



# **CSA Update: GAO report and SMS Effectiveness**

MCSAC

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# FMCSA's Safety Mission

- Reduce crashes, injuries, and fatalities involving large trucks and buses
  - Vision for a crash free environment
- Oversight on 525k active companies
  - Diverse population of carrier size and operations
  - Over 83% of companies have 5 or fewer trucks
  - 20, 000 investigations per year
  - 3.5 million inspections per year
- Proactive resource prioritization is essential



# Key Principles of Resource Prioritization

- Proactive by intervening before crashes occur
- Responsive by intervening early and quickly upon identifying poor compliance patterns
- Incorporates risk management techniques for the high consequence/low likelihood events
- Considers exposure when identifying high risk companies



# FMCSA Concerns with draft GAO report

- Focus only on large carriers
- Assumes no crash as no-risk
- Alternatives are not data driven
- Commentary on unpublished Safety Fitness Determination Rule
- Does not consider compliance status of the carrier or purpose of SMS to prioritize intervention resources



# GAO Report

*Precision and confidence* of many SMS scores is limited and SMS is unreliable for prioritization

- Strengthening data sufficiency standards would improve *precision* and *confidence* (20+ inspections)
- Two metrics used to examine *precision* and *confidence*
  - Violation relationship to crash risk
  - Percentage of individual carriers that are involved in at least one crash after being prioritized



# GAO's Metrics Limitations

## GAO:

- For SMS to be effective, violations used should have a strong predictive relationship with crashes.
- Most regulations used to calculate SMS scores are not violated often enough to strongly associate them with crash risk for individual carriers.

## FMCSA:

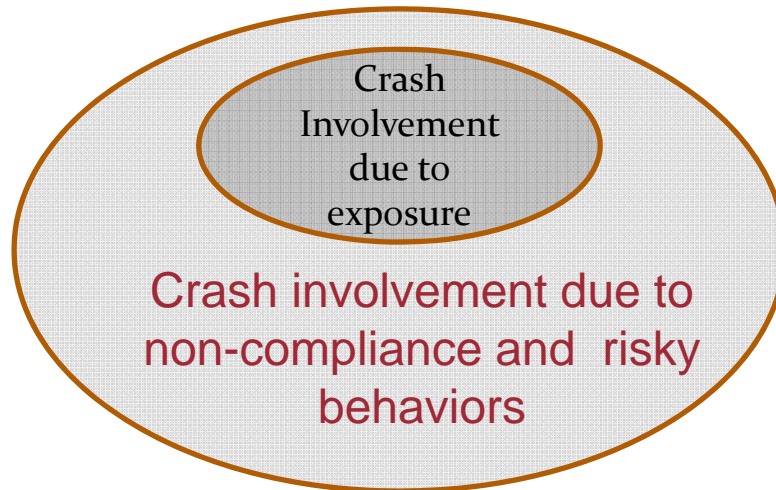
- Objective is to find carriers with patterns of unsafe behaviors leading to increased crash risk.
- FMCSA and ATRI both found associations with groups of violations and crash risk



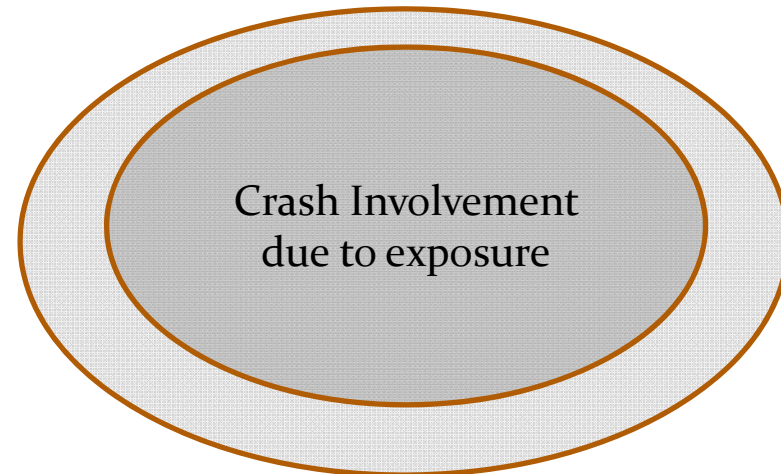
# GAO's Metric limitations

**GAO's metric of "individual carriers involved in a crash"  
makes these two carriers appear equal**

**Carrier A: 3 crashes**  
10 trucks



**Carrier B: 3 crashes**  
100 trucks



- Crash rates should be considered
- **Carrier A provides greater opportunity for intervention and compliance improvement efforts**





# GAO's Alternative Methodology

- 1. Requires 20+ Inspections**
- 2. Removes Safety Event Groups (SEG)**
- 3. Removes VMT**





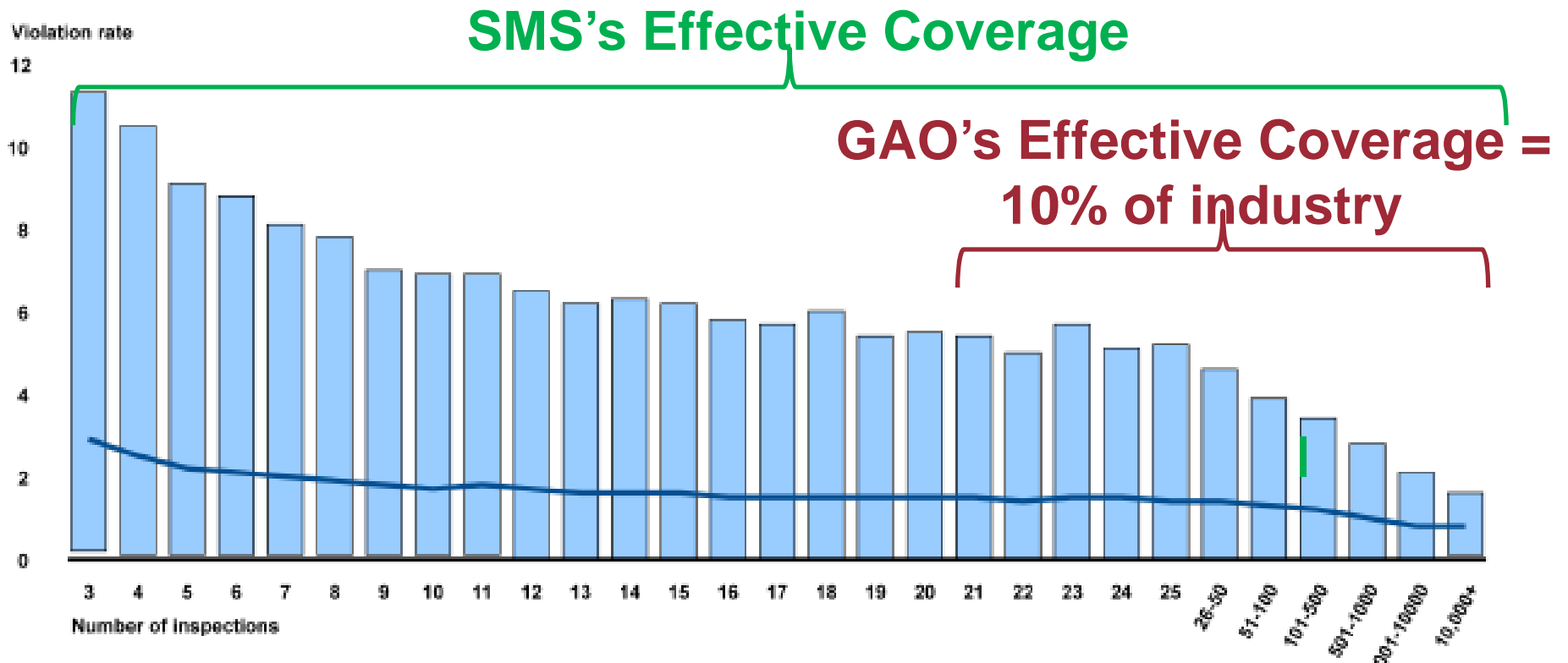
# Requiring 20+ Inspections and No Grouping

- No accountability for over 90% of carriers
- Carriers prioritized based on a single inspection with a violation over carriers with < 20 inspections and multiple violations



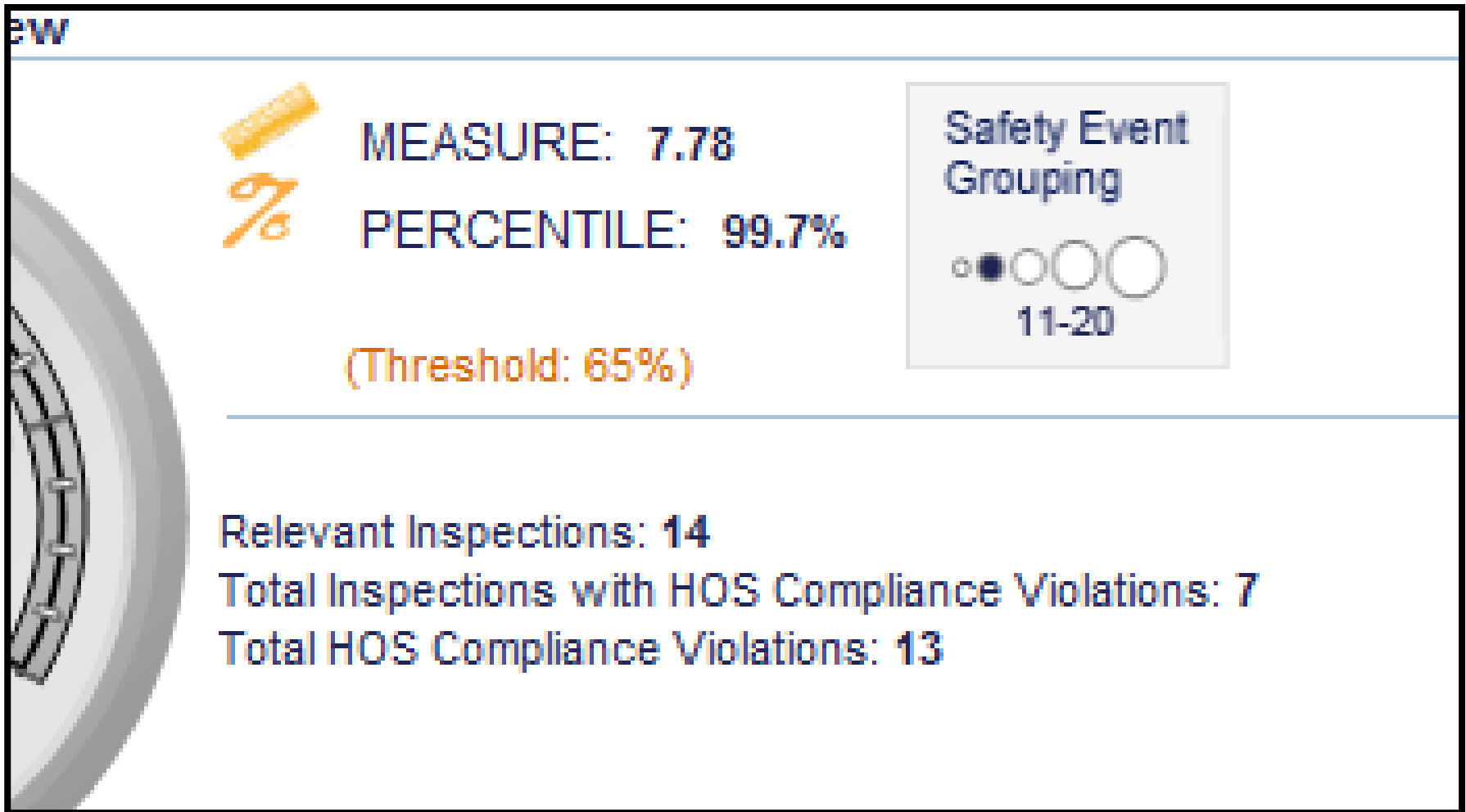
# Requiring 20 + inspections

Figure 1: Average and Range of Violation Rates (between the 1st and 99th Percentiles) for Carriers in the Hours-of-Service Compliance BASIC





# Who is excluded from oversight?

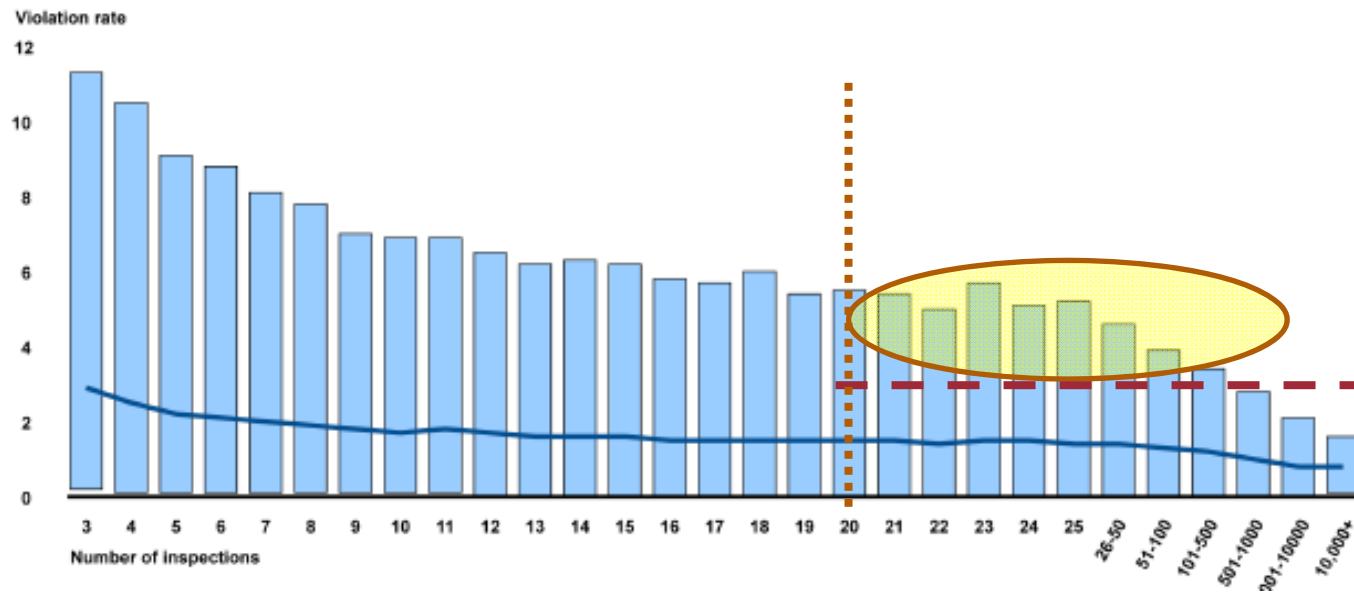




# Removal of Safety Event Groups

- Creates variability by treating companies with 20 inspections equal to a company with 10,000 inspections
- Creates bias toward carriers at the lower end of the sufficiency standard and a virtual free pass for the larger carriers with 100+ inspections

**Figure 1: Average and Range of Violation Rates (between the 1st and 99th Percentiles) for Carriers in the Hours-of-Service Compliance BASIC**





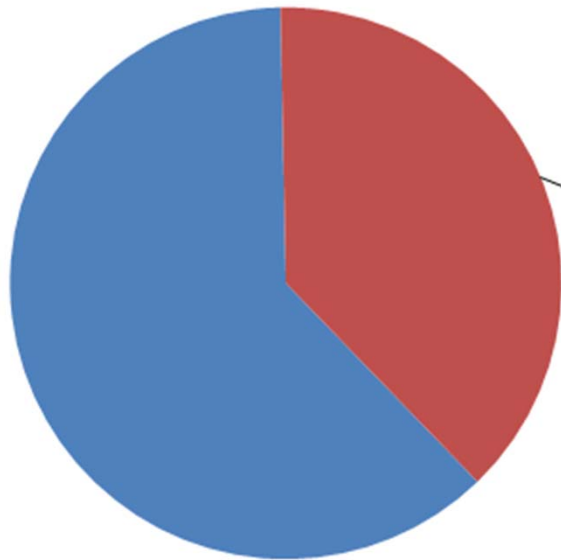
## Removal of VMT: Bias created for high utilization companies

- Analysis confirmed that Crash and Unsafe Driving BASICs based on power units only may be biased against high utilization companies
- SMS solution was to incorporate exposure via VMT-related “utilization” factor (UF)
- Helped counter high utilization bias
  - More accurately accounts for on-road exposure
  - Improved SMS ability to identify high crash risk carriers



# Data Sufficiency in SMS

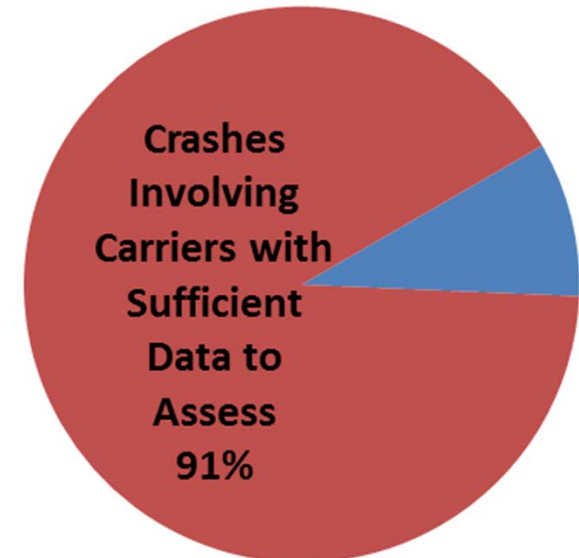
## 525k Active Carriers



**Carriers  
with  
Sufficient  
Data to  
Assess  
38%**



## Crash Involvement



**Crashes  
Involving  
Carriers with  
Sufficient  
Data to  
Assess  
91%**



# GAO's Methodology

SMS produces higher crash rates than the alternative in 5 of 8 categories

Category	Crash Rate of FMCSA identified Carriers as determined by GAO	Crash Rate of GAO identified carriers
Unsafe Driving BASIC	7.13	6.13
Hours of Service Compliance BASIC	6.63	6.72
Driver Fitness BASIC	2.87	2.63
Drug and Alcohol BASIC	3.24	4.71
Vehicle Maintenance BASIC	5.56	6.35
Hazardous Materials BASIC	5.47	5.07
Crash Indicator	7.19	6.83
<b>High Risk Group</b>	<b>8.38</b>	<b>8.25</b>





# GAO Methodology: Impacts

- Driver Fitness BASIC: 1000 carriers prioritized with 1 violation
- Drug and Alcohol BASIC: 1 violation places carrier automatically at 93% or higher
- Carrier with 8 of 10 inspections cited for suspended CDL; not prioritized, when a carrier with 1 out 20 would be prioritized



# Summary of Assessment of GAO Report

- FMCSA acknowledges that there is more variability with fewer inspections
- SMS require a pattern of inspections with violations before intervention
- SMS does have data sufficiency requirements: Waiting for 20 observations before addressing a compliance problem is poor risk management
- Compares compliance between carriers to prioritize the poorest performing carriers
- FMSCA believes SMS is reliable for its stated purpose
- FMCSA agrees that SFD requires different considerations



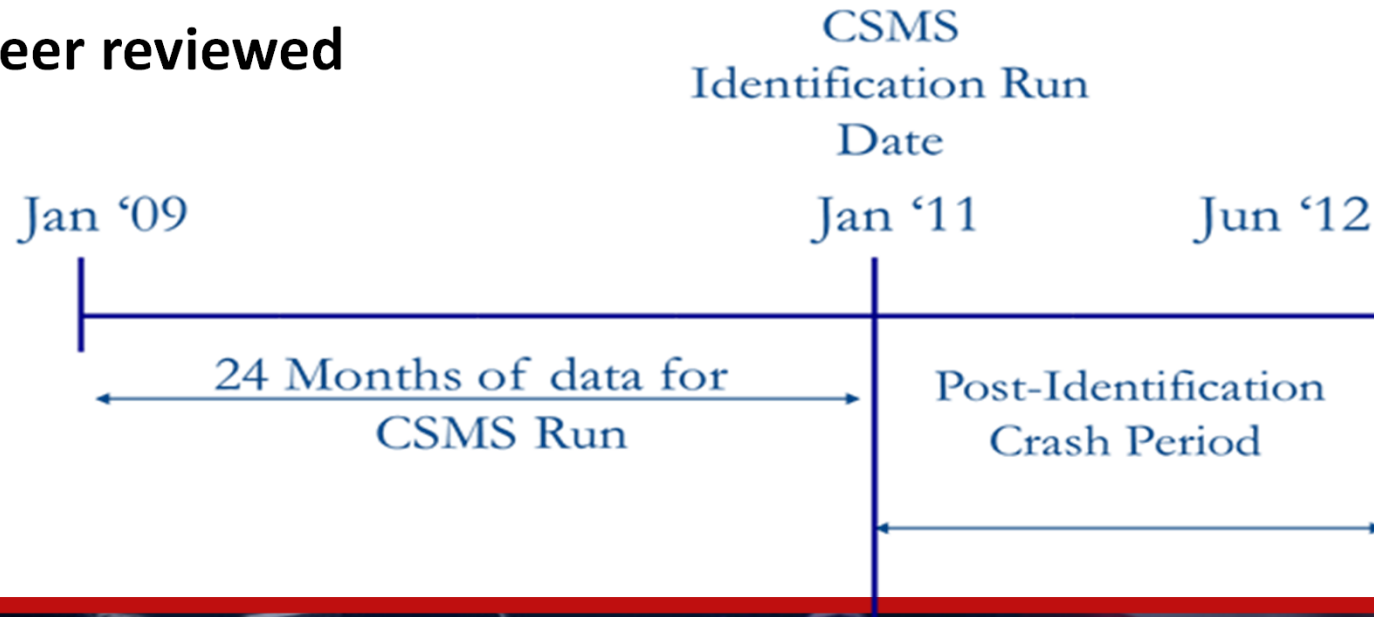
# **SMS Effective Test Report Overview**





# SMS Effectiveness Testing

- **Objective** - Quantify how effectively the SMS identifies high-risk motor carriers
- **Methodology** - Use historical data to examine the “future” crash rate of motor carriers
- **Consistent** with findings of analysis by UMTRI and ATRI
- **Peer reviewed**





# Prioritized Companies: High Risk

The carrier population identified by FMCSA as “High Risk” has **more than twice** national average crash rate.

Group	# of Carriers	# of Post-Period Crashes	# Post-Period PUs	Post-Period Crash Rate (Crashes per 100 PUs)
All Carriers in ET Study	278,318	105,985	3,090,111	3.43
High-Risk Carriers	5,654	8,836	120,622	7.33



## Prioritized Companies: Crash Rates

SMS is prioritizing carriers with higher crash rates (*79% higher*) than active carriers not prioritized

Carrier Group Identified for Interventions	Number of Carriers Identified	Total Power Unit	Total Crashes	Crash Rate (Crashes per 100 Power Units)
Identified in 1 or more BASICs	43,042	1,073,093	51,763	4.82
Not Identified	235,276	2,017,018	54,222	2.69



## Prioritized Companies: By Carrier Size

- Higher crash rates are observed, regardless of carrier size
- FMCSA is more selective and more effective when prioritizing smaller carriers
  - 12% of small carriers are prioritized
  - Crash rates are 137% higher than those not prioritized





# Prioritized Companies: By Carrier Size

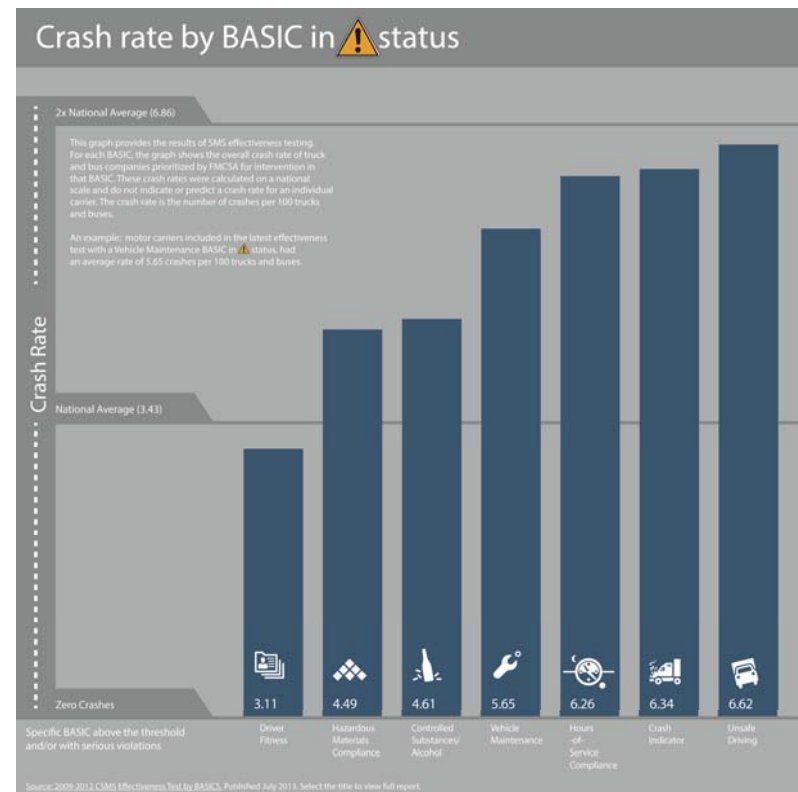
Carriers and Power Units	# of Carriers Prioritized	% Carriers with at least 1 BAISC Prioritized	Total Power Units	Total Crashes	Crash Rate (per 100 Power Units)	% Increase in Crash Rate
5 or Fewer PUs	24,647	12%	56,731	4,336	7.64	137%
5 < PUs <= 15	10,253	24%	92,965	6,173	6.64	149%
15 < PUs <= 50	5,514	30%	145,894	8,693	5.96	117%
50 < PUs <= 500	2,359	35%	308,120	15,110	4.90	84%
More than 500 PUs	269	49%	469,384	17,451	3.72	60%
All Carriers	43,042	15%	1,073,093	51,763	4.82	79%



# Crash Rates by BASIC

Six of the seven BASICs show that prioritized carriers have a crash rate higher than the national average.

For-hire operators of combination units:  
All seven BASICs have a crash rate higher than the national average **and are** about half of the carriers assessed





# Crash Rates by BASIC

BASIC Identified for Interventions	Number of Carriers Identified	Total Power Units	Total Crashes	Crash Rate (per 100 Power units)	% Increase in Crash Rate Compared to National Average (3.43)
Unsafe Driving	9,594	194,756	12,888	6.62	93%
Crash	4,662	246,463	15,638	6.34	85%
HOS Compliance	22,558	343,114	21,462	6.26	83%
Vehicle Maintenance	15,734	234,895	13,261	5.65	65%
Controlled Substances/Alcohol	2,914	44,945	2,070	4.61	34%
HM Compliance	746	250,892	11,266	4.49	31%
Driver Fitness	5,067	323,038	10,047	3.11	-9%



# FMCSA Position

- FMCSA prioritizes companies when a pattern of non-compliance is present due to the increased crash risk
- SMS is not designed nor intended to predict an *individual* company's crashes in the future
  - Patterns of non-compliance (BASICs) relate to a higher future crash rate for groups of carriers