

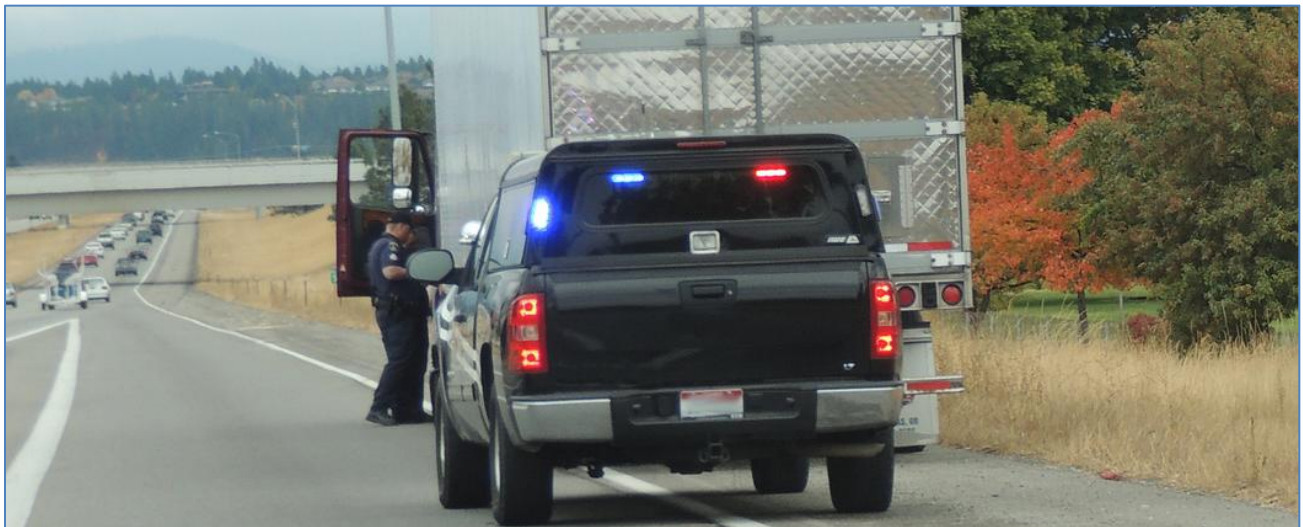


TECHNICAL BRIEF: Commercial Motor Vehicle Enforcement – Top 10 High Performance States

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Analysis of the Top 10 High Performance States

BACKGROUND

On July 31, 2014, the American Transportation Research Institute (ATRI) released its study, *“Evaluating the Impact of Commercial Motor Vehicle Enforcement Disparities on Carrier Safety Performance.”* One outcome from this study was a data metrics compendium which compared and contrasted the enforcement and safety performance of the 48 contiguous states across several dozen variables. To gain a better understanding of how states perform in relation to one another, ATRI researchers developed “Top 10” and “Bottom 10” lists for each given metric.

For example, ATRI examined which states had the most and fewest roadside inspections (RI) per million vehicle miles traveled (MVMT). Maryland rounded out the Top 10 states with 27.9 RIs per MVMT, while Oklahoma rounded out the Bottom 10 with 3.7 per MVMT. An examination of the Top/Bottom 10 lists across metrics reveals that certain states ranked in the Top 10 for one metric, but ranked in the Bottom 10 for another metric. Consequently, ATRI researchers sought to identify the “Top 10” states that demonstrated continuous and superior safety and enforcement performance across a plurality of data metrics.

METHODOLOGY

While the data metrics compendium includes numerous variables, ATRI researchers only included a select few that were most representative of safety and enforcement metrics. Table 1 displays the data metrics which were included in the Top 10 States analysis.

Table 1. Data Metrics in Top 10 States Analysis

Data Metric
Crashes per MVMT
Fatal crashes per MVMT
RIs without violations per MVMT
RIs per MVMT
Violations per MVMT
Out-of-service (OOS) violations per MVMT
Traffic enforcement stops (TES) per MVMT
Violations issued during TES per MVMT
Red Flag violations per MVMT
Crash Predictor violations ^{1,2,3} per MVMT
State funds expended per federal Motor Carrier Safety Assistance funds

To identify the top performing states, a discrete number of points were awarded to a state when it ranked in the Top 10 for each data metric in Table 1. In order to preserve each state’s ranking across the data metrics, a weighted point system ranging from one to 10 points was used. As

¹ In 2005, ATRI analyzed the relationship between Motor Carrier Management Information System (MCMIS) inspection data, Commercial Driver License Information System (CDLIS) records and crash risk. Based on this analysis, ATRI developed a list of the top 10 driver violations or convictions most statistically associated with future crash risk. Using the same methodology as in 2005, ATRI researchers updated the top 10 Crash Predictor violations in 2011. The 2011 Crash Predictor violations were used in the current analysis.

² Murray, D.C., Lantz, B., & Keppler, S.A. (2005). Predicting Truck Crash Involvement: Developing A Commercial Driver Behavior-Based Model and Recommended Countermeasures. Arlington, VA: American Transportation Research Institute.

³ Lueck, M.D., & Murray, D.C. (2011). Predicting Truck Crash Involvement: A 2011 Update. Arlington, VA: American Transportation Research Institute.

Table 2 illustrates an inverse relationship exists between a state’s ranking and the number of points awarded. For example, if a state ranked first for a specific metric it was awarded 10 points, however if a state ranked 10th it received one point. The exceptions to this rule were the rankings for crashes per MVMT and fatal crashes per MVMT as higher rankings would indicate that these states are less safe since they have higher crash rates. Therefore, states with lower crash rates received more points, while states with higher crash rates received fewer points.

Table 2. Weighted Point System

Top 10 Ranking	Points Awarded	Bottom 10 Ranking	Points Awarded
1	10	48	10
2	9	47	9
3	8	46	8
4	7	45	7
5	6	44	6
6	5	43	5
7	4	42	4
8	3	41	3
9	2	40	2
10	1	39	1

RESULTS

Table 3 displays the Top 10 states that have greater safety and enforcement performance relative to other states (according to criteria in Table 1). Noticeably, Maryland’s total points on the Top 10 list are substantially greater than the other nine states which indicates that Maryland ranked near the top of most of the data metrics lists. As displayed in Table 3, New Mexico and California tied with 27 total points each. New Mexico received the higher consecutive ranking based on its slightly higher position on both ATRI Crash Predictor lists, and greater frequency of appearances on the various Top 10 Enforcement Disparities metrics list.

Table 3. Enforcement Disparities Top 10 States

Ranking	State	Total Points
1	MD	73
2	WA	40
3	NV	36
4	RI	33
5	MT	31
6	CT	29
7	NM	27
8	CA	27
9	SD	25
10	IA	24

DISCUSSION

It is worth noting that previous ATRI safety risk studies (informally referred to as “*Crash Predictor*”) evaluated and ranked states based on effective enforcement countermeasures in

2005⁴ and an update in 2011.⁵ In both of these studies a list of the “Top Tier” states was developed based on the relationship between the percentage of traffic enforcement relative to the percentage of crashes within each state. In the Crash Predictor research, a state was considered Top Tier if its percentage of traffic enforcement was greater than its percentage of crashes. Table 4 displays the Top Tier states from the 2005 and 2011 Crash Predictor studies. States that appeared on both the 2005 and 2011 lists are shaded in gray.

Table 4. Crash Predictor 2005 and 2011 Top Tier States

2005 Crash Predictor		2011 Crash Predictor	
Ranking	State	Ranking	State
1	WA	1	IN
2	TN	2	NM
3	IA	3	WA
4	NM	4	CA
5	CA	5	AZ
6	MI	6	MI
7	IN	7	KY
8	IL	8	IA
9	KS	9	MD
10	LA	10	NV

While the methodologies for identifying the top performing states across the Enforcement Disparities and the Crash Predictor studies differ, the top performing states do overlap between these lists, suggesting validation of the findings. Table 5 displays the states from the current Top 10 analysis that also appear on the 2005 and/or 2011 Crash Predictor Top Tier lists. Among these states, Washington, New Mexico and California rank within the top five states across both the 2005 and 2011 Top Tier lists. Based on the findings one could surmise that enforcement partners should model or adopt the enforcement strategies of these states due to each appearing on “Top 10” lists over a number of years.

Table 5. Comparison Between Enforcement Disparities Top 10 States and Crash Predictor Top Tier States

Enforcement Disparities		Crash Predictor	
State	Ranking	2005 Ranking	2011 Ranking
MD	1	-	9
WA	2	1	3
NV	3	-	10
RI	4	-	-
MT	5	-	-
CT	6	-	-
NM	7	4	2
CA	8	5	4
SD	9	-	-
IA	10	3	8

⁴ Murray, D.C., Lantz, B., & Keppler, S.A. (2005). Predicting Truck Crash Involvement: Developing A Commercial Driver Behavior-Based Model and Recommended Countermeasures. Arlington, VA: American Transportation Research Institute.

⁵ Lueck, M.D., & Murray, D.C. (2011). Predicting Truck Crash Involvement: A 2011 Update. Arlington, VA: American Transportation Research Institute.