

FMCSA Safety Program Effectiveness Measurement: Roadside Intervention Effectiveness Model, Fiscal Year 2012



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 enforcements in terms of the number of crashes prevented, 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.

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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. This model provides FMCSA management with information 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 Roadside Intervention Effectiveness Model for fiscal year 2012.			
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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.)

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ABBREVIATIONS AND ACRONYMS

Acronym	Definition
BASIC	Behavioral Analysis and Safety Improvement Category
CMV	commercial motor vehicle
CSA	Compliance, Safety, Accountability
CY	calendar year
FMCSA	Federal Motor Carrier Safety Administration
FY	fiscal year
MCMIS	Motor Carrier Management Information System
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. The Roadside Inspection Program consists of roadside inspections performed by qualified safety inspectors. These inspections follow the North American Standard guidelines, 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 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 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 prevented 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 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 prevented 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 violations corrected over all inspections, the model estimates the number of crashes prevented 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 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 2012 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 2012 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 2012) and the 2 years prior (FY 2010 and FY 2011). Overall program activity was slightly lower in FY 2012 than in 2011. The number of interventions performed decreased by about 0.6 percent from FY 2011, roadside inspections rose by 50,815 (1.7 percent), and traffic enforcements decreased by 70,856 (12.2 percent).

Table 1. Program activity from FY 2010 to FY 2012.

Interventions*	FY 2010	FY 2011	FY 2012
Roadside Inspections	2,849,350	3,021,002	3,071,817
Traffic Enforcements	710,983	580,939	510,083
Total	3,560,333	3,601,941	3,581,900

* The June 2013 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 8,721 crashes in FY 2012, while the Traffic Enforcement Program prevented 5,703, for a total of 14,424 crashes prevented. The number of crashes prevented decreased from FY 2011 to FY 2012. The proportion of inspections resulting in no violations also increased (from 37 percent to 39 percent).

Table 2. Program effectiveness from FY 2010 to FY 2012 using the RIEM Version 3.0.

Intervention Benefits	FY 2010	FY 2011*	FY 2012*
Crashes prevented due to roadside inspections	8,154	8,311	8,721
Crashes prevented due to traffic enforcements	8,330	6,468	5,703
Total Crashes Prevented	16,484	14,779	14, 424
Injuries prevented due to roadside inspections	5,129	5,106	5,341
Injuries prevented due to traffic enforcements	5,240	3,974	3,492
Total Injuries Prevented	10,369	9,080	8,833
Lives saved due to roadside inspections	258	272	285
Lives saved due to traffic enforcements	263	212	187
Total Lives Saved	521	484	472

* The FY 2011 and FY 2012 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 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 2012, these programs are estimated to have saved 472 lives and prevented 8,833 injuries by averting more than 14,424 crashes. Over the past 11 years, it is estimated that these two programs have saved more than 7,000 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 North American Standard guidelines, 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 prevented, 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—that 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 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 and then corrected as a 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 prevented 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 violations corrected over all inspections, the model estimates the number of crashes prevented as a result of the Roadside Inspection and Traffic Enforcement programs.

Intervention data is 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. The improved methodology uses applicable results from related FMCSA research, including the

Violation Severity Assessment Study,¹ 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.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 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 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 of study. Future model runs will be enhanced to reflect the updated BASIC definition for Hazardous Materials.

¹ <http://www.regulations.gov/#!documentDetail;D=FMCSA-2004-18898-0210>.

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>.

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 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 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 2012 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 2012 (October 1, 2011, to September 30, 2012). 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 2012) and the two years prior (FY 2010–FY 2011). Overall program activity was lower in FY 2012 than in FY 2011, with the number of interventions performed decreasing by about 0.6 percent. While roadside inspections rose by 50,815 (1.7 percent), traffic enforcements decreased by 70,856 (12.2 percent).

Table 3. Program activity from FY 2010 to FY 2012.

Interventions	FY 2010	FY 2011	FY 2012
Roadside Inspections	2,849,350	3,021,002	3,071,817
Traffic Enforcements	710,983	580,939	510,083
Total	3,560,333	3,601,941	3,581,900

Table 4 presents the estimated benefits of the two programs over the past 3 years. The Roadside Inspection Program prevented 8,721 crashes in FY 2012, while the Traffic Enforcement Program prevented 5,703, for a total of 14,424 crashes prevented. The proportion of inspections resulting in no violations increased from 37 percent in 2011 to 39 percent in 2012. Because more roadside inspections found no violations, the average number of violations per inspection decreased from 1.91 in 2010 to 1.77 in 2011 and further to 1.65 in 2012.

Table 4. Program effectiveness from FY 2010 to FY 2012 using the RIEM Version 3.0.

Intervention Benefits	FY 2010	FY 2011*	FY 2012*
Crashes prevented due to roadside inspections	8,154	8,311	8,721
Crashes prevented due to traffic enforcements	8,330	6,468	5,703
Total Crashes Prevented	16,484	14,779	14,424
Injuries prevented due to roadside inspections	5,129	5,106	5,341
Injuries prevented due to traffic enforcements	5,240	3,974	3,492
Total Injuries Prevented	10,369	9,080	8,833
Lives saved due to roadside inspections	258	272	285
Lives saved due to traffic enforcements	263	212	187
Total Lives Saved	521	484	472

* The FY 2011 and FY 2012 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 prevented and lives saved from FY 2007 to FY 2012. 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, and FY 2012 estimates for analytical purposes.³ In FY 2012, the number of crashes prevented and lives saved decreased from previous years. The decrease in crashes prevented and lives saved is largely driven by the more than 12 percent decrease in traffic enforcement inspections in FY 2012 (see Table 1). In contrast, roadside inspections continued a gradual year-over-year rise. Complete model results from FY 2007 to FY 2012 are available in Table 5, and historical results from CY 2001 are presented in Table 6.

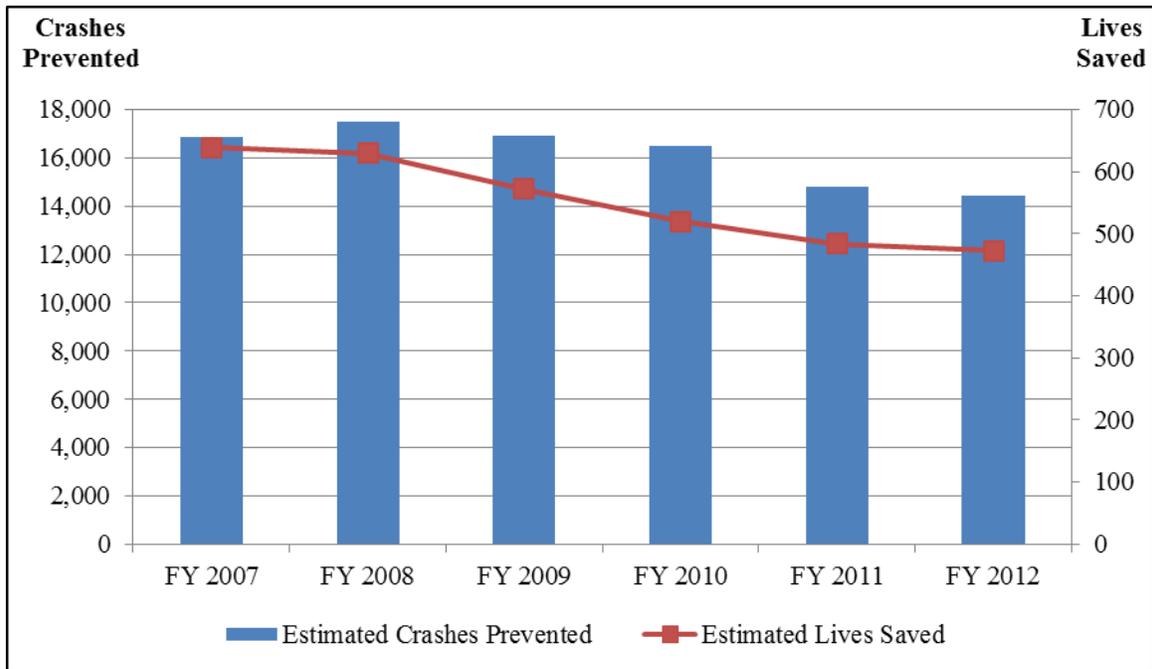


Figure 1. Bar graph. Trends in crashes prevented and lives saved.

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>.

Table 5. RIEM Version 3.0 estimated program benefits, FY 2007–12.

Intervention Results	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011*	FY 2012*
Number of Roadside Inspections	2,616,868	2,723,576	2,788,728	2,849,350	3,021,002	3,071,817
Number of Traffic Enforcements	752,649	756,169	730,916	710,983	580,939	510,083
Total Number of Interventions	3,369,517	3,479,745	3,519,644	3,560,333	3,601,941	3,581,900
Crashes Prevented Due to Roadside Inspections	8,101	8,464	8,149	8,154	8,311	8,721
Crashes Prevented Due to Traffic Enforcement	8,769	9,053	8,789	8,330	6,468	5,703
Total Crashes Prevented	16,870	17,517	16,938	16,484	14,779	14,424
Injuries Prevented Due to Roadside Inspections	5,222	5,381	5,206	5,129	5,106	5,341
Injuries Prevented Due to Traffic Enforcement	5,652	5,755	5,615	5,240	3,974	3,492
Total Injuries Prevented	10,874	11,136	10,821	10,369	9,080	8,833
Lives Saved Due to Roadside Inspections	307	304	276	258	272	285
Lives Saved Due to Traffic Enforcement	332	325	297	263	212	187
Total Lives Saved	639	629	573	521	484	472

* The FY 2011 and FY 2012 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 2012.

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*
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	3,071,817
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	510,083
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
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	8,721
Crashes prevented 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	5,703
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	14,424
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	5,341
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	3,492
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	8,833
Lives saved due to roadside inspections	331	346	317	284	282	287	307	304	276	258	272	285
Lives saved due to traffic enforcements	361	389	364	327	342	357	332	325	297	263	212	187
Total Lives Saved	691	735	681	611	624	644	639	629	573	521	484	472

* The FY 2011 and FY 2012 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 2012.

Table 7. FY 2012 program exposure of U.S.-domiciled versus non-U.S.-domiciled carriers.

Interventions	U.S.-Domiciled	Non-U.S.-Domiciled
Roadside Inspections	2,770,309	301,508
Traffic Enforcements	497,619	12,464
Total Interventions	3,267,928	313,972

Table 8 compares the effectiveness of interventions conducted in FY 2012 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. 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 almost half of that of non-U.S. carriers (2.62 compared to 4.83), while the rate of crashes prevented per traffic enforcement is similar for U.S.-domiciled and non-U.S.-domiciled carriers (11.19 and 10.84, respectively). The injuries and fatalities prevented per intervention in U.S. versus non-U.S. carriers exhibit a similar relationship.

Table 8. FY 2012 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	7,265	1,456	2.62	4.83
Crashes prevented due to traffic enforcements	5,568	135	11.19	10.84
Total Crashes Prevented*	12,833	1,591	3.93	5.07
Injuries prevented due to roadside inspections	4,449	892	1.61	2.96
Injuries prevented due to traffic enforcements	3,410	83	6.85	6.64
Total Injuries Prevented*	7,859	974	2.40	3.10
Lives saved due to roadside inspections	238	48	0.09	0.16
Lives saved due to traffic enforcements	182	4	0.37	0.35
Total Lives Saved*	420	52	0.13	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, 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 interventions (per 1,000 roadside inspections in Table 9; per 1,000 traffic enforcements in Table 10). This analysis 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 the rates of crashes prevented per 1,000 roadside inspections are very different. In Wisconsin, the rate of crashes prevented—5.99—is higher than the national average of 2.84, and in Nevada the rate is lower, at 1.73. Roadside inspections and traffic enforcements performed by Federal staff are highly effective, with 6.35 crashes prevented per 1,000 roadside inspections (compared to the national average of 2.84) and 19.65 crashes prevented per 1,000 traffic enforcements (compared to the national average of 11.17).

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

Table 9. Roadside Inspection Program estimated benefits by reporting State, FY 2012.

Reporting State	Total 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	46266	40740	102.51	62.77	3.35	2.52	1.54	0.08
Alaska	7580	7058	15.87	9.72	0.52	2.25	1.38	0.07
Arizona	73868	58559	221.72	135.77	7.26	3.79	2.32	0.12
Arkansas	38527	31657	103.49	63.37	3.39	3.27	2.00	0.11
California	565833	490670	559.11	342.38	18.29	1.14	0.70	0.04
Colorado	31246	25223	72.01	44.10	2.36	2.85	1.75	0.09
Connecticut	21654	14157	70.97	43.46	2.32	5.01	3.07	0.16
Delaware	6724	4654	9.09	5.57	0.30	1.95	1.20	0.06
District of Columbia	4424	3444	4.59	2.81	0.15	1.33	0.82	0.04
Florida	105435	92758	214.85	131.57	7.03	2.32	1.42	0.08
Georgia	86385	78609	264.68	162.08	8.66	3.37	2.06	0.11
Hawaii	4286	3868	3.83	2.35	0.13	0.99	0.61	0.03
Idaho	10622	6700	37.48	22.95	1.23	5.59	3.43	0.18
Illinois	56564	41026	108.54	66.47	3.55	2.65	1.62	0.09
Indiana	83169	52441	171.31	104.90	5.61	3.27	2.00	0.11
Iowa	58079	47308	197.91	121.19	6.48	4.18	2.56	0.14
Kansas	56863	50761	116.36	71.25	3.81	2.29	1.40	0.08
Kentucky	106253	93066	148.21	90.76	4.85	1.59	0.98	0.05
Louisiana	53609	47920	301.52	184.64	9.87	6.29	3.85	0.21
Maine	16697	15382	44.08	26.99	1.44	2.87	1.75	0.09
Maryland	114235	97831	214.81	131.54	7.03	2.20	1.34	0.07
Massachusetts	21083	10133	32.53	19.92	1.06	3.21	1.97	0.10
Michigan	60934	41039	164.07	100.47	5.37	4.00	2.45	0.13
Minnesota	41760	34953	173.07	105.98	5.66	4.95	3.03	0.16
Mississippi	67850	66650	76.09	46.59	2.49	1.14	0.70	0.04
Missouri	103026	77133	173.84	106.45	5.69	2.25	1.38	0.07

Reporting State	Total 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	36634	33976	75.45	46.20	2.47	2.22	1.36	0.07
Nebraska	28792	23103	66.01	40.42	2.16	2.86	1.75	0.09
Nevada	33963	27521	47.60	29.15	1.56	1.73	1.06	0.06
New Hampshire	11858	9670	28.73	17.59	0.94	2.97	1.82	0.10
New Jersey	38371	30951	76.29	46.72	2.50	2.46	1.51	0.08
New Mexico	83010	63451	86.65	53.06	2.84	1.37	0.84	0.04
New York	109217	96340	230.19	140.96	7.53	2.39	1.46	0.08
North Carolina	93696	85849	170.90	104.65	5.59	1.99	1.22	0.07
North Dakota	13265	11327	22.52	13.79	0.74	1.99	1.22	0.07
Ohio	78732	65221	161.58	98.95	5.29	2.48	1.52	0.08
Oklahoma	26498	17697	54.68	33.48	1.79	3.09	1.89	0.10
Oregon	50518	46160	114.76	70.27	3.76	2.49	1.52	0.08
Pennsylvania	123844	103299	226.30	138.58	7.40	2.19	1.34	0.07
Rhode Island	2692	1811	7.33	4.49	0.24	4.05	2.48	0.13
South Carolina	51092	41824	151.84	92.98	4.97	3.63	2.22	0.12
South Dakota	28465	25353	56.81	34.79	1.86	2.24	1.37	0.07
Tennessee	77252	67496	139.25	85.27	4.56	2.06	1.26	0.07
Texas	441673	425973	1872.59	1146.71	61.27	4.40	2.69	0.14
Utah	34430	29539	81.27	49.77	2.66	2.75	1.68	0.09
Vermont	6670	5135	17.52	10.73	0.57	3.41	2.09	0.11
Virginia	36699	31306	96.08	58.84	3.14	3.07	1.88	0.10
Washington	101807	82009	182.98	112.05	5.99	2.23	1.37	0.07
West Virginia	29774	25044	41.20	25.23	1.35	1.65	1.01	0.05
Wisconsin	32852	27409	164.11	100.49	5.37	5.99	3.67	0.20
Wyoming	19446	15705	52.92	32.41	1.73	3.37	2.06	0.11
U.S. Territories	7774	6772	15.70	9.62	0.51	2.32	1.42	0.08
Federal	139904	138136	877.58	537.40	28.72	6.35	3.89	0.21
Total	3,581,900	3,071,817	8,721.38	5,340.65	285.41	2.84	1.74	0.09

Table 10. Traffic Enforcement Program estimated benefits by reporting State, FY 2012.

Reporting State	Total Interventions Initiated	Number Traffic Enforcements	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	46266	5526	57.88	35.44	1.89	10.47	6.41	0.34
Alaska	7580	522	8.39	5.14	0.27	16.07	9.85	0.52
Arizona	73868	15309	204.08	124.97	6.68	13.33	8.16	0.44
Arkansas	38527	6870	78.56	48.11	2.57	11.44	7.00	0.37
California	565833	75163	566.38	346.83	18.53	7.54	4.61	0.25
Colorado	31246	6023	57.75	35.36	1.89	9.59	5.87	0.31
Connecticut	21654	7497	112.56	68.93	3.68	15.01	9.19	0.49
Delaware	6724	2070	15.55	9.52	0.51	7.51	4.60	0.25
District of Columbia	4424	980	12.34	7.56	0.40	12.59	7.71	0.41
Florida	105435	12677	158.09	96.81	5.17	12.47	7.64	0.41
Georgia	86385	7776	92.00	56.34	3.01	11.83	7.25	0.39
Hawaii	4286	418	3.57	2.19	0.12	8.54	5.24	0.29
Idaho	10622	3922	40.79	24.98	1.33	10.40	6.37	0.34
Illinois	56564	15538	163.66	100.22	5.36	10.53	6.45	0.34
Indiana	83169	30728	254.74	155.99	8.34	8.29	5.08	0.27
Iowa	58079	10771	108.53	66.46	3.55	10.08	6.17	0.33
Kansas	56863	6102	84.83	51.95	2.78	13.90	8.51	0.46
Kentucky	106253	13187	193.40	118.43	6.33	14.67	8.98	0.48
Louisiana	53609	5689	48.80	29.88	1.60	8.58	5.25	0.28
Maine	16697	1315	18.36	11.24	0.60	13.96	8.55	0.46
Maryland	114235	16404	212.50	130.13	6.95	12.95	7.93	0.42
Massachusetts	21083	10950	147.13	90.10	4.81	13.44	8.23	0.44
Michigan	60934	19895	214.53	131.37	7.02	10.78	6.60	0.35
Minnesota	41760	6807	92.71	56.77	3.03	13.62	8.34	0.45
Mississippi	67850	1200	13.87	8.49	0.45	11.56	7.08	0.38
Missouri	103026	25893	433.70	265.58	14.19	16.75	10.26	0.55

Reporting State	Total Interventions Initiated	Number Traffic Enforcements	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	36634	2658	30.56	18.71	1.00	11.50	7.04	0.38
Nebraska	28792	5689	51.65	31.63	1.69	9.08	5.56	0.30
Nevada	33963	6442	72.87	44.62	2.38	11.31	6.93	0.37
New Hampshire	11858	2188	29.92	18.32	0.98	13.67	8.37	0.45
New Jersey	38371	7420	90.11	55.18	2.95	12.14	7.44	0.40
New Mexico	83010	19559	207.61	127.13	6.79	10.61	6.50	0.35
New York	109217	12877	156.90	96.08	5.13	12.18	7.46	0.40
North Carolina	93696	7847	119.45	73.15	3.91	15.22	9.32	0.50
North Dakota	13265	1938	23.23	14.23	0.76	11.99	7.34	0.39
Ohio	78732	13511	111.75	68.43	3.66	8.27	5.06	0.27
Oklahoma	26498	8801	82.58	50.57	2.70	9.38	5.75	0.31
Oregon	50518	4358	49.85	30.53	1.63	11.44	7.01	0.37
Pennsylvania	123844	20545	253.63	155.31	8.30	12.35	7.56	0.40
Rhode Island	2692	881	17.56	10.75	0.57	19.93	12.20	0.65
South Carolina	51092	9268	126.23	77.30	4.13	13.62	8.34	0.45
South Dakota	28465	3112	46.36	28.39	1.52	14.90	9.12	0.49
Tennessee	77252	9756	100.34	61.44	3.28	10.28	6.30	0.34
Texas	441673	15700	139.39	85.36	4.56	8.88	5.44	0.29
Utah	34430	4891	70.52	43.18	2.31	14.42	8.83	0.47
Vermont	6670	1535	15.50	9.49	0.51	10.10	6.18	0.33
Virginia	36699	5393	67.78	41.51	2.22	12.57	7.70	0.41
Washington	101807	19798	245.10	150.09	8.02	12.38	7.58	0.41
West Virginia	29774	4730	33.10	20.27	1.08	7.00	4.29	0.23
Wisconsin	32852	5443	63.37	38.81	2.07	11.64	7.13	0.38
Wyoming	19446	3741	49.90	30.56	1.63	13.34	8.17	0.44
U.S. Territories	7774	1002	18.28	11.20	0.60	18.24	11.18	0.60
Federal	139904	1768	34.74	21.27	1.14	19.65	12.03	0.64
Total	3,574,126	509,081	5,684.70	3,481.10	185.98	11.17	6.84	0.37

3.2.3 Estimates by Carrier State of Domicile

Table 11 and Table 12 provide detailed roadside inspections and traffic enforcement results, respectively, organized by carrier domicile State 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. The estimated benefits 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 highest numbers of carriers receiving roadside inspections were Texas (366,489) and California (516,339). The estimated benefits per 1,000 inspections for each were dissimilar. The estimated number of crashes prevented per 1,000 inspections 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.

Table 11 and Table 12 also provide more details of the effectiveness of roadside inspections and traffic enforcements on non-U.S.-domiciled carriers. While the average for U.S.-domiciled carriers was 11.19, carriers domiciled in Canada had 9.74 crashes prevented per 1,000 enforcements. Mexican and non-North American carriers did have noticeably higher rates of 14.64 and 20.00 crashes prevented per 1,000 enforcements, respectively. Table 11, on the other hand, shows some interesting differences in the results of roadside inspections on carriers domiciled in various non-U.S. countries. Mexico had 5.95 crashes prevented per 1,000 inspections, and other non-North America countries averaged 5.88 crashes prevented per 1,000 inspections, a rate higher than the U.S.-domiciled average of 2.62 crashes prevented per 1,000 inspections. Canada, on the other hand, had a much lower average number of crashes prevented per 1,000 inspections, at 1.62.

Table 11. Roadside Inspection Program estimated benefits by domicile State and country, FY 2012.

Carrier State	Total Interventions Initiated	Number 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	58624	51339	135.08	82.72	4.42	2.63	1.61	0.09
Alaska	6023	5510	14.28	8.74	0.47	2.59	1.59	0.09
Arizona	76248	64683	151.68	92.88	4.96	2.34	1.44	0.08
Arkansas	54836	46153	106.36	65.13	3.48	2.30	1.41	0.08
California	516339	437631	637.85	390.60	20.87	1.46	0.89	0.05
Colorado	37539	31350	91.89	56.27	3.01	2.93	1.79	0.10
Connecticut	13362	9429	33.36	20.43	1.09	3.54	2.17	0.12
Delaware	6294	5137	13.21	8.09	0.43	2.57	1.57	0.08
District of Columbia	1719	1418	2.89	1.77	0.09	2.04	1.25	0.06
Florida	155823	134994	377.00	230.86	12.34	2.79	1.71	0.09
Georgia	101644	88532	267.77	163.97	8.76	3.02	1.85	0.10
Hawaii	3870	3492	3.56	2.18	0.12	1.02	0.62	0.03
Idaho	17303	14454	42.55	26.06	1.39	2.94	1.80	0.10
Illinois	136477	110342	287.71	176.18	9.41	2.61	1.60	0.09
Indiana	76825	62133	146.09	89.46	4.78	2.35	1.44	0.08
Iowa	61504	49481	136.74	83.73	4.47	2.76	1.69	0.09
Kansas	37051	30343	85.99	52.66	2.81	2.83	1.74	0.09
Kentucky	59683	51070	109.83	67.26	3.59	2.15	1.32	0.07
Louisiana	41694	38107	195.01	119.42	6.38	5.12	3.13	0.17
Maine	10859	9310	28.46	17.43	0.93	3.06	1.87	0.10
Maryland	57606	49120	113.69	69.62	3.72	2.31	1.42	0.08
Massachusetts	30574	21285	57.72	35.35	1.89	2.71	1.66	0.09
Michigan	80643	63300	192.08	117.62	6.29	3.03	1.86	0.10
Minnesota	66803	55369	192.95	118.16	6.31	3.48	2.13	0.11
Mississippi	35279	31486	85.74	52.50	2.81	2.72	1.67	0.09
Missouri	76473	61260	134.91	82.61	4.41	2.20	1.35	0.07

Carrier State	Total Interventions Initiated	Number 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	14447	12606	33.77	20.68	1.11	2.68	1.64	0.09
Nebraska	43950	35808	89.40	54.75	2.93	2.50	1.53	0.08
Nevada	14413	12193	30.42	18.63	1.00	2.49	1.53	0.08
New Hampshire	8801	6800	21.14	12.95	0.69	3.11	1.90	0.10
New Jersey	67552	55661	149.48	91.54	4.89	2.69	1.64	0.09
New Mexico	15175	11873	31.97	19.58	1.05	2.69	1.65	0.09
New York	74695	61715	186.34	114.11	6.10	3.02	1.85	0.10
North Carolina	90238	79476	189.25	115.89	6.19	2.38	1.46	0.08
North Dakota	11919	9939	28.95	17.73	0.95	2.91	1.78	0.10
Ohio	101584	85933	184.18	112.79	6.03	2.14	1.31	0.07
Oklahoma	42533	34283	108.48	66.43	3.55	3.16	1.94	0.10
Oregon	40632	35535	76.16	46.64	2.49	2.14	1.31	0.07
Pennsylvania	136630	115052	231.48	141.75	7.57	2.01	1.23	0.07
Rhode Island	4408	3152	11.41	6.99	0.37	3.62	2.22	0.12
South Carolina	41427	34976	121.71	74.53	3.98	3.48	2.13	0.11
South Dakota	11368	9236	27.88	17.07	0.91	3.02	1.85	0.10
Tennessee	90034	76553	156.19	95.65	5.11	2.04	1.25	0.07
Texas	366489	338137	1,363.69	835.07	44.62	4.03	2.47	0.13
Utah	43593	36102	89.62	54.88	2.93	2.48	1.52	0.08
Vermont	4804	3868	12.22	7.48	0.40	3.16	1.93	0.10
Virginia	45391	38278	94.53	57.89	3.09	2.47	1.51	0.08
Washington	74682	61201	144.09	88.24	4.71	2.35	1.44	0.08
West Virginia	19799	17371	33.15	20.30	1.08	1.91	1.17	0.06
Wisconsin	68155	56080	169.60	103.86	5.55	3.02	1.85	0.10
Wyoming	6361	4999	20.24	12.39	0.66	4.05	2.48	0.13
U.S. Territories	7753	6754	15.61	9.56	0.51	2.31	1.42	0.08
Canada	87876	78175	126.61	77.53	4.15	1.62	0.99	0.05
Mexico	224447	221782	1320.43	808.6	43.19	5.95	3.65	0.19

Carrier State	Total Interventions Initiated	Number 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
Non-North American	1015	990	5.82	3.56	0.19	5.88	3.60	0.19
N/A	634	561	3.21	1.97	0.1	5.72	3.51	0.18
Total	3,581,900	3,071,817	8,721.43	5,340.74	285.33	2.84	1.74	0.09

Table 12. Traffic Enforcement Program estimated benefits by domicile State and country, FY 2012.

Carrier State	Total Interventions Initiated	Number Traffic Enforcements	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	58624	7285	79.86	48.9	2.61	10.96	6.71	0.36
Alaska	6023	513	8.39	5.14	0.27	16.35	10.02	0.53
Arizona	76248	11565	133.78	81.92	4.38	11.57	7.08	0.38
Arkansas	54836	8683	94.96	58.15	3.11	10.94	6.70	0.36
California	516339	78708	682.87	418.16	22.34	8.68	5.31	0.28
Colorado	37539	6189	70.46	43.15	2.31	11.38	6.97	0.37
Connecticut	13362	3933	54.44	33.34	1.78	13.84	8.48	0.45
Delaware	6294	1157	14.99	9.18	0.49	12.96	7.93	0.42
District of Columbia	1719	301	3.8	2.33	0.12	12.62	7.74	0.40
Florida	155823	20829	255.7	156.58	8.37	12.28	7.52	0.40
Georgia	101644	13112	150.99	92.46	4.94	11.52	7.05	0.38
Hawaii	3870	378	3.42	2.09	0.11	9.05	5.53	0.29
Idaho	17303	2849	34.99	21.43	1.14	12.28	7.52	0.40
Illinois	136477	26135	299.26	183.26	9.79	11.45	7.01	0.37
Indiana	76825	14692	152.2	93.2	4.98	10.36	6.34	0.34
Iowa	61504	12023	120.32	73.68	3.94	10.01	6.13	0.33
Kansas	37051	6708	81.18	49.71	2.66	12.10	7.41	0.40
Kentucky	59683	8613	111.46	68.25	3.65	12.94	7.92	0.42
Louisiana	41694	3587	40.94	25.07	1.34	11.41	6.99	0.37
Maine	10859	1549	18.43	11.29	0.6	11.90	7.29	0.39
Maryland	57606	8486	108.99	66.74	3.57	12.84	7.86	0.42
Massachusetts	30574	9289	141.5	86.65	4.63	15.23	9.33	0.50
Michigan	80643	17343	193.44	118.46	6.33	11.15	6.83	0.36
Minnesota	66803	11434	134.46	82.34	4.4	11.76	7.20	0.38
Mississippi	35279	3793	41.5	25.41	1.36	10.94	6.70	0.36
Missouri	76473	15213	199.17	121.96	6.52	13.09	8.02	0.43
Montana	14447	1841	21.98	13.46	0.72	11.94	7.31	0.39
Nebraska	43950	8142	78.42	48.02	2.57	9.63	5.90	0.32

Carrier State	Total Interventions Initiated	Number Traffic Enforcements	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
Nevada	14413	2220	25.9	15.86	0.85	11.67	7.14	0.38
New Hampshire	8801	2001	27.46	16.82	0.9	13.72	8.41	0.45
New Jersey	67552	11891	145.93	89.36	4.78	12.27	7.51	0.40
New Mexico	15175	3302	36.92	22.61	1.21	11.18	6.85	0.37
New York	74695	12980	157.68	96.56	5.16	12.15	7.44	0.40
North Carolina	90238	10762	139.71	85.55	4.57	12.98	7.95	0.42
North Dakota	11919	1980	22.97	14.07	0.75	11.60	7.11	0.38
Ohio	101584	15651	157.23	96.28	5.14	10.05	6.15	0.33
Oklahoma	42533	8250	91.28	55.9	2.99	11.06	6.78	0.36
Oregon	40632	5097	57.55	35.24	1.88	11.29	6.91	0.37
Pennsylvania	136630	21578	243.81	149.3	7.98	11.30	6.92	0.37
Rhode Island	4408	1256	20.62	12.63	0.67	16.42	10.06	0.53
South Carolina	41427	6451	89.48	54.79	2.93	13.87	8.49	0.45
South Dakota	11368	2132	25.31	15.5	0.83	11.87	7.27	0.39
Tennessee	90034	13481	151.11	92.53	4.94	11.21	6.86	0.37
Texas	366489	28352	302.18	185.04	9.89	10.66	6.53	0.35
Utah	43593	7491	93.19	57.07	3.05	12.44	7.62	0.41
Vermont	4804	936	10.5	6.43	0.34	11.22	6.87	0.36
Virginia	45391	7113	85.26	52.21	2.79	11.99	7.34	0.39
Washington	74682	13481	165.15	101.13	5.4	12.25	7.50	0.40
West Virginia	19799	2428	22.32	13.67	0.73	9.19	5.63	0.30
Wisconsin	68155	12075	127.94	78.35	4.19	10.60	6.49	0.35
Wyoming	6361	1362	18.33	11.22	0.6	13.46	8.24	0.44
U.S. Territories	7753	999	18.19	11.14	0.59	18.21	11.15	0.59
Canada	87876	9701	94.51	57.89	3.09	9.74	5.97	0.32
Mexico	224447	2665	39.01	23.91	1.25	14.64	8.97	0.47
Non-North American	1015	25	0.5	0.3	0.01	20.00	12.00	0.40
N/A	634	73	1.04	0.64	0.03	14.25	8.77	0.41
Total	3,581,900	510,083	5,702.98	3,492.33	186.57	11.18	6.85	0.37

3.3 CONCLUSION

The Roadside Inspection and Traffic Enforcement programs are two of FMCSA's most powerful safety tools. In 2012, these programs are estimated to have saved 472 lives and prevented 8,833 injuries by averting 14,424 crashes. Since 2001, it is estimated that the two programs have saved more than 7,000 lives.

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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 (%)	Total # of Violations (FY 2012)
Unsafe	Careless Driving	0.000141	30	0.004224	100	66,077
Unsafe	Reckless Driving	0.000028	30	0.000834	100	16,797
Unsafe	Speeding related	0.000078	30	0.002341	100	139,904
Unsafe	HM related	0.000001	30	0.000029	100	838
Unsafe	Other Driver Violations	0.000401	30	0.012038	100	74,461
Unsafe	392.2 Driver	0.000524	30	0.015718	100	178,173
Fatigue	Hours	0.000104	30	0.003120	100	105,107
Fatigue	False Log	0.000212	30	0.006360	100	38,569
Fatigue	Incomplete/Wrong Log	0.000123	30	0.003690	100	179,587
Fatigue	Jumping OOS/Driving Fatigued	0.005741	30	0.172230	100	1,614
Fatigue	EOBR related	0.000123	30	0.003690	100	3,595
Fitness	Driver Qualification	0.000209	45	0.009405	71	101,937
Fitness	Endorsements & Vehicle Group	0.000178	45	0.008010	85	37,289
Fitness	Medical Certificate	0.000148	45	0.006660	64	145,398
Fitness	Physical	0.000092	45	0.004140	93	6,384
Fitness	Multiple License	0.000259	45	0.011655	93	130
Fitness	Fitness Jumping OOS	0.001463	45	0.065835	100	18
D&A	Alcohol	0.000871	90	0.078390	100	2,743
D&A	Drugs	0.000994	90	0.089460	100	1,249
D&A	Alcohol Jumping OOS	0.000563	90	0.050670	100	156
Vehicle	Brakes Out of Adjustment	0.000128	37	0.004736	70	220,778
Vehicle	Brakes, All Others	0.000077	37	0.002849	79	877,470
Vehicle	Coupling Devices	0.000249	7	0.001743	93	14,112
Vehicle	Exhaust Discharge	0.000058	37	0.002146	82	63,773

BASIC	Violation Group	Crash Risk (per day trip)	Duration (days)	Crash Risk Reduction (Crash Risk x Duration)	Correction Rate (%)	Total # of Violations (FY 2012)
Vehicle	Fuel Systems	0.000126	37	0.004662	92	17,678
Vehicle	Lighting	0.000093	7	0.000651	61	636,096
Vehicle	Steering Mechanism	0.000077	37	0.002849	82	62,272
Vehicle	Suspension	0.000125	37	0.004625	89	80,073
Vehicle	Tires	0.000136	7	0.000952	67	437,955
Vehicle	Wheels, Studs, Clamps, Etc.	0.000099	7	0.000693	71	272,142
Vehicle	Windshield/Glass/Makings	0.000100	7	0.000700	73	182,496
Vehicle	Cab, Body, Frame	0.000155	7	0.001085	91	80,215
Vehicle	Inspection Reports	0.000155	37	0.005735	70	197,325
Vehicle	Vehicle Jumping OOS	0.000238	37	0.008806	95	3,450
Vehicle	Other Vehicle Defect	0.000135	37	0.004995	65	249,503
Vehicle	Emergency Equipment	0.000095	37	0.003515	74	260,144
Vehicle	Tire vs. Load	0.000100	37	0.003700	93	28,313
Vehicle	Clearance Identification Lamps/Other	0.000082	7	0.000574	57	71,156
Vehicle	392.2 Vehicle	0.000106	37	0.003922	100	223,979
Cargo	Load Securement	0.000168	30	0.005040	100	139,494
Cargo	Other Cargo	0.000158	30	0.004740	100	255,312
Cargo	Fire Hazard	0.000080	30	0.002400	100	187
Cargo	Markings	0.000056	30	0.001680	100	406,546
Cargo	Cargo Protection	0.000153	30	0.004590	100	1,284
Cargo	Documentation	0.000067	30	0.002010	100	32,474
Cargo	HM Route	0.000149	30	0.004470	100	82
Cargo	Fraudulent Behavior	0.000000	30	0.000000	100	682
Cargo	Package Integrity	0.000083	30	0.002490	100	1,283
Cargo	HM Other	0.000074	30	0.002220	100	1,596
Cargo	Package Testing	0.000086	30	0.002580	100	1,623