

**FMCSA Safety Program  
Effectiveness Measurement:  
Roadside Intervention Effectiveness Model  
Fiscal Year 2010**



U.S. Department of Transportation  
**Federal Motor Carrier Safety Administration**

**November 2014**

## **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.

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# SI\* (MODERN METRIC) CONVERSION FACTORS

## APPROXIMATE CONVERSIONS TO SI UNITS

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

## APPROXIMATE CONVERSIONS FROM SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
<b>LENGTH</b>				
Mm	Millimeters	0.039	inches	in
M	Meters	3.28	feet	ft
M	Meters	1.09	yards	yd
Km	Kilometers	0.621	miles	mi
<b>AREA</b>				
mm <sup>2</sup>	square millimeters	0.0016	square inches	in <sup>2</sup>
m <sup>2</sup>	square meters	10.764	square feet	ft <sup>2</sup>
m <sup>2</sup>	square meters	1.195	square yards	yd <sup>2</sup>
Ha	Hectares	2.47	acres	ac
km <sup>2</sup>	square kilometers	0.386	square miles	mi <sup>2</sup>
<b>VOLUME</b>				
mL	Milliliters	0.034	fluid ounces	fl oz
L	Liters	0.264	gallons	gal
m <sup>3</sup>	cubic meters	35.314	cubic feet	ft <sup>3</sup>
m <sup>3</sup>	cubic meters	1.307	cubic yards	yd <sup>3</sup>
<b>MASS</b>				
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
<b>TEMPERATURE</b>				
°C	Celsius	$1.8c + 32$	Temperature is in exact degrees Fahrenheit	°F
<b>ILLUMINATION</b>				
Lx	Lux	0.0929	foot-candles	fc
cd/m <sup>2</sup>	candela/m <sup>2</sup>	0.2919	foot-Lamberts	fl
<b>Force &amp; Pressure Or Stress</b>				
N	Newtons	0.225	poundforce	lbf
kPa	Kilopascals	0.145	poundforce per square inch	lbf/in <sup>2</sup>

\* 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**

<b>Acronym</b>	<b>Definition</b>
CMV	commercial motor vehicle
CSA	Compliance, Safety, Accountability
CY	calendar year
FMCSA	Federal Motor Carrier Safety Administration
FY	fiscal year
HM	hazardous materials
HOS	hours of service
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 (GPRA), 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 Compliance Review Effectiveness Model (<http://ai.fmcsa.dot.gov/pe/CompliancePg.aspx>) 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 the elimination of specific crash probabilities associated with each violation 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.

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 group is recorded.
- The **correction rate** of violations in that violation group 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 violation group’s duration. 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 2010 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 2010 were estimated by the RIEM. The results are presented at the national and State levels. Beginning in FY 2006, the RIEM was implemented to estimate benefits from roadside interventions by FY; previous years were implemented 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 2010) and the 2 years prior (FY 2008–09). Overall program activity was higher in FY 2010 than in the 2 previous years, with the number of performed interventions increasing by about 1.2 percent from FY 2009. However, while roadside inspections rose by 60,622 (2.2 percent), traffic enforcements decreased by 19,933 (2.7 percent).

**Table 1. Program activity from FY 2008–10.**

<b>Interventions</b>	<b>FY 2008</b>	<b>FY 2009</b>	<b>FY 2010</b>
Roadside Inspections	2,723,576	2,788,728	2,849,350
Traffic Enforcements	756,169	730,916	710,983
<b>Total</b>	<b>3,479,745</b>	<b>3,519,644</b>	<b>3,560,333</b>

Table 2 presents the benefits of the two programs over the past 3 years. The Roadside Inspection Program prevented 8,154 crashes in FY 2010, while the Traffic Enforcement Program prevented 8,330, for a total of 16,484 crashes avoided. The number of crashes avoided decreased from FY 2009 to 2010, even as the total number of interventions increased. The proportion of inspections that found no violations was unchanged from 2009 to 2010 (34 percent).

**Table 2: Program effectiveness from FY 2008 to FY 2010 using the RIEM Version 3.0.**

<b>Intervention Benefits</b>	<b>FY 2008</b>	<b>FY 2009</b>	<b>FY 2010</b>
Crashes avoided due to roadside inspections	8,464	8,149	8,154
Crashes avoided due to traffic enforcements	9,053	8,789	8,330
<b>Total Crashes Avoided</b>	<b>17,517</b>	<b>16,938</b>	<b>16,484</b>
Injuries prevented due to roadside inspections	5,381	5,206	5,129
Injuries prevented due to traffic enforcements	5,755	5,615	5,240
<b>Total Injuries Prevented</b>	<b>11,136</b>	<b>10,821</b>	<b>10,369</b>
Lives saved due to roadside inspections	304	276	258
Lives saved due to traffic enforcements	325	297	263
<b>Total Lives Saved</b>	<b>629</b>	<b>573</b>	<b>521</b>

## **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 Roadside Inspection and Traffic Enforcement programs and the magnitude of their effects on highway safety. In 2010, these programs are estimated to have saved 521 lives and prevented 10,370 injuries by averting 16,487 crashes; over the past 9 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 the elimination of specific crash probabilities associated with each violation 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 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.

### **2.2 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,<sup>1</sup> 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.<sup>2</sup> A violation group is defined as a set of related violations assigned equal crash risks. The model assumes that correcting a violation associated with a particular violation group during an intervention reduces the risk of a subsequent crash by a finite amount equal to the crash risk probability associated with that group.

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

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

A preliminary potential crash risk reduction for a violation group is calculated from the product of the crash risk and the duration. 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 2010.

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

<sup>2</sup> 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 2010 ROADSIDE INTERVENTION EFFECTIVENESS MODEL RESULTS

The RIEM was implemented to estimate the crashes avoided, lives saved, and injuries prevented as a result of activities performed during FY 2010 (October 1, 2009, to September 30, 2010). 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 2010) and the 2 years prior (FY 2008–09). Overall program activity was higher in FY 2010 than in the 2 previous years, with the number of performed interventions increasing by about 1.2 percent from FY 2009. However, while roadside inspections rose by 60,622 (2.2 percent), traffic enforcements decreased by 19,933 (2.7 percent).

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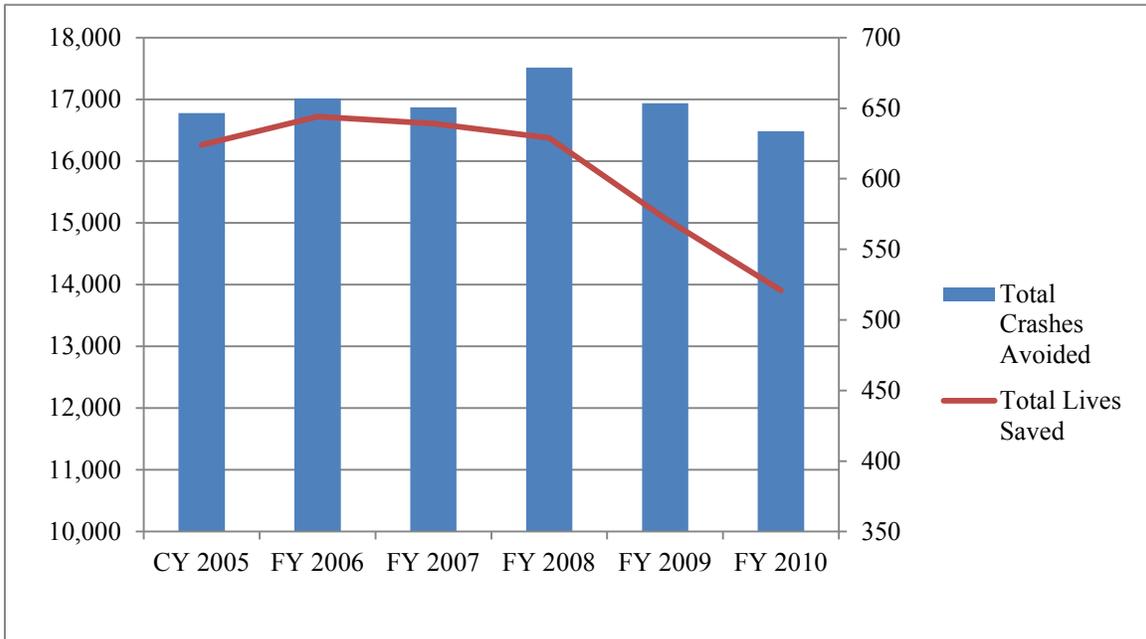
Table 4 presents the estimated benefits of the two programs over the past 3 years. The Roadside Inspection Program prevented 8,154 crashes in FY 2010, while the Traffic Enforcement Program prevented 8,330, for a total of 16,484 crashes avoided. The number of crashes avoided decreased from FY 2009 to 2010, even as the total number of interventions increased. The proportion of inspections that found no violations was unchanged from 2009 to 2010 (34 percent).

**Table 4: Program effectiveness from FY 2008 to FY 2010 using the RIEM Version 3.0.**

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Figure 1 displays the trends in estimated crashes avoided and lives saved from calendar year (CY) 2005 to FY 2010. 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 and

FY 2010 estimates for analytical purposes. In FY 2010, the number of lives saved decreased from previous years, while the number of crashes avoided has remained relatively flat in the most recent years.



**Figure 1. Bar chart. Trends in crashes avoided and lives saved.**

This growing divergence of crashes avoided and lives saved suggests that, on average, CMV crashes have become less severe during this particular time period, with fewer fatalities per crash. Complete Version 3.0 results from CY 2005 to FY 2010 are available in Table 5. Complete results from CY 2001 to FY 2010 are shown in Table 6.

**Table 5. RIEM Version 3.0 estimated program benefits, CY 2005–FY 2010.**

<b>Intervention Results</b>	<b>CY 2005</b>	<b>FY 2006</b>	<b>FY 2007</b>	<b>FY 2008</b>	<b>FY 2009</b>	<b>FY 2010</b>
Number of roadside inspections	2,193,954	2,372,802	2,616,868	2,723,576	2,788,728	2,849,350
Number of traffic enforcements	826,951	900,260	752,649	756,169	730,916	710,983
<b>Total Number of Interventions</b>	<b>3,020,905</b>	<b>3,273,062</b>	<b>3,369,517</b>	<b>3,479,745</b>	<b>3,519,644</b>	<b>3,560,333</b>
Crashes avoided due to roadside inspections	7,575	7,593	8,101	8,464	8,149	8,154
Crashes avoided due to traffic enforcements	9,205	9,422	8,769	9,053	8,789	8,330
<b>Total Crashes Avoided</b>	<b>16,780</b>	<b>17,015</b>	<b>16,870</b>	<b>17,517</b>	<b>16,938</b>	<b>16,484</b>
Injuries prevented due to roadside inspections	5,252	5,090	5,222	5,381	5,206	5,129
Injuries prevented due to traffic enforcements	6,382	6,316	5,652	5,755	5,615	5,240
<b>Total Injuries Prevented</b>	<b>11,634</b>	<b>11,405</b>	<b>10,874</b>	<b>11,136</b>	<b>10,821</b>	<b>10,369</b>
Lives saved due to roadside inspections	282	287	307	304	276	258
Lives saved due to traffic enforcements	342	357	332	325	297	263
<b>Total Lives Saved</b>	<b>624</b>	<b>644</b>	<b>639</b>	<b>629</b>	<b>573</b>	<b>521</b>

**Table 6: Historical results for RIEM, CY 2001–FY 2010.**

<b>Intervention Results</b>	<b>CY 2001</b>	<b>CY 2002</b>	<b>CY 2003</b>	<b>CY 2004</b>	<b>CY 2005</b>	<b>FY 2006</b>	<b>FY 2007</b>	<b>FY 2008</b>	<b>FY 2009</b>	<b>FY 2010</b>
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
Number of traffic enforcements	695,619	760,094	791,116	802,798	826,951	900,260	752,649	756,169	730,916	710,983
<b>Total Number of Interventions</b>	<b>2,746,405</b>	<b>3,013,164</b>	<b>3,006,785</b>	<b>3,013,640</b>	<b>3,020,905</b>	<b>3,273,062</b>	<b>3,369,517</b>	<b>3,479,745</b>	<b>3,519,644</b>	<b>3,560,333</b>
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
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
<b>Total Crashes Avoided</b>	<b>13,921</b>	<b>15,333</b>	<b>15,427</b>	<b>15,820</b>	<b>16,780</b>	<b>17,015</b>	<b>16,870</b>	<b>17,517</b>	<b>16,938</b>	<b>16,484</b>
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
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
<b>Total Injuries Prevented</b>	<b>10,559</b>	<b>11,594</b>	<b>11,730</b>	<b>11,535</b>	<b>11,634</b>	<b>11,405</b>	<b>10,874</b>	<b>11,136</b>	<b>10,821</b>	<b>10,369</b>
Lives saved due to roadside inspections	331	346	317	284	282	287	307	304	276	258
Lives saved due to traffic enforcements	361	389	364	327	342	357	332	325	297	263
<b>Total Lives Saved</b>	<b>691</b>	<b>735</b>	<b>681</b>	<b>611</b>	<b>624</b>	<b>644</b>	<b>639</b>	<b>629</b>	<b>573</b>	<b>521</b>

## 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 2010.

**Table 7. FY 2010 program exposure of U.S.-domiciled versus non-U.S.-domiciled carriers.**

<b>Interventions</b>	<b>U.S.-Domiciled</b>	<b>Non-U.S.-Domiciled</b>
Roadside Inspections	2,540,745	308,605
Traffic Enforcements	693,308	17,675
<b>Total Interventions</b>	<b>3,234,053</b>	<b>326,280</b>

Table 8 compares the effectiveness of interventions conducted in FY 2010 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 avoided, injuries prevented, and lives saved are much higher. When comparing the estimated program benefits per 1,000 interventions, U.S. carriers have about half the rate of crashes avoided for roadside inspections (2.57 compared to 5.22), while the rates of crashes avoided per traffic enforcement are similar for U.S. and non-U.S. carriers (11.72 and 11.69). The injuries and fatalities prevented per intervention in U.S. versus non-U.S. carriers exhibit a similar relationship.

**Table 8. FY 2010 program effectiveness for U.S.-domiciled versus non-U.S.-domiciled carriers.**

<b>Types of Benefits</b>	<b>Benefits: U.S.- Domiciled</b>	<b>Benefits: Non-U.S.- Domiciled</b>	<b>Benefits per 1,000 Interventions: U.S.-Domiciled</b>	<b>Benefits per 1,000 Interventions: Non-U.S.- Domiciled</b>
Crashes avoided due to roadside inspections	6,542	1,612	2.57	5.22
Crashes avoided due to traffic enforcements	8,123	207	11.72	11.69
<b>Total Crashes Avoided</b>	<b>14,665</b>	<b>1,819</b>	<b>4.53</b>	<b>5.57</b>
Injuries prevented due to roadside inspections	4,115	1,014	1.62	3.29
Injuries prevented due to traffic enforcements	5,110	130	7.37	7.35
<b>Total Injuries Prevented</b>	<b>9,225</b>	<b>1,144</b>	<b>2.85</b>	<b>3.51</b>
Lives saved due to roadside inspections	207	51	0.08	0.16
Lives saved due to traffic enforcements	256	7	0.37	0.37
<b>Total Lives Saved</b>	<b>463</b>	<b>58</b>	<b>0.14</b>	<b>0.18</b>

### **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 in all 50 States, the District of Columbia, and the U.S. territories combined (American Samoa, Guam, the Northern Mariana Islands, U.S. Virgin Islands, and Puerto Rico). These tables provide intervention counts and total estimated benefits (crashes avoided, injuries prevented, lives saved).

**Table 9. FY 2010 Roadside Inspection Program benefits by reporting State.**

<b>Reporting State</b>	<b>Total Interventions Initiated</b>	<b>Number of Roadside Inspections</b>	<b>Est. Crashes Avoided</b>	<b>Est. Injuries Prevented</b>	<b>Est. Lives Saved</b>	<b>Est. Crashes Avoided per 1,000 Inspections</b>	<b>Est. Injuries Prevented per 1,000 Inspections</b>	<b>Est. Lives Saved per 1,000 Inspections</b>
Alabama	42114	35861	86.98	54.71	2.75	2.43	1.53	0.08
Alaska	7190	6226	15.05	9.47	0.48	2.42	1.52	0.08
Arizona	78087	49813	205.61	129.33	6.49	4.13	2.60	0.13
Arkansas	39162	29478	92.09	57.92	2.91	3.12	1.96	0.10
California	564928	483835	577.65	363.34	18.24	1.19	0.75	0.04
Colorado	54015	43072	153.36	96.46	4.84	3.56	2.24	0.11
Connecticut	20682	11420	51.93	32.66	1.64	4.55	2.86	0.14
Delaware	3968	2574	5.33	3.35	0.17	2.07	1.30	0.07
District of Columbia	6176	4629	5.59	3.52	0.18	1.21	0.76	0.04
Federal	143176	140905	916.03	576.18	28.92	6.50	4.09	0.21
Florida	119918	98107	222.73	140.10	7.03	2.27	1.43	0.07
Georgia	106498	81403	282.97	177.99	8.93	3.48	2.19	0.11
Hawaii	4644	4105	5.14	3.23	0.16	1.25	0.79	0.04
Idaho	10938	5476	21.83	13.73	0.69	3.99	2.51	0.13
Illinois	74135	51568	140.91	88.63	4.45	2.73	1.72	0.09
Indiana	91090	44005	146.52	92.16	4.63	3.33	2.09	0.11
Iowa	48929	36083	143.15	90.04	4.52	3.97	2.50	0.13
Kansas	52446	44376	99.15	62.37	3.13	2.23	1.41	0.07
Kentucky	97919	74295	126.43	79.52	3.99	1.70	1.07	0.05
Louisiana	48489	28868	129.85	81.68	4.10	4.50	2.83	0.14
Maine	16433	13948	39.34	24.74	1.24	2.82	1.77	0.09
Maryland	100935	82617	164.75	103.63	5.20	1.99	1.25	0.06
Massachusetts	17367	7148	21.63	13.61	0.68	3.03	1.90	0.10
Michigan	74353	42410	138.38	87.04	4.37	3.26	2.05	0.10
Minnesota	37412	23118	79.16	49.79	2.50	3.42	2.15	0.11
Mississippi	82809	80305	106.01	66.68	3.35	1.32	0.83	0.04
Missouri	70080	46814	134.69	84.72	4.25	2.88	1.81	0.09
Montana	36144	33067	70.14	44.12	2.21	2.12	1.33	0.07
Nebraska	29545	21246	59.87	37.66	1.89	2.82	1.77	0.09
Nevada	32791	22003	45.13	28.39	1.42	2.05	1.29	0.06

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
New Hampshire	11084	8731	25.91	16.30	0.82	2.97	1.87	0.09
New Jersey	40258	30684	86.49	54.40	2.73	2.82	1.77	0.09
New Mexico	105596	79073	120.58	75.84	3.81	1.52	0.96	0.05
New York	117045	102719	234.91	147.76	7.42	2.29	1.44	0.07
North Carolina	89038	74126	155.97	98.10	4.92	2.10	1.32	0.07
North Dakota	16529	14665	19.15	12.05	0.60	1.31	0.82	0.04
Ohio	76636	61545	144.17	90.68	4.55	2.34	1.47	0.07
Oklahoma	28421	18310	54.32	34.17	1.72	2.97	1.87	0.09
Oregon	42731	35070	106.32	66.88	3.36	3.03	1.91	0.10
Pennsylvania	94436	75326	169.83	106.82	5.36	2.25	1.42	0.07
Rhode Island	3856	2384	10.21	6.42	0.32	4.28	2.69	0.13
South Carolina	50330	37202	118.31	74.42	3.74	3.18	2.00	0.10
South Dakota	28872	24315	57.08	35.90	1.80	2.35	1.48	0.07
Tennessee	64317	49613	78.52	49.39	2.48	1.58	1.00	0.05
Texas	386290	371354	1916.94	1205.75	60.52	5.16	3.25	0.16
Utah	38492	31434	93.25	58.65	2.94	2.97	1.87	0.09
Vermont	6737	5164	17.02	10.71	0.54	3.30	2.07	0.10
Virginia	37941	29802	84.48	53.14	2.67	2.83	1.78	0.09
Washington	118202	86698	189.59	119.25	5.99	2.19	1.38	0.07
West Virginia	32257	22312	35.45	22.30	1.12	1.59	1.00	0.05
Wisconsin	33537	20546	94.71	59.57	2.99	4.61	2.90	0.15
Wyoming	18901	13959	41.85	26.32	1.32	3.00	1.89	0.09
U.S. Territories	6454	5543	11.69	7.35	0.37	2.11	1.33	0.07
<b>Total</b>	<b>3,560,333</b>	<b>2,849,350</b>	<b>8,154.15</b>	<b>5,128.94</b>	<b>257.45</b>	<b>2.86</b>	<b>1.80</b>	<b>0.09</b>

**Table 10. FY 2010 Traffic Enforcement Program benefits by reporting State.**

<b>Reporting State</b>	<b>Total Interventions Initiated</b>	<b>Number Traffic Enforcements</b>	<b>Est. Crashes Avoided</b>	<b>Est. Injuries Prevented</b>	<b>Est. Lives Saved</b>	<b>Est. Crashes Avoided per 1,000 Inspections</b>	<b>Est. Injuries Prevented per 1,000 Inspections</b>	<b>Est. Lives Saved per 1,000 Inspections</b>
Alabama	42114	6253	76.30	47.99	2.41	12.20	7.67	0.39
Alaska	7190	964	14.09	8.86	0.44	14.62	9.19	0.46
Arizona	78087	28274	347.15	218.36	10.96	12.28	7.72	0.39
Arkansas	39162	9684	122.30	76.93	3.86	12.63	7.94	0.40
California	564928	81093	604.74	380.38	19.09	7.46	4.69	0.24
Colorado	54015	10943	121.65	76.52	3.84	11.12	6.99	0.35
Connecticut	20682	9262	137.02	86.19	4.33	14.79	9.31	0.47
Delaware	3968	1394	11.10	6.98	0.35	7.96	5.01	0.25
District of Columbia	6176	1547	21.94	13.80	0.69	14.18	8.92	0.45
Federal	143176	2271	46.87	29.48	1.48	20.64	12.98	0.65
Florida	119918	21811	265.60	167.06	8.39	12.18	7.66	0.38
Georgia	106498	25095	359.28	225.99	11.34	14.32	9.01	0.45
Hawaii	4644	539	4.83	3.04	0.15	8.96	5.64	0.28
Idaho	10938	5462	63.34	39.84	2.00	11.60	7.29	0.37
Illinois	74135	22567	221.36	139.23	6.99	9.81	6.17	0.31
Indiana	91090	47085	460.21	289.47	14.53	9.77	6.15	0.31
Iowa	48929	12846	177.14	111.42	5.59	13.79	8.67	0.44
Kansas	52446	8070	107.94	67.89	3.41	13.38	8.41	0.42
Kentucky	97919	23624	344.65	216.78	10.88	14.59	9.18	0.46
Louisiana	48489	19621	201.89	126.99	6.37	10.29	6.47	0.32
Maine	16433	2485	31.79	20.00	1.00	12.79	8.05	0.40
Maryland	100935	18318	238.55	150.05	7.53	13.02	8.19	0.41
Massachusetts	17367	10219	142.45	89.60	4.50	13.94	8.77	0.44
Michigan	74353	31943	369.07	232.14	11.65	11.55	7.27	0.36
Minnesota	37412	14294	220.38	138.62	6.96	15.42	9.70	0.49
Mississippi	82809	2504	28.25	17.77	0.89	11.28	7.10	0.36
Missouri	70080	23266	355.92	223.87	11.24	15.30	9.62	0.48
Montana	36144	3077	32.34	20.34	1.02	10.51	6.61	0.33
Nebraska	29545	8299	74.53	46.88	2.35	8.98	5.65	0.28
Nevada	32791	10788	127.44	80.16	4.02	11.81	7.43	0.37

Reporting State	Total Interventions Initiated	Number Traffic Enforcements	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
New Hampshire	11084	2353	37.57	23.63	1.19	15.97	10.04	0.51
New Jersey	40258	9574	127.17	79.99	4.02	13.28	8.35	0.42
New Mexico	105596	26523	281.96	177.35	8.90	10.63	6.69	0.34
New York	117045	14326	170.49	107.24	5.38	11.90	7.49	0.38
North Carolina	89038	14912	243.84	153.37	7.70	16.35	10.29	0.52
North Dakota	16529	1864	22.23	13.98	0.70	11.93	7.50	0.38
Ohio	76636	15091	149.86	94.26	4.73	9.93	6.25	0.31
Oklahoma	28421	10111	122.39	76.98	3.86	12.10	7.61	0.38
Oregon	42731	7661	86.25	54.25	2.72	11.26	7.08	0.36
Pennsylvania	94436	19110	244.19	153.60	7.71	12.78	8.04	0.40
Rhode Island	3856	1472	23.28	14.64	0.74	15.82	9.95	0.50
South Carolina	50330	13128	176.55	111.05	5.57	13.45	8.46	0.42
South Dakota	28872	4557	60.97	38.35	1.92	13.38	8.42	0.42
Tennessee	64317	14704	172.43	108.46	5.44	11.73	7.38	0.37
Texas	386290	14936	140.88	88.61	4.45	9.43	5.93	0.30
Utah	38492	7058	104.99	66.04	3.31	14.88	9.36	0.47
Vermont	6737	1573	19.98	12.57	0.63	12.70	7.99	0.40
Virginia	37941	8139	109.11	68.63	3.44	13.41	8.43	0.42
Washington	118202	31504	389.54	245.02	12.30	12.36	7.78	0.39
West Virginia	32257	9945	87.54	55.06	2.76	8.80	5.54	0.28
Wisconsin	33537	12991	152.53	95.94	4.82	11.74	7.39	0.37
Wyoming	18901	4942	62.35	39.22	1.97	12.62	7.94	0.40
U.S. Territories	6454	911	13.68	8.61	0.43	15.02	9.45	0.47
<b>Total</b>	<b>3,560,333</b>	<b>710,983</b>	<b>8,329.90</b>	<b>5,239.48</b>	<b>262.95</b>	<b>11.72</b>	<b>7.37</b>	<b>0.37</b>

### **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.

**Table 11. FY 2010 Roadside Inspection Program benefits by domicile State and country.**

<b>Carrier State</b>	<b>Total Interventions Initiated</b>	<b>Number Roadside Inspections</b>	<b>Est. Crashes Avoided</b>	<b>Est. Injuries Prevented</b>	<b>Est. Lives Saved</b>	<b>Est. Crashes Avoided per 1,000 Inspections</b>	<b>Est. Injuries Prevented per 1,000 Inspections</b>	<b>Est. Lives Saved per 1,000 Inspections</b>
Alabama	56585	46167	114.18	71.82	3.60	2.47	1.56	0.08
Alaska	5851	4947	13.64	8.58	0.43	2.76	1.73	0.09
Arizona	82667	65000	152.95	96.21	4.83	2.35	1.48	0.07
Arkansas	58237	45606	103.32	64.99	3.26	2.27	1.43	0.07
California	493191	402252	596.10	374.95	18.82	1.48	0.93	0.05
Colorado	42863	32845	99.97	62.88	3.16	3.04	1.91	0.10
Connecticut	13018	8102	26.20	16.48	0.83	3.23	2.03	0.10
Delaware	5005	3807	9.06	5.70	0.29	2.38	1.50	0.08
District of Columbia	1691	1387	2.61	1.64	0.08	1.88	1.18	0.06
Florida	160653	128539	350.91	220.72	11.08	2.73	1.72	0.09
Georgia	107540	81190	250.50	157.56	7.91	3.09	1.94	0.10
Hawaii	4198	3706	4.93	3.10	0.16	1.33	0.84	0.04
Idaho	18353	13825	38.81	24.41	1.23	2.81	1.77	0.09
Illinois	123886	90898	246.57	155.09	7.78	2.71	1.71	0.09
Indiana	84830	60970	151.69	95.41	4.79	2.49	1.56	0.08
Iowa	59797	44990	111.51	70.14	3.52	2.48	1.56	0.08
Kansas	37122	27891	78.04	49.09	2.46	2.80	1.76	0.09
Kentucky	56331	42211	87.78	55.21	2.77	2.08	1.31	0.07
Louisiana	39137	29081	113.96	71.68	3.60	3.92	2.46	0.12
Maine	10944	8650	23.82	14.98	0.75	2.75	1.73	0.09
Maryland	51870	42219	86.52	54.42	2.73	2.05	1.29	0.06
Massachusetts	26935	16986	44.60	28.05	1.41	2.63	1.65	0.08
Michigan	87087	59454	178.13	112.04	5.62	3.00	1.88	0.09
Minnesota	67135	46726	110.08	69.24	3.48	2.36	1.48	0.07
Mississippi	36995	30978	74.74	47.01	2.36	2.41	1.52	0.08
Missouri	77331	57313	129.76	81.62	4.10	2.26	1.42	0.07
Montana	16497	13992	31.63	19.90	1.00	2.26	1.42	0.07
Nebraska	49247	37498	88.86	55.89	2.81	2.37	1.49	0.07
Nevada	14184	11413	29.05	18.27	0.92	2.55	1.60	0.08
New Hampshire	8792	6545	20.60	12.96	0.65	3.15	1.98	0.10

Carrier State	Total Interventions Initiated	Number 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
New Jersey	64972	50329	134.80	84.79	4.26	2.68	1.68	0.08
New Mexico	20086	15147	40.51	25.48	1.28	2.67	1.68	0.08
New York	75010	60026	172.35	108.41	5.44	2.87	1.81	0.09
North Carolina	89613	71595	176.28	110.88	5.57	2.46	1.55	0.08
North Dakota	13167	10541	24.15	15.19	0.76	2.29	1.44	0.07
Ohio	101936	79447	175.53	110.41	5.54	2.21	1.39	0.07
Oklahoma	42152	31778	104.46	65.71	3.30	3.29	2.07	0.10
Oregon	43458	35498	79.63	50.09	2.51	2.24	1.41	0.07
Pennsylvania	120099	95862	197.43	124.18	6.23	2.06	1.30	0.06
Rhode Island	4441	2840	10.92	6.87	0.34	3.85	2.42	0.12
South Carolina	42879	32468	109.25	68.72	3.45	3.36	2.12	0.11
South Dakota	13812	10380	28.46	17.90	0.90	2.74	1.72	0.09
Tennessee	90138	70647	141.48	88.99	4.47	2.00	1.26	0.06
Texas	333908	297811	1,276.99	803.22	40.32	4.29	2.70	0.14
Utah	42638	32242	82.82	52.09	2.61	2.57	1.62	0.08
Vermont	4529	3621	10.46	6.58	0.33	2.89	1.82	0.09
Virginia	43712	33841	81.04	50.97	2.56	2.39	1.51	0.08
Washington	84354	64426	150.49	94.66	4.75	2.34	1.47	0.07
West Virginia	20358	15092	27.70	17.42	0.87	1.84	1.15	0.06
Wisconsin	72256	51889	120.67	75.90	3.81	2.33	1.46	0.07
Wyoming	6311	4690	15.10	9.50	0.48	3.22	2.03	0.10
U.S. Territories	6252	5387	11.32	7.12	0.37	2.10	1.32	0.07
Canada	97776	84194	140.2	88.18	4.42	1.67	1.05	0.05
Mexico	226428	222560	1463.36	920.45	46.19	6.58	4.14	0.21
Non-North America	1,039	1,010	5.31	3.34	0.17	5.26	3.31	0.17
N/A	1,037	841	2.93	1.84	0.09	3.48	2.19	0.11
<b>Total</b>	<b>3,560,333</b>	<b>2,849,350</b>	<b>8,154.16</b>	<b>5,128.93</b>	<b>257.54</b>	<b>2.86</b>	<b>1.80</b>	<b>0.09</b>

**Table 12. FY 2010 Traffic Enforcement Program benefits by domicile State and country.**

<b>Carrier State</b>	<b>Total Interventions Initiated</b>	<b>Number Traffic Enforcements</b>	<b>Est. Crashes Avoided</b>	<b>Est. Injuries Prevented</b>	<b>Est. Lives Saved</b>	<b>Est. Crashes Avoided per 1,000 Inspections</b>	<b>Est. Injuries Prevented per 1,000 Inspections</b>	<b>Est. Lives Saved per 1,000 Inspections</b>
Alabama	56585	10418	122.27	76.91	3.86	11.74	7.38	0.37
Alaska	5851	904	13.67	8.6	0.43	15.12	9.51	0.48
Arizona	82667	17667	206.12	129.65	6.51	11.67	7.34	0.37
Arkansas	58237	12631	140.59	88.43	4.44	11.13	7.00	0.35
California	493191	90939	826.29	519.73	26.09	9.09	5.72	0.29
Colorado	42863	10018	117.42	73.86	3.71	11.72	7.37	0.37
Connecticut	13018	4916	68.61	43.16	2.17	13.96	8.78	0.44
Delaware	5005	1198	15.58	9.8	0.49	13.01	8.18	0.41
District of Columbia	1691	304	3.99	2.51	0.13	13.13	8.26	0.43
Florida	160653	32114	394.85	248.36	12.47	12.30	7.73	0.39
Georgia	107540	26350	363.77	228.81	11.49	13.81	8.68	0.44
Hawaii	4198	492	4.75	2.99	0.15	9.65	6.08	0.30
Idaho	18353	4528	56.56	35.58	1.79	12.49	7.86	0.40
Illinois	123886	32988	384	241.54	12.12	11.64	7.32	0.37
Indiana	84830	23860	257.77	162.14	8.14	10.80	6.80	0.34
Iowa	59797	14807	170.39	107.17	5.38	11.51	7.24	0.36
Kansas	37122	9231	111.03	69.84	3.51	12.03	7.57	0.38
Kentucky	56331	14120	185.95	116.96	5.87	13.17	8.28	0.42
Louisiana	39137	10056	119.16	74.95	3.76	11.85	7.45	0.37
Maine	10944	2294	27.41	17.24	0.87	11.95	7.52	0.38
Maryland	51870	9651	126.55	79.6	4	13.11	8.25	0.41
Massachusetts	26935	9949	150.19	94.47	4.74	15.10	9.50	0.48
Michigan	87087	27633	326.83	205.58	10.32	11.83	7.44	0.37
Minnesota	67135	20409	271.03	170.48	8.56	13.28	8.35	0.42
Mississippi	36995	6017	69.49	43.71	2.19	11.55	7.26	0.36
Missouri	77331	20018	248.08	156.04	7.83	12.39	7.79	0.39
Montana	16497	2505	29.01	18.25	0.92	11.58	7.29	0.37
Nebraska	49247	11749	117.73	74.05	3.72	10.02	6.30	0.32
Nevada	14184	2771	34.28	21.56	1.08	12.37	7.78	0.39
New Hampshire	8792	2247	33.85	21.29	1.07	15.06	9.47	0.48
New Jersey	64972	14643	187.19	117.74	5.91	12.78	8.04	0.40
New Mexico	20086	4939	55.97	35.21	1.77	11.33	7.13	0.36
New York	75010	14984	181.82	114.36	5.74	12.13	7.63	0.38
North Carolina	89613	18018	254.38	160	8.03	14.12	8.88	0.45
North Dakota	13167	2626	31.5	19.81	0.99	12.00	7.54	0.38
Ohio	101936	22489	244.08	153.53	7.71	10.85	6.83	0.34
Oklahoma	42152	10374	134.36	84.51	4.24	12.95	8.15	0.41
Oregon	43458	7960	91.07	57.28	2.88	11.44	7.20	0.36
Pennsylvania	120099	24237	281.54	177.09	8.89	11.62	7.31	0.37
Rhode Island	4441	1601	25.11	15.79	0.79	15.68	9.86	0.49

Carrier State	Total Interventions Initiated	Number Traffic Enforcements	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
South Carolina	42879	10411	152.42	95.87	4.81	14.64	9.21	0.46
South Dakota	13812	3432	42.38	26.66	1.34	12.35	7.77	0.39
Tennessee	90138	19491	228.64	143.81	7.22	11.73	7.38	0.37
Texas	333908	36097	393.94	247.79	12.44	10.91	6.86	0.34
Utah	42638	10396	132.82	83.54	4.19	12.78	8.04	0.40
Vermont	4529	908	11.31	7.11	0.36	12.46	7.83	0.40
Virginia	43712	9871	122.99	77.36	3.88	12.46	7.84	0.39
Washington	84354	19928	239.16	150.43	7.55	12.00	7.55	0.38
West Virginia	20358	5266	56.92	35.8	1.8	10.81	6.80	0.34
Wisconsin	72256	20367	224.15	140.99	7.08	11.01	6.92	0.35
Wyoming	6311	1621	21.58	13.57	0.68	13.31	8.37	0.42
U.S. Territories	6252	865	12.84	8.08	0.4	14.84	9.34	0.46
Canada	97776	13582	141.13	88.77	4.45	10.39	6.54	0.33
Mexico	226428	3868	62	39.01	1.95	16.03	10.09	0.50
Non-North	1039	29	0.61	0.39	0.01	21.03	13.45	0.34
N/A	1037	196	2.80	1.76	0.09	14.29	8.98	0.46
<b>Total</b>	<b>3,560,333</b>	<b>710,983</b>	<b>8,329.93</b>	<b>5,239.52</b>	<b>263.01</b>	<b>11.72</b>	<b>7.37</b>	<b>0.37</b>

### 3.3 CONCLUSION

The Roadside Inspection and Traffic Enforcement programs are two of FMCSA's most powerful safety tools. In 2010, these programs saved 521 lives and prevented 10,370 injuries by averting 16,487 crashes; over the past 9 years, it is estimated that these programs have saved more than 6,000 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 (Percent)	Total Number of Violations (FY 2010)
Unsafe	Careless Driving	0.000141	30	0.004224	100	68,824
Unsafe	Reckless Driving	0.000028	30	0.000834	100	1,098
Unsafe	Speeding-related	0.000078	30	0.002341	100	175,050
Unsafe	Hazardous Materials (HM)- related	0.000001	30	0.000029	100	1,518
Unsafe	Other Driver Violations	0.000401	30	0.012038	100	76,301
Unsafe	392.2 Driver	0.000524	30	0.015718	100	195,391
Fatigue	Hours	0.000104	30	0.003120	100	89,682
Fatigue	False Log	0.000212	30	0.006360	100	38,769
Fatigue	Incomplete/Wrong Log	0.000123	30	0.003690	100	224,645
Fatigue	Jumping Out-of-Service (OOS)/Driving Fatigued	0.005741	30	0.172230	100	1,647
Fatigue	Electronic Onboard Recorder-related	0.000123	30	0.003690	100	1,330
Fitness	Driver Qualification	0.000209	45	0.009405	71	111,873
Fitness	Endorsements & Vehicle Group	0.000178	45	0.008010	85	35,655
Fitness	Medical Certificate	0.000148	45	0.006660	64	176,577
Fitness	Physical	0.000092	45	0.004140	93	6,093
Fitness	Multiple License	0.000259	45	0.011655	93	213
Fitness	Fitness Jumping OOS	0.001463	45	0.065835	100	11
D&A	Alcohol	0.000871	90	0.078390	100	2,611
D&A	Drugs	0.000994	90	0.089460	100	1,099
D&A	Alcohol Jumping OOS	0.000563	90	0.050670	100	178
Vehicle	Brakes Out of Adjustment	0.000128	37	0.004736	70	159,046
Vehicle	Brakes, All Others	0.000077	37	0.002849	79	512,047
Vehicle	Coupling Devices	0.000249	7	0.001743	93	15,237
Vehicle	Exhaust Discharge	0.000058	37	0.002146	82	70,285
Vehicle	Fuel Systems	0.000126	37	0.004662	92	20,103
Vehicle	Lighting	0.000093	7	0.000651	61	471,423
Vehicle	Steering Mechanism	0.000077	37	0.002849	82	64,157
Vehicle	Suspension	0.000125	37	0.004625	89	71,719
Vehicle	Tires	0.000136	7	0.000952	67	327,974
Vehicle	Wheels, Studs, Clamps, Etc.	0.000099	7	0.000693	71	221,761
Vehicle	Windshield/Glass/Makings	0.000100	7	0.000700	73	179,267
Vehicle	Cab, Body, Frame	0.000155	7	0.001085	91	63,024
Vehicle	Inspection Reports	0.000155	37	0.005735	70	174,637

<b>BASIC</b>	<b>Violation Group</b>	<b>Crash Risk (Per Day Trip)</b>	<b>Duration (Days)</b>	<b>Crash Risk Reduction (Crash Risk x Duration)</b>	<b>Correction Rate (Percent)</b>	<b>Total Number of Violations (FY 2010)</b>
Vehicle	Vehicle Jumping OOS	0.000238	37	0.008806	95	755
Vehicle	Other Vehicle Defect	0.000135	37	0.004995	65	224,510
Vehicle	Emergency Equipment	0.000095	37	0.003515	74	229,452
Vehicle	Tire vs. Load	0.000100	37	0.003700	93	24,622
Vehicle	Clearance Identification Lamps/Other	0.000082	7	0.000574	57	345,419
Vehicle	392.2 Vehicle	0.000106	37	0.003922	100	271,215
Cargo	Load Securement	0.000168	30	0.005040	100	133,911
Cargo	Other Cargo	0.000158	30	0.004740	100	215,511
Cargo	Fire Hazard	0.000080	30	0.002400	100	260
Cargo	Markings	0.000056	30	0.001680	100	14,047
Cargo	Cargo Protection	0.000153	30	0.004590	100	1,280
Cargo	Documentation	0.000067	30	0.002010	100	8,612
Cargo	HM Route	0.000149	30	0.004470	100	106
Cargo	Fraudulent Behavior	0.000000	30	0.000000	100	284
Cargo	Package Integrity	0.000083	30	0.002490	100	1,661
Cargo	HM Other	0.000074	30	0.002220	100	1,617
Cargo	Package Testing	0.000086	30	0.002580	100	1,522