12	6.66	12.48	7.67	0.41
Hawaii	3745	409	3.38	2.08	0.11	8.26	5.09	0.27
Idaho	17220	3279	40.59	24.94	1.33	12.38	7.61	0.41
Illinois	133676	29269	331.94	203.94	10.86	11.34	6.97	0.37
Indiana	81438	19387	197.19	121.15	6.45	10.17	6.25	0.33
Iowa	61414	12470	120.96	74.32	3.96	9.70	5.96	0.32
Kansas	35483	7486	89.05	54.71	2.91	11.90	7.31	0.39
Kentucky	64836	10468	130.65	80.27	4.27	12.48	7.67	0.41
Louisiana	41881	6701	85.48	52.52	2.8	12.76	7.84	0.42
Maine	9536	1581	17.54	10.78	0.57	11.09	6.82	0.36
Maryland	54199	9260	122.84	75.47	4.02	13.27	8.15	0.43
Massachusetts	28298	10232	155.08	95.28	5.07	15.16	9.31	0.50
Michigan	81296	20618	230.68	141.73	7.55	11.19	6.87	0.37
Minnesota	63098	12756	143.5	88.17	4.69	11.25	6.91	0.37
Mississippi	36842	4676	54.2	33.3	1.77	11.59	7.12	0.38
Missouri	78193	17167	213.26	131.03	6.98	12.42	7.63	0.41
Montana	15016	1990	22.86	14.05	0.75	11.49	7.06	0.38
Nebraska	46823	9479	89.15	54.77	2.92	9.41	5.78	0.31
Nevada	14910	2414	27.63	16.98	0.9	11.45	7.03	0.37

Carrier State	Total Interventions Initiated	Number Traffic Enforcements	Est. Crashes Avoided	Est. Injuries Prevented	Est. Lives Saved	Est. Crashes Avoided per 1,000 Enforcements	Est. Injuries Prevented per 1,000 Enforcements	Est. Lives Saved per 1,000 Enforcements
New Hampshire	8331	2088	29.24	17.96	0.96	14.00	8.60	0.46
New Jersey	66724	12898	158.73	97.52	5.19	12.31	7.56	0.40
New Mexico	16667	3587	40.41	24.83	1.32	11.27	6.92	0.37
New York	72222	13395	157.11	96.53	5.14	11.73	7.21	0.38
North Carolina	89100	12845	175.84	108.04	5.75	13.69	8.41	0.45
North Dakota	11785	1883	21	12.9	0.69	11.15	6.85	0.37
Ohio	105736	19026	190.49	117.04	6.23	10.01	6.15	0.33
Oklahoma	40072	7935	94.28	57.93	3.08	11.88	7.30	0.39
Oregon	43411	5911	64.28	39.49	2.1	10.87	6.68	0.36
Pennsylvania	127352	22535	251.32	154.41	8.22	11.15	6.85	0.36
Rhode Island	4587	1609	25.15	15.45	0.82	15.63	9.60	0.51
South Carolina	43804	7512	110.03	67.6	3.6	14.65	9.00	0.48
South Dakota	12359	2353	25.91	15.92	0.85	11.01	6.77	0.36
Tennessee	91093	15529	176.46	108.42	5.77	11.36	6.98	0.37
Texas	350403	31064	337.52	207.37	11.04	10.87	6.68	0.36
Utah	42097	8457	103.55	63.62	3.39	12.24	7.52	0.40
Vermont	4534	936	10.52	6.46	0.34	11.24	6.90	0.36
Virginia	45169	8292	104.42	64.16	3.42	12.59	7.74	0.41
Washington	78970	15711	186.99	114.89	6.12	11.90	7.31	0.39
West Virginia	20036	2675	24.25	14.9	0.79	9.07	5.57	0.30
Wisconsin	68885	13967	139.48	85.7	4.56	9.99	6.14	0.33
Wyoming	6246	1443	19.02	11.69	0.62	13.18	8.10	0.43
U.S. Territories	7660	988	16.62	10.21	0.55	16.82	10.33	0.56
Canada	89388	10423	106.21	65.26	3.47	10.19	6.26	0.33
Mexico	223414	3414	54.77	33.65	1.76	16.04	9.86	0.52
Non-North America	1320	22	0.62	0.38	0.02	28.18	17.27	0.91
N/A	761	85	1.14	0.7	0.04	13.41	8.24	0.47
Total	**3,601,941**	**580,939**	**6,467.68**	**3,973.75**	**211.53**	**11.13**	**6.84**	**0.36**

3.3   CONCLUSION

The Roadside Inspection and Traffic Enforcement programs are two of FMCSA's most powerful safety tools. In 2011, these programs saved 484 lives and prevented 9,080 injuries by averting 14,779 crashes; over the past 10 years, it is estimated that these programs have saved more than 6,000 lives.

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

Table 13. 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 (percent)	Total Number of Violations (FY 2011)
Unsafe	Careless Driving	0.000141	30	0.004224	100	71,448
Unsafe	Reckless Driving	0.000028	30	0.000834	100	1,096
Unsafe	Speeding related	0.000078	30	0.002341	100	153,858
Unsafe	Hazardous Materials (HM)-related	0.000001	30	0.000029	100	1,316
Unsafe	Other Driver Violations	0.000401	30	0.012038	100	84,323
Unsafe	392.2 Driver	0.000524	30	0.015718	100	166,652
Fatigue	Hours	0.000104	30	0.003120	100	126,654
Fatigue	False Log	0.000212	30	0.006360	100	40,826
Fatigue	Incomplete/Wrong Log	0.000123	30	0.003690	100	200,271
Fatigue	Jumping Out of Service (OOS)/Driving Fatigued	0.005741	30	0.172230	100	1,579
Fatigue	EOBR related	0.000123	30	0.003690	100	2,245
Fitness	Driver Qualification	0.000209	45	0.009405	71	107,597
Fitness	Endorsements & Vehicle Group	0.000178	45	0.008010	85	38,214
Fitness	Medical Certificate	0.000148	45	0.006660	64	161,937
Fitness	Physical	0.000092	45	0.004140	93	5,924
Fitness	Multiple License	0.000259	45	0.011655	93	173
Fitness	Fitness Jumping OOS	0.001463	45	0.065835	100	10
D&A	Alcohol	0.000871	90	0.078390	100	2,812
D&A	Drugs	0.000994	90	0.089460	100	1,230
D&A	Alcohol Jumping OOS	0.000563	90	0.050670	100	164
Vehicle	Brakes Out of Adjustment	0.000128	37	0.004736	70	226,552
Vehicle	Brakes, All Others	0.000077	37	0.002849	79	929,919
Vehicle	Coupling Devices	0.000249	7	0.001743	93	15,075
Vehicle	Exhaust Discharge	0.000058	37	0.002146	82	66,298
Vehicle	Fuel Systems	0.000126	37	0.004662	92	20,495
Vehicle	Lighting	0.000093	7	0.000651	61	779,997
Vehicle	Steering Mechanism	0.000077	37	0.002849	82	64,013
Vehicle	Suspension	0.000125	37	0.004625	89	88,753
Vehicle	Tires	0.000136	7	0.000952	67	458,561
Vehicle	Wheels, Studs, Clamps, Etc.	0.000099	7	0.000693	71	301,676

BASIC	Violation Group	Crash Risk (per Day Trip)	Duration (Days)	Crash Risk Reduction (Crash Risk x Duration)	Correction Rate (percent)	Total Number of Violations (FY 2011)
Vehicle	Windshield/Glass/ Makings	0.000100	7	0.000700	73	196,122
Vehicle	Cab, Body, Frame	0.000155	7	0.001085	91	79,181
Vehicle	Inspection Reports	0.000155	37	0.005735	70	205,290
Vehicle	Vehicle Jumping OOS	0.000238	37	0.008806	95	762
Vehicle	Other Vehicle Defect	0.000135	37	0.004995	65	285,969
Vehicle	Emergency Equipment	0.000095	37	0.003515	74	274,657
Vehicle	Tire versus Load	0.000100	37	0.003700	93	27,826
Vehicle	Clearance Identification Lamps/Other	0.000082	7	0.000574	57	470,622
Vehicle	392.2 Vehicle	0.000106	37	0.003922	100	237,257
Cargo	Load Securement	0.000168	30	0.005040	100	151,048
Cargo	Other Cargo	0.000158	30	0.004740	100	264,360
Cargo	Fire Hazard	0.000080	30	0.002400	100	204
Cargo	Markings	0.000056	30	0.001680	100	22,906
Cargo	Cargo Protection	0.000153	30	0.004590	100	1,347
Cargo	Documentation	0.000067	30	0.002010	100	25,852
Cargo	HM Route	0.000149	30	0.004470	100	104
Cargo	Fraudulent Behavior	0.000000	30	0.000000	100	211
Cargo	Package Integrity	0.000083	30	0.002490	100	1,522
Cargo	HM Other	0.000074	30	0.002220	100	1,577
Cargo	Package Testing	0.000086	30	0.002580	100	1,586