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FMCSA Intervention Model

Executive Summary

Calendar Year 2005

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Executive Summary

Brief Description

The Roadside Inspection and Traffic Enforcement programs are two of the Federal Motor Carrier Safety Administration's (FMCSA) key safety programs. The Roadside Inspection program consists of roadside inspections performed by qualified safety inspectors following 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 (MCSAP). There are six levels of inspections that include a vehicle component, a driver component, or both. The Traffic Enforcement program is composed of two distinct activities: a traffic stop as a result of a moving violation and a roadside inspection.

FMCSA, in cooperation with the Volpe National Transportation Systems Center, has developed an analytic model to measure the effectiveness of roadside inspections and traffic enforcements in terms of crashes avoided, injuries avoided, and lives saved. Traffic enforcements and roadside inspections are considered interventions and this analytic model is known as the Intervention Model. This model provides FMCSA management with information to address the requirements of the Government Performance and Results Act of 1993 (GPRA), which obligates 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 Intervention Model is based on the premise that interventions to correct vehicle and driver defects, defined as roadside inspections and traffic enforcements, directly and indirectly contribute to a reduction in crashes. The model includes two submodels that are used for measuring these different effects:

- Direct effects are based on the assumption that vehicle and/or driver defects discovered and then corrected as the result of interventions reduce the probability that these vehicles/drivers will be involved in subsequent crashes. The model calculates direct-effect-prevented crashes according to the number and type of violations detected during an intervention.
- Indirect effects are the by-products of the carriers' increased awareness of FMCSA programs and the potential consequences that the programs could impose if steps are not taken to ensure and/or maintain higher levels of safety. In order to measure indirect effects, which are essentially changes in behavior involving driver preparation, practices and vehicle maintenance, the model calculates responses to exposure to the programs and the resulting reduction in potentially crash-causing violations.

This model, which measures the effectiveness of the Roadside Inspection and Traffic Enforcement programs, when combined with the Compliance Review Effectiveness Model (http://ai.fmcsa.dot.gov/CarrierResearchResults/PDFs/ProgramEffectiveness/CREM_O6.pdf), forms a powerful performance measurement capability that plays a significant role in resource allocation decisions regarding FMCSA's safety programs.

Methodology

This model is based on the premise that the two programs - Roadside Inspection and Traffic Enforcement - directly and indirectly contribute to the reduction of crashes. As a result, the model includes two submodels that are used for measuring these different effects. Direct effects are based on the assumption that vehicle and/or driver defects discovered and then corrected as the result of interventions (roadside inspections and traffic enforcements) reduce the probability that these vehicles/drivers will be involved in subsequent crashes. Indirect effects are considered to be the by-products of the carriers' increased awareness of FMCSA programs and the potential consequences that these programs impose if steps are not taken to ensure and/or maintain high levels of safety. Figure ES-1 provides an overview of the Intervention Model.

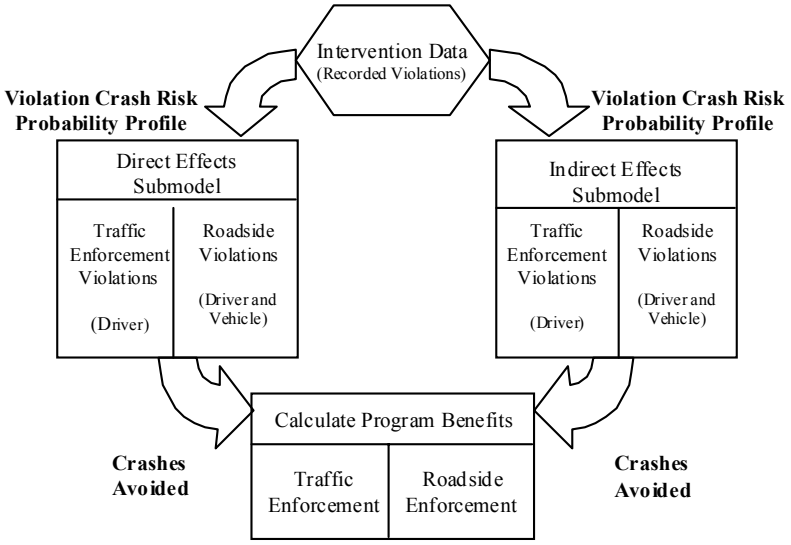

Figure ES-1. Overview of the Intervention Model

Direct Effects

This section describes the methodology employed to estimate the number of direct-effect crashes avoided.

Conceptually, the approach at the heart of the Direct Effects Submodel is straightforward. Since the occurrence of a single violation implies a certain degree of crash risk, each inspection that uncovers at least one violation can be interpreted as having reduced the risk associated with its noted violation(s). The model expresses this risk reduction in terms of the likelihood of a crash being avoided by each inspection violation that was noted and corrected. For an individual intervention, the avoided crash probability will be dependent upon the number and type of violations. Multiple viola-

tions will have a compounding effect, thereby increasing the likelihood of a prevented crash. By accounting separately for the two types of violations (roadside and traffic enforcement) and summing the portions of crashes avoided for all inspections within each group, it is possible to estimate direct-effect crashes that have been avoided due to the programs. The Direct Effects Submodel is composed of three major steps: input data selection, assignment of crash risk probabilities, and calculation of direct results.

Input Data Selection. One year of intervention data is extracted from the Motor Carrier Management Information System (MCMIS) database. This database contains roadside inspection and traffic enforcement information compiled from federal and state safety agencies. This data also includes the violations (if any) that were cited during the intervention. While interventions are not required to have violations associated with them, in practice about 75% of all interventions do have one or more violations.

This violation data is the key component in the model as it represents the defects that were identified and subsequently corrected as a part of the program. This data is also used in the determination of which interventions were conducted under the Traffic Enforcement Program (i.e. traffic enforcements) and which were conducted under the Roadside Inspection Program. An inspection with a traffic enforcement driver violation is classified as traffic enforcement with a driver and/or vehicle roadside inspection component(s). All other inspections are classified as entirely driver and/or vehicle roadside inspections.

Assignment of Crash Risk Probabilities. In the model, the assumption is made 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 defects 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. The assumption is that these deficiencies can be noted and ranked into discrete risk categories, each with a probability that quantifies the potential for a crash for all deficiencies in that category. The risk categories and their descriptions are as follows:

- Risk Category 1 - The violation is the potential single, immediate factor leading to a crash.
- Risk Category 2 - The violation is the potential single, eventual factor leading to a crash.
- Risk Category 3 - The violation is a potential contributing factor leading to a crash.
- Risk Category 4 - The violation is an unlikely potential contributing factor leading to a crash.
- Risk Category 5 - The violation has little or no connection to crashes.

The risk categories were designed such that each category represents a different order of magnitude of likelihood of contributing to a crash. Using this information and the latest available data, crash risk probabilities were developed for each risk category by out-of-service indicator and by violation type (driver or vehicle). Each probability is

an estimate of the portion of a crash avoided when an inspection uncovers a particular violation or inversely the number of violations of that type that would need to be uncovered before one crash could be prevented.

Calculation of Direct Results. The likelihood of an avoided crash for each inspection is calculated by using the crash reduction probabilities of each of the violations cited during the inspection. An inspection with multiple violations will have a greater likelihood of an avoided crash than will an inspection with a single violation, assuming all the violations are in the same risk category. This result reflects the belief that multiple violations compound the safety hazard posed from driver deficiencies and/or vehicle defects.

Once the number of crashes avoided for each inspection has been calculated, the next step in the calculation of the results is to compute the number of lives saved and injuries avoided as a result of those crashes avoided. This is done by computing national averages of fatalities per crash and injuries per crash using MCMIS data. These averages are then multiplied by the number of crashes avoided resulting in the number of lives saved and injuries avoided.

Indirect Effects

The fundamental premise of the indirect-effects approach is that once carriers have been exposed to interventions, they will change their behavior. This change in behavior will result in higher levels of compliance, fewer future violations, and, therefore, a reduction in the number of crashes. This section presents a summary of the methods used in the model to arrive at program indirect effects. The deterrent-effects part of the model - that is, the Indirect Effects Submodel - follows a similar process to that of the Direct Effects Submodel.

Indirect effects, by their nature, defy measurement. However, changes in behavior represented by changes in the number of violations recorded for a carrier over time can be used to identify and evaluate the results of the indirect effects. In other words, if a carrier receives fewer and fewer violations as it is subjected to more inspections, it will be determined that compliance behavior has been affected and the resulting likelihood of crashes has been reduced. To measure these effects, multiple successive years of intervention data are required.

The Indirect Effects Submodel compares carrier performance in a base year to the year after in order to measure the effects of the exposure to interventions in the base year on compliance. What is sought is an improvement, i.e., a reduction, in the likelihood of a crash resulting from increasingly fewer violations being recorded. The difference between the totals is calculated as the indirect-effect crashes-avoided. Depending upon the initiating intervention, it is tallied as indirect-effect crashes avoided for either the Roadside Inspection or Traffic Enforcement programs. Figure ES-2 illustrates the processes involved in assessing the indirect effects of the model.

Input Data Selection. Instead of one year of intervention data, like the Direct Effects Submodel, two years of intervention data are required. Again this includes the interventions as well as any associated violations. The first year of data selected is the base year. This is the year in which the effectiveness of the interventions will be esti-

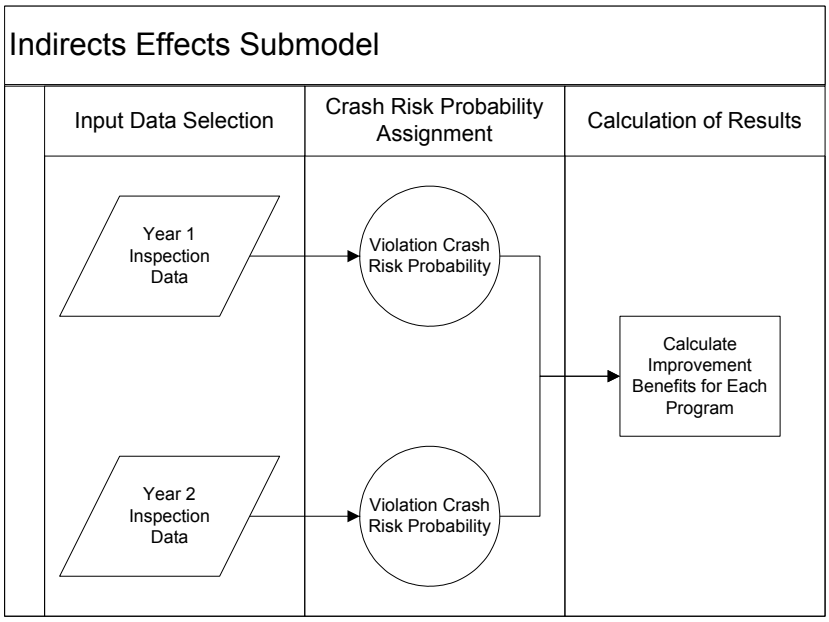

Figure ES-2. Indirect Effect Approach

mated. The second year is the year after the base year and is used for comparison purposes in order to determine the change in carrier performance.

Crash Risk Probability Assignment. In this step, the two years of intervention data is analyzed and the violations are assigned to their appropriate risk category.

Calculation of Results. The crashes avoided are calculated for both years of data by carrier for each program using the same algorithm as the Direct Effects Model. This is where the two submodels diverge in their approach. A standard set of filtering criteria is used to eliminate carriers with insufficient data for a comparison. Once the filtering is complete, the difference between the crashes avoided estimated in the base year and the crashes avoided estimated in the subsequent year is computed for each carrier and program. These carrier-level results are then summed in order to arrive at program-level results for the difference in crashes from the base year to the subsequent year. This change in crashes is converted to a percentage difference then applied to the number of interventions conducted in the base year. The results of the computation are the estimated number of crashes avoided for each program. The determination of lives saved and injuries avoided is done in the exact same way as it was for the direct effects, that is national level fatalities and injuries per crash are used to estimate the lives saved and injuries avoided. The safety benefits estimated by this part of the model represent the indirect effect of the intervention program activities conducted in the base year, which is the activity year that was used in the direct effects calculation.

The only drawback to this method of calculating the indirect effects is that it requires an additional year of data after the activity year. For example, in order to compute the

indirect effects for the 2005 interventions, it would require 2006 intervention data as well. Instead of waiting until this data is available to release results, an average of the prior two years indirect effects benefits (as a percentage of the total benefits) are used to project the indirect effects. For example, to project the indirect benefits for the Roadside Inspection program for 2005 the percent of indirect benefits in the Roadside Inspection program for 2003 and 2004 are averaged. Once the additional year of activity data is available the indirect effect benefits are updated and used in the subsequent years calculations.

2005 Intervention Model Results

The model was implemented to estimate the crashes avoided, lives saved, and injuries avoided as a result of activities performed during the 2005 calendar year. The direct effects were calculated exactly as described in the previous section. The indirect effects for each program were projected from the 2003 - 2004 indirect effects results. Over those two years the indirect effects on average accounted for 23% of the total Roadside Inspection program benefits and 14% of the total Traffic Enforcement program benefits. The direct and indirect results are combined and presented at two different levels, the national level and the state level.

National Level

Table ES-1 provides a comparison of the program activity level at the national level for the current analysis year (2005) as well as two historical years (2003 - 2004). In general, the activity levels of the two programs have remained relatively constant over the past few years; however, there is a noticeable shift from roadside inspections to traffic enforcements.

Table ES-1. Program Exposure 2003 - 2005

	2003	2004	2005
Roadside Inspections	2,215,762	2,211,875	2,194,567
Traffic Enforcements	791,157	803,032	827,719
Total Interventions	*3,006,919*	*3,014,907*	*3,022,286*

Table ES-2 presents the benefits of the two programs in the current analysis year (2005) as well as two years of historical results (2003 - 2004). There are a number of noteworthy observations that warrant some additional discussion, found in the Analysis section.

Table ES-2. Program Effectiveness 2003 - 2005

	2003†	2004	2005
Crashes Avoided			
Roadside Inspection	12,667	9,606	9,256
Traffic Enforcement	4,484	9,067	9,215
Total	*17,151*	*18,673*	*18,471*
Injuries Avoided			
Roadside Inspection	9,647	7,004	6,418
Traffic Enforcement	3,415	6,611	6,390
Total	*13,062*	*13,615*	*12,807*
Lives Saved			
Roadside Inspection	534	371	344
Traffic Enforcement	188	351	343
Total	*722*	*722*	*687*

†. In 2003 all benefits from roadside inspections conducted in conjunction with traffic enforcements were allocated to the Roadside Inspection Program; in 2004 and 2005 these benefits were allocated to the Traffic Enforcement Program. A description of this can be found in: "FMCSA Intervention Model - Executive Summary" April 2006.

Figure ES-3 displays the trends in intervention benefits, crashes avoided and lives saved, from 2000 to 2005. Overall, the number of crashes avoided has shown an increasing trend, while the number of lives saved has decreased in recent years.

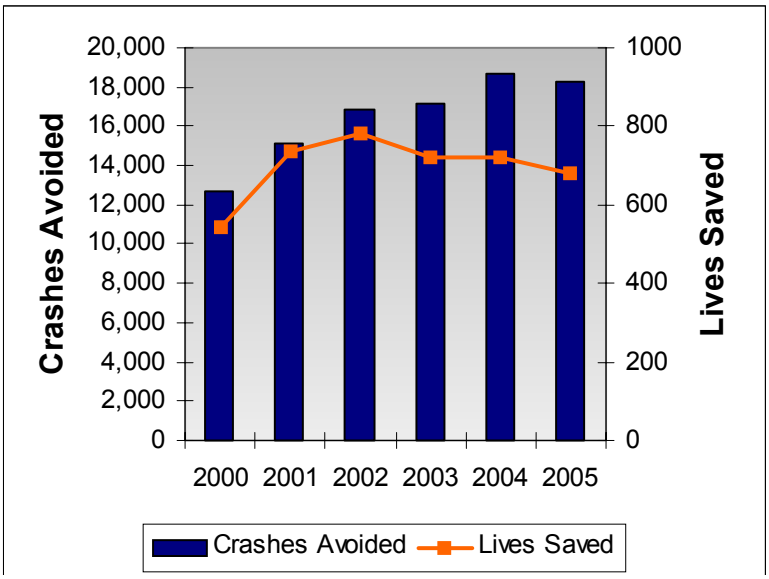

Figure ES-3. Crash and Fatality Trends

State Level

The model's flexibility lends itself to finer divisions of examination, such as scrutiny by state, which then can be used to guide the allocation of MCSAP resources and the design of state safety programs. Because many states manage their intervention program differently, it is also important to analyze state level totals as well as the national totals. The national totals have the ability to obscure state level trends that may occur because of the differences in how the programs are administered.

Table ES-10 through Table ES-12 at the end of the document provide detailed results for interventions conducted:

- in all fifty states,
- in the District of Columbia, American Samoa, the Northern Mariana Islands, Puerto Rico and
- by federal staff (denoted by US).

These tables provide intervention counts, total estimated benefits (crashes avoided, lives saved, injuries avoided), and normalized estimated benefits (benefits per thousand interventions.

Analysis

This section is devoted to the analysis of the model results. The current analysis year (2005) has shown a minor increase of 0.25% in the number of interventions compared with the previous year (2004), while the number of crashes avoided resulting from the interventions has decreased by 4.85%. The reason for the decreased marginal contribution per inspection is a combination of the shift in intervention type and the indirect contribution, which are further explored in the following sections.

Program Activity. The activity data reveals that there has been a slight shift in the program exposure from roadside inspections to traffic enforcements (Table ES-1), while the overall activity has remained fairly constant. Comparing 2005 to 2004 the number of roadside inspections has decreased by 17,308 and the number of traffic enforcements has increased by 24,687. The shift in program exposure has carried over to the program effectiveness; the crashes avoided due to roadside inspections has decreased by 350 relative to 2004 while the crashes avoided due to traffic enforcements has increased by 148 relative to 2004. The shift in program exposure has further been influenced by the indirect effects.

Indirect Effect Trends. The decrease in the number of crashes avoided is largely attributable to the decrease in the indirect contribution over the most recent years in the Roadside Inspection program.

Table ES-3 provides a comparison of the direct and indirect program benefits for the Roadside Inspection program over 2002 - 2004. The percent of direct crashes avoided has shown a steady increase from about 75% in 2002 to about 78% in 2004. The indirect percentage has shown the opposite trend decreasing by approximately 3% from 2002 to 2004.

Table ES-3. Roadside Inspection Program Benefits 2002-2004

	2002		2003		2004	
	Crashes Avoided	% of Total	Crashes Avoided	% of Total	Crashes Avoided	% of Total
Direct	6,558	74.57%	6,840	76.69%	7,265	77.87%
Indirect	2,236	25.43%	2,079	23.31%	2,065	22.13%
Total	8,795		8,919		9,300	

Table ES-4 displays a comparison of the direct and indirect crashes avoided for the Traffic Enforcement program. The Traffic Enforcement program has remained fairly constant in the percent allocation of direct and indirect benefits.

Table ES-4. Traffic Enforcement Program Benefits 2002 - 2004

	2002		2003		2004	
	Crashes Avoided	% of Total	Crashes Avoided	% of Total	Crashes Avoided	% of Total
Direct	7,298	85.80%	7,269	85.45%	7,764	86.21%
Indirect	1,208	14.20%	1,238	14.55%	1,242	13.79%
Total	8,505		8,506		9,005	

The indirect effect percentages used in the model come from a two-year average of the years prior to the benefit year. For example, the estimated indirect benefits for 2005 use the two-year average of the 2003 and 2004 indirect benefits as a percentage of total crashes avoided. Table ES-5 displays these two-year averages for both programs.

Table ES-5. Two Year Average of Indirect Benefits as a Percentage of Total Crashes

	2001 - 2002 Average	2002 - 2003 Average	2003 - 2004 Average
Roadside Inspections	25.72%	24.37%	22.72%
Traffic Enforcements	14.66%	14.37%	14.17%

Figure ES-4 clearly illustrates the decreasing trend in indirect effects for the Roadside Inspection program. The figure also depicts the large difference between the indirect contribution for each enforcement type. The indirect contribution of roadside inspections is much greater than the indirect contribution of the Traffic Enforcement program.

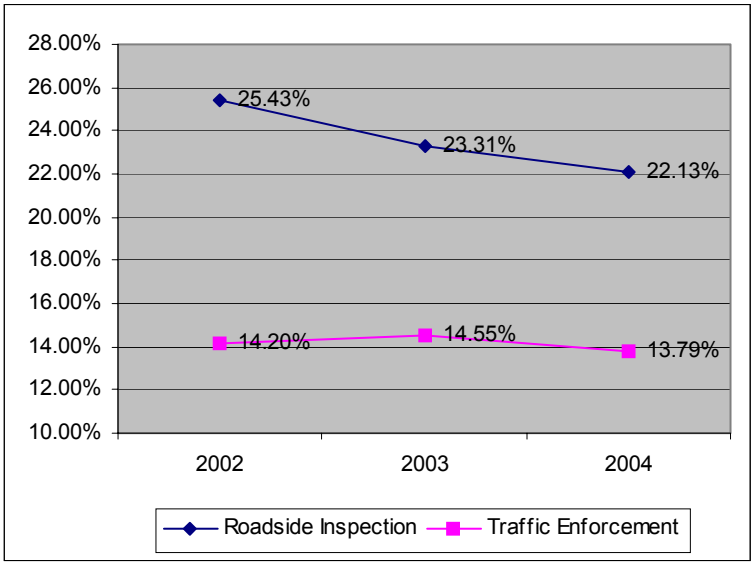

Figure ES-4. Indirect Effects Trends

The loss of 350 crashes avoided from the Roadside Inspection program from 2004 to 2005 stems from the shift in program exposure and the diminishing contribution from the roadside inspection indirect effects. The effectiveness of the Roadside Inspection program carries over to the total program effectiveness, which has shown a net loss of 202 crashes avoided from 2004 to 2005.

Crash Severity Trends. The program effectiveness in 2005 has shown a decrease relative to 2004 in terms of injuries avoided and lives saved (Table ES-2). In the previous three years the number of lives saved has not been proportional to the number of crashes avoided. The major reason for this behavior is the model relies on crash severity statistics from actual crashes reported during the current activity year and previous activity year as described in the methodology section of this document. Over the past few years the average number of fatal crashes and fatalities per crash have been decreasing according to MCMIS data. It is plausible that some of this decrease has resulted from increases in the safety of roads and vehicles. In the past few years, FMCSA has placed a greater emphasis on reporting injury and towaway crashes,

which would also account for a decrease in the percentage of fatal crashes and subsequently the expected number of fatalities per crash.

Table ES-6 displays the decreasing percentage of fatal and injury crashes from 2002 to 2005. The trend shows the percent of fatal and injury crashes has decreased from 2002 to 2005 while the percent of tow away crashes has shown an increase of almost 6% over these years.

Table ES-6. Crash Severity Shares

Year	Fatal Crash	Injury Crash	Tow away Crash
2002	3.94%	47.76%	48.30%
2003	3.41%	47.18%	49.41%
2004	3.05%	44.98%	51.97%
2005	3.18%	42.78%	54.03%

Table ES-7 shows the two year average of fatal, injury and tow away crash shares to smooth out any year to year fluctuations and display the percentages used in the model.

Table ES-7. Two Year Average of Crash Severity Shares

Time Range	Fatal Crash	Injury Crash	Tow away Crash
2002 - 2003	3.68%	47.47%	48.86%
2003 - 2004	3.23%	46.08%	50.69%
2004 - 2005	3.12%	43.88%	53.00%

Table ES-8 displays the average number of fatalities and injuries that are present in either fatal or injury crashes. In general, there has not been any substantial changes in the number of fatalities per crash and injuries per fatal or injury crash.

Table ES-8. Average Number of Fatalities and Injuries by Year

Year	Fatalities/ Fatal Crash	Injuries/Fatal Crash	Injuries/ Injury Crash
2002	1.223	1.131	1.515
2003	1.178	1.031	1.521
2004	1.214	1.174	1.489
2005	1.169	0.968	1.519

Table ES-9 shows the two year average of number of fatalities and injuries in fatal or injury crashes to eliminate any yearly inconsistencies and display the numbers used in the model.

Table ES-9. Two Year Average of Fatalities and Injuries

Time Range	Fatalities/ Fatal Crash	Injuries/Fatal Crash	Injuries/ Injury Crash
2002 - 2003	1.200	1.081	1.518
2003 - 2004	1.196	1.102	1.505
2004 - 2005	1.192	1.071	1.504

The above table ES-9 clearly shows that there is not much variation in the number of fatalities per fatal crash, around 1.2, injuries per fatal crash, around 1.1, or injuries per injury crash, around 1.5. However, there is a obvious decrease in the percent of fatal and injury crashes and rise in the percent of tow away crashes given by table ES-7. The drop in number of fatalities and injuries avoided due to interventions is attributable to the decreased share of fatal and injury crashes.

Table ES-10. 2005 Roadside Inspection and Traffic Enforcement Program Benefits

State	Total Initiating Interventions	Number with Violations	% of Total	Estimated Totals				Estimated Totals / 1000 Inspections			
				Crashes Avoided	Injuries Avoided	Lives Saved	Rank	Crashes Avoided	Injuries Avoided	Lives Saved	Rank
AK	9,940	5,345	53.8%	41.20	28.57	1.53	47	4.14	2.87	0.15	42
AL	29,363	25,054	85.3%	196.11	135.98	7.30	31	6.68	4.63	0.25	20
AR	53,397	38,750	72.6%	377.07	261.46	14.03	19	7.06	4.90	0.26	17
AS	860	345	40.1%	4.40	3.04	0.16	55	5.12	3.54	0.19	34
AZ	43,679	39,226	89.8%	746.16	517.37	27.76	5	17.08	11.84	0.64	1
CA	470,941	244,124	51.8%	932.31	646.44	34.66	2	1.98	1.37	0.07	55
CO	62,918	45,825	72.8%	420.04	291.24	15.63	17	6.68	4.63	0.25	21
CT	18,100	16,410	90.7%	224.13	155.41	8.33	28	12.38	8.59	0.46	7
DC	8,654	4,250	49.1%	24.50	16.98	0.92	50	2.83	1.96	0.11	52
DE	5,003	3,891	77.8%	26.16	18.13	0.98	49	5.23	3.62	0.20	31
FL	77,043	60,756	78.9%	536.75	372.17	19.97	8	6.97	4.83	0.26	18
GA	92,784	82,806	89.2%	920.59	638.31	34.22	3	9.92	6.88	0.37	11
HI	3,418	1,941	56.8%	22.68	15.73	0.85	51	6.64	4.60	0.25	22
IA	64,294	51,768	80.5%	205.43	142.43	7.65	30	3.20	2.22	0.12	50
ID	9,313	8,016	86.1%	142.91	99.10	5.32	34	15.35	10.64	0.57	3
IL	84,461	61,846	73.2%	435.40	301.89	16.19	15	5.15	3.57	0.19	32
IN	60,660	55,780	92.0%	420.48	291.55	15.63	16	6.93	4.81	0.26	19
KS	45,008	33,124	73.6%	207.63	143.97	7.71	29	4.61	3.20	0.17	39
KY	86,040	40,700	47.3%	293.84	203.75	10.92	23	3.42	2.37	0.13	48
LA	40,242	34,172	84.9%	147.09	101.99	5.48	33	3.66	2.53	0.14	46
MA	18,358	12,141	66.1%	114.54	79.43	4.26	38	6.24	4.33	0.23	23
MD	102,823	68,358	66.5%	486.08	337.04	18.08	11	4.73	3.28	0.18	38
ME	11,718	8,549	73.0%	70.56	48.92	2.62	42	6.02	4.17	0.22	26
MI	47,494	39,900	84.0%	407.87	282.80	15.18	18	8.59	5.95	0.32	15
MN	31,399	26,322	83.8%	477.87	331.35	17.78	12	15.22	10.55	0.57	4
MO	77,459	62,025	80.1%	856.88	594.13	31.86	4	11.06	7.67	0.41	8
MP	994	826	83.1%	12.99	9.00	0.49	54	13.07	9.06	0.50	5
MS	20,271	11,599	57.2%	103.74	71.94	3.86	40	5.12	3.55	0.19	33
MT	32,925	19,298	58.6%	120.39	83.49	4.48	37	3.66	2.54	0.14	45
NC	52,559	41,250	78.5%	267.73	185.65	9.95	27	5.09	3.53	0.19	35
ND	18,282	9,693	53.0%	39.17	27.16	1.45	48	2.14	1.49	0.08	54
NE	34,444	21,408	62.2%	120.63	83.64	4.49	36	3.50	2.43	0.13	47
NH	9,974	7,530	75.5%	44.96	31.18	1.67	46	4.51	3.13	0.17	40
NJ	31,133	24,467	78.6%	277.37	192.33	10.32	26	8.91	6.18	0.33	14
NM	71,990	54,757	76.1%	439.87	305.00	16.36	14	6.11	4.24	0.23	25
NV	26,765	19,158	71.6%	140.81	97.64	5.24	35	5.26	3.65	0.20	29
NY	95,029	63,264	66.6%	530.78	368.03	19.74	9	5.59	3.87	0.21	27
OH	78,909	61,528	78.0%	711.94	493.64	26.47	6	9.02	6.26	0.34	13
OK	18,427	15,472	84.0%	113.46	78.67	4.23	39	6.16	4.27	0.23	24
OR	55,826	42,175	75.5%	306.73	212.67	11.40	22	5.49	3.81	0.20	28
PA	85,933	65,786	76.6%	612.76	424.87	22.79	7	7.13	4.94	0.27	16
PR	1,379	1,230	89.2%	22.38	15.52	0.83	52	16.23	11.25	0.60	2
RI	3,244	2,518	77.6%	17.03	11.80	0.64	53	5.25	3.64	0.20	30
SC	38,052	31,655	83.2%	154.79	107.32	5.76	32	4.07	2.82	0.15	43
SD	23,791	14,050	59.1%	55.83	38.71	2.09	43	2.35	1.63	0.09	53
TN	66,393	43,110	64.9%	286.04	198.34	10.63	24	4.31	2.99	0.16	41
TX	322,894	280,916	87.0%	3,262.60	2,262.20	121.30	1	10.10	7.01	0.38	10
US	104,655	76,065	72.7%	324.73	225.15	12.08	20	3.10	2.15	0.12	51
UT	27,159	19,478	71.7%	280.06	194.18	10.42	25	10.31	7.15	0.38	9
VA	32,604	25,077	76.9%	319.13	221.27	11.87	21	9.79	6.79	0.36	12
VT	10,031	8,469	84.4%	48.54	33.65	1.82	45	4.84	3.35	0.18	36
WA	128,578	96,925	75.4%	492.96	341.82	18.32	10	3.83	2.66	0.14	44
WI	38,155	34,825	91.3%	474.47	328.98	17.64	13	12.44	8.62	0.46	6
WV	16,632	10,318	62.0%	55.55	38.53	2.06	44	3.34	2.32	0.12	49
WY	19,889	13,197	66.4%	94.69	65.67	3.54	41	4.76	3.30	0.18	37
Total	**3,022,286**	**2,187,468**	**72.4%**	**18,471**	**12,807**	**687**		**6.11**	**4.24**	**0.23**	

Table ES-11. 2005 Roadside Inspection Program Benefits

State	Total Initiating Interventions	Roadside Inspections				Estimated Totals				Estimated Totals / 1000 Inspections			
		Number	% of Total	# with DR/VH	% of Total	Crashes Avoided	Injuries Avoided	Lives Saved	Rank	Crashes Avoided	Injuries Avoided	Lives Saved	Rank
AK	9,940	8,532	85.84	3,937	39.61	21.05	14.60	0.79	46	2.47	1.71	0.09	45
AL	29,363	19,262	65.60	14,953	50.92	76.63	53.13	2.85	32	3.98	2.76	0.15	24
AR	53,397	35,609	66.69	20,962	39.26	150.83	104.58	5.62	18	4.24	2.94	0.16	18
AS	860	740	86.05	225	26.16	3.23	2.24	0.12	54	4.37	3.03	0.16	15
AZ	43,679	24,783	56.74	20,330	46.54	205.50	142.49	7.65	15	8.29	5.75	0.31	4
CA	470,941	374,224	79.46	147,407	31.30	439.99	305.08	16.36	2	1.18	0.82	0.04	55
CO	62,918	50,504	80.27	33,411	53.10	322.08	223.32	11.98	5	6.38	4.42	0.24	9
CT	18,100	11,377	62.86	9,687	53.52	86.05	59.67	3.20	26	7.56	5.24	0.28	6
DC	8,654	7,306	84.42	2,902	33.53	14.29	9.90	0.53	49	1.96	1.35	0.07	49
DE	5,003	3,818	76.31	2,706	54.09	13.07	9.06	0.49	50	3.42	2.37	0.13	27
FL	77,043	49,722	64.54	33,435	43.40	210.16	145.72	7.82	14	4.23	2.93	0.16	19
GA	92,784	61,474	66.25	51,496	55.50	413.81	286.93	15.39	3	6.73	4.67	0.25	7
HI	3,418	2,557	74.81	1,080	31.60	3.34	2.32	0.13	53	1.31	0.91	0.05	53
IA	64,294	52,785	82.10	40,259	62.62	142.57	98.85	5.31	20	2.70	1.87	0.10	40
ID	9,313	5,458	58.61	4,161	44.68	43.10	29.89	1.60	37	7.90	5.48	0.29	5
IL	84,461	48,861	57.85	26,246	31.07	108.60	75.30	4.04	23	2.22	1.54	0.08	46
IN	60,660	22,413	36.95	17,533	28.90	90.77	62.94	3.38	25	4.05	2.81	0.15	23
KS	45,008	30,797	68.43	18,913	42.02	85.33	59.16	3.17	27	2.77	1.92	0.10	39
KY	86,040	71,958	83.63	26,618	30.94	231.08	160.23	8.59	11	3.21	2.23	0.12	30
LA	40,242	23,277	57.84	17,207	42.76	50.04	34.69	1.86	35	2.15	1.49	0.08	47
MA	18,358	11,996	65.34	5,779	31.48	31.56	21.89	1.18	40	2.63	1.83	0.10	42
MD	102,823	78,023	75.88	43,558	42.36	219.10	151.91	8.15	13	2.81	1.95	0.10	38
ME	11,718	8,949	76.37	5,780	49.33	28.18	19.54	1.05	41	3.15	2.18	0.12	32
MI	47,494	21,672	45.63	14,078	29.64	115.46	80.06	4.30	22	5.33	3.69	0.20	13
MN	31,399	14,687	46.78	9,610	30.61	63.43	43.98	2.37	34	4.32	2.99	0.16	17
MO	77,459	48,542	62.67	33,108	42.74	282.85	196.12	10.52	7	5.83	4.04	0.22	12
MP	994	901	90.64	733	73.74	10.26	7.12	0.39	51	11.39	7.90	0.43	1
MS	20,271	19,629	96.83	10,957	54.05	84.90	58.86	3.16	28	4.33	3.00	0.16	16
MT	32,925	27,756	84.30	14,129	42.91	83.46	57.88	3.11	30	3.01	2.09	0.11	33
NC	52,559	36,346	69.15	25,037	47.64	104.77	72.66	3.89	24	2.88	2.00	0.11	35
ND	18,282	14,977	81.92	6,388	34.94	24.12	16.72	0.89	43	1.61	1.12	0.06	52
NE	34,444	24,896	72.28	11,860	34.43	80.23	55.63	2.99	31	3.22	2.23	0.12	29
NH	9,974	7,930	79.51	5,486	55.00	20.65	14.32	0.76	47	2.60	1.81	0.10	43
NJ	31,133	21,385	68.69	14,719	47.28	84.46	58.57	3.14	29	3.95	2.74	0.15	25
NM	71,990	50,983	70.82	33,750	46.88	227.13	157.49	8.45	12	4.46	3.09	0.17	14
NV	26,765	19,043	71.15	11,436	42.73	48.78	33.82	1.81	36	2.56	1.78	0.10	44
NY	95,029	78,651	82.77	46,886	49.34	256.42	177.79	9.54	9	3.26	2.26	0.12	28
OH	78,909	61,767	78.28	44,386	56.25	384.83	266.83	14.31	4	6.23	4.32	0.23	10
OK	18,427	7,071	38.37	4,116	22.34	24.30	16.85	0.91	42	3.44	2.38	0.13	26
OR	55,826	40,535	72.61	26,884	48.16	169.55	117.56	6.30	16	4.18	2.90	0.16	21
PA	85,933	67,530	78.58	47,383	55.14	281.35	195.08	10.47	8	4.17	2.89	0.16	22
PR	1,379	760	55.11	611	44.31	3.20	2.21	0.12	55	4.21	2.91	0.15	20
RI	3,244	2,061	63.53	1,335	41.15	6.59	4.57	0.25	52	3.20	2.22	0.12	31
SC	38,052	14,190	37.29	7,793	20.48	38.19	26.47	1.42	39	2.69	1.87	0.10	41
SD	23,791	16,995	71.43	7,254	30.49	21.88	15.18	0.82	45	1.29	0.89	0.05	54
TN	66,393	35,479	53.44	12,196	18.37	67.91	47.09	2.52	33	1.91	1.33	0.07	50
TX	322,894	274,416	84.99	232,438	71.99	2,715.15	1,882.61	100.94	1	9.89	6.86	0.37	2
US	104,655	102,323	97.77	73,733	70.45	292.93	203.10	10.90	6	2.86	1.98	0.11	37
UT	27,159	20,958	77.17	13,277	48.89	124.00	85.97	4.62	21	5.92	4.10	0.22	11
VA	32,604	24,755	75.93	17,228	52.84	165.84	114.98	6.17	17	6.70	4.64	0.25	8
VT	10,031	6,327	63.07	4,765	47.50	18.21	12.62	0.69	48	2.88	1.99	0.11	36
WA	128,578	75,724	58.89	44,071	34.28	149.79	103.87	5.56	19	1.98	1.37	0.07	48
WI	38,155	25,444	66.69	22,114	57.96	249.82	173.21	9.29	10	9.82	6.81	0.37	3
WV	16,632	12,158	73.10	5,844	35.14	22.37	15.51	0.83	44	1.84	1.28	0.07	51
WY	19,889	14,251	71.65	7,559	38.01	42.31	29.35	1.58	38	2.97	2.06	0.11	34
Total	**3,022,286**	**2,194,567**	**72.61**	**1,359,749**	**44.99**	**9,255**	**6,418**	**344**		**4.22**	**2.92**	**0.16**	

Table ES-12. 2005 Traffic Enforcement Program Benefits

State	Total Initiating Interventions	Traffic Enforcements		Program Estimated Totals				Estimated Totals / 1000 Inspections			
		Number	% of Total	Crashes Avoided	Injuries Avoided	Lives Saved	Rank	Crashes Avoided	Injuries Avoided	Lives Saved	Rank
AK	9,940	1,408	14.16	20.14	13.97	0.75	46	14.31	9.92	0.53	19
AL	29,363	10,101	34.40	119.48	82.85	4.45	27	11.83	8.20	0.44	26
AR	53,397	17,788	33.31	226.25	156.88	8.41	16	12.72	8.82	0.47	22
AS	860	120	13.95	1.17	0.80	0.05	55	9.71	6.70	0.39	33
AZ	43,679	18,896	43.26	540.66	374.87	20.11	3	28.61	19.84	1.06	4
CA	470,941	96,717	20.54	492.31	341.35	18.30	5	5.09	3.53	0.19	50
CO	62,918	12,414	19.73	97.96	67.92	3.65	30	7.89	5.47	0.29	41
CT	18,100	6,723	37.14	138.08	95.75	5.14	24	20.54	14.24	0.76	9
DC	8,654	1,348	15.58	10.22	7.08	0.38	53	7.58	5.25	0.29	43
DE	5,003	1,185	23.69	13.10	9.08	0.49	51	11.05	7.66	0.41	29
FL	77,043	27,321	35.46	326.59	226.46	12.15	12	11.95	8.29	0.44	23
GA	92,784	31,310	33.75	506.77	351.39	18.84	4	16.19	11.22	0.60	17
HI	3,418	861	25.19	19.34	13.41	0.72	47	22.46	15.57	0.84	8
IA	64,294	11,509	17.90	62.86	43.59	2.34	35	5.46	3.79	0.20	49
ID	9,313	3,855	41.39	99.81	69.21	3.72	29	25.89	17.95	0.96	5
IL	84,461	35,600	42.15	326.79	226.60	12.15	11	9.18	6.37	0.34	35
IN	60,660	38,247	63.05	329.70	228.61	12.26	9	8.62	5.98	0.32	38
KS	45,008	14,211	31.57	122.31	84.81	4.54	26	8.61	5.97	0.32	39
KY	86,040	14,082	16.37	62.76	43.52	2.33	36	4.46	3.09	0.17	54
LA	40,242	16,965	42.16	97.05	67.29	3.61	31	5.72	3.97	0.21	48
MA	18,358	6,362	34.66	82.98	57.53	3.09	34	13.04	9.04	0.49	21
MD	102,823	24,800	24.12	266.99	185.13	9.93	15	10.77	7.46	0.40	30
ME	11,718	2,769	23.63	42.37	29.38	1.57	38	15.30	10.61	0.57	18
MI	47,494	25,822	54.37	292.41	202.75	10.88	13	11.32	7.85	0.42	27
MN	31,399	16,712	53.22	414.44	287.37	15.41	6	24.80	17.20	0.92	7
MO	77,459	28,917	37.33	574.03	398.01	21.34	1	19.85	13.76	0.74	10
MP	994	93	9.36	2.73	1.89	0.10	54	29.31	20.29	1.13	3
MS	20,271	642	3.17	18.84	13.07	0.70	49	29.34	20.36	1.09	2
MT	32,925	5,169	15.70	36.93	25.61	1.37	40	7.15	4.95	0.27	45
NC	52,559	16,213	30.85	162.96	112.99	6.06	21	10.05	6.97	0.37	32
ND	18,282	3,305	18.08	15.05	10.44	0.56	50	4.55	3.16	0.17	53
NE	34,444	9,548	27.72	40.40	28.01	1.50	39	4.23	2.93	0.16	55
NH	9,974	2,044	20.49	24.30	16.86	0.91	45	11.89	8.25	0.44	25
NJ	31,133	9,748	31.31	192.91	133.76	7.18	20	19.79	13.72	0.74	11
NM	71,990	21,007	29.18	212.74	147.51	7.91	19	10.13	7.02	0.38	31
NV	26,765	7,722	28.85	92.03	63.81	3.43	32	11.92	8.26	0.44	24
NY	95,029	16,378	17.23	274.36	190.23	10.21	14	16.75	11.62	0.62	16
OH	78,909	17,142	21.72	327.11	226.80	12.16	10	19.08	13.23	0.71	13
OK	18,427	11,356	61.63	89.16	61.82	3.32	33	7.85	5.44	0.29	42
OR	55,826	15,291	27.39	137.18	95.12	5.10	25	8.97	6.22	0.33	36
PA	85,933	18,403	21.42	331.40	229.79	12.33	8	18.01	12.49	0.67	14
PR	1,379	619	44.89	19.19	13.31	0.71	48	31.00	21.49	1.15	1
RI	3,244	1,183	36.47	10.44	7.24	0.40	52	8.82	6.12	0.33	37
SC	38,052	23,862	62.71	116.60	80.84	4.33	28	4.89	3.39	0.18	52
SD	23,791	6,796	28.57	33.95	23.53	1.27	41	5.00	3.46	0.19	51
TN	66,393	30,914	46.56	218.14	151.25	8.11	18	7.06	4.89	0.26	46
TX	322,894	48,478	15.01	547.46	379.59	20.35	2	11.29	7.83	0.42	28
US	104,655	2,332	2.23	31.79	22.04	1.19	43	13.63	9.45	0.51	20
UT	27,159	6,201	22.83	156.06	108.21	5.80	22	25.17	17.45	0.94	6
VA	32,604	7,849	24.07	153.29	106.29	5.70	23	19.53	13.54	0.73	12
VT	10,031	3,704	36.93	30.34	21.03	1.13	44	8.19	5.68	0.31	40
WA	128,578	52,854	41.11	343.17	237.95	12.76	7	6.49	4.50	0.24	47
WI	38,155	12,711	33.31	224.65	155.77	8.35	17	17.67	12.25	0.66	15
WV	16,632	4,474	26.90	33.18	23.01	1.23	42	7.42	5.14	0.28	44
WY	19,889	5,638	28.35	52.38	36.33	1.96	37	9.29	6.44	0.35	34
Total	**3,022,286**	**827,719**	**27.39**	**9,215**	**6,390**	**343**		**11.13**	**7.72**	**0.41**	