

**EVALUATION OF 2008 RHODE ISLAND  
CRASH DATA REPORTED TO MCMIS  
CRASH FILE**

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**Evaluation of 2008 Rhode Island Crash Data  
Reported to the MCMIS Crash File**

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16. Abstract <p>This report is part of a series evaluating the data reported to the Motor Carrier Management Information System (MCMIS) Crash File undertaken by the Center for National Truck and Bus Statistics at the University of Michigan Transportation Research Institute. The earlier studies showed that reporting to the MCMIS Crash File was incomplete. This report examines the factors that are associated with reporting rates for the State of Rhode Island.</p> <p>MCMIS Crash File records were matched to the Rhode Island crash file to determine the nature and extent of underreporting. It is estimated that that Rhode Island reported 75.0% of reportable crash involvements in 2008.</p> <p>The most decisive factor identified in predicting reporting was whether the Truck/Bus Crash Report Supplemental form was completed. Over 95% of reportable cases with this form completed were reported, compared with no records where the officer did not fill out the form.</p> <p>Missing data rates are low for most variables. Corresponding data elements in the MCMIS and Rhode Island crash files were reasonably consistent, though specific problems were noted with hazmat variables and the truck and trailer configuration.</p>					
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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 yard	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>				
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>
NOTE: volumes greater than 1000 L shall be shown in 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 (exact degrees)</b>				
°F	Fahrenheit	5 (F-32)/9 or (F-32)/1.8	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 (exact degrees)</b>				
°C	Celsius	1.8C+32	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 and 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)

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## **Evaluation of 2008 Rhode Island Crash Data Reported to the MCMIS Crash File**

### **1. Introduction**

The Motor Carrier Management Information System (MCMIS) Crash file was developed by the Federal Motor Carrier Safety Administration (FMCSA) to serve as a census file of trucks and buses involved in traffic crashes meeting a specified crash severity threshold. FMCSA maintains the MCMIS file to support its mission to reduce crashes, injuries, and fatalities involving large trucks and buses. Accurate and complete crash data are essential to assess the magnitude and characteristics of motor carrier crashes and to design effective safety measures to prevent such crashes. The data in the file are extracted by the States from their own crash records, and uploaded through the SafetyNet system. The usefulness of the MCMIS Crash file thus depends upon individual states identifying and transmitting the correct records on the trucks and buses involved in traffic crashes that meet the crash file severity threshold.

The present report is part of a series of reports that evaluate the completeness and accuracy of the data reported by States to the MCMIS Crash file. Previous reports showed some underreporting which seemed to be related in large part to problems in interpreting and applying the reporting criteria within the states' respective crash reporting systems. The problems often were more severe in large jurisdictions and police departments. States also had issues specific to the nature of its own system. [See references 2 to 39.] The States are responsible for identifying and reporting qualifying crash involvements. Accordingly, improved completeness and accuracy ultimately depends upon the efficiency and effectiveness of individual state systems.

This report focuses on reporting by Rhode Island to MCMIS Crash file for 2008. Between 2002 and 2006, Rhode Island has reported from 166 to 488 involvements annually to the MCMIS Crash file. Rhode Island is the 43rd largest State by population and in most years ranks about 49th among the states in terms of the number of annual truck and bus fatal involvements. The number of fatal truck and bus involvements varies widely in relative terms, in part no doubt because the number is small, so changes in a few cases has a large relative effect. Between 2003 and 2008, the number of fatal truck and bus involvements in Rhode Island has ranged between one in 2005 and 11 in 2006. While the number of fatal involvements is typically small in Rhode Island relative to most other states, the amount of variability from year to year is notable.

Police accident report (PAR) data recorded in Rhode Island's statewide files as of August, 2010, were used in this analysis. The 2008 PAR file contains the crash records for 77,025 units (72,960 vehicles, excluding witnesses, pedestrians, and bicyclists).

The standard method for State evaluations consists of the following steps, which we attempted to pursue here:

1. The complete police accident report file (PAR file hereafter) from Rhode Island was obtained for the most recent year available, which was 2008. An algorithm was developed, using the data coded in the Rhode Island file, to identify all cases that qualified for reporting to the MCMIS Crash file.
2. All cases in the Rhode Island PAR file—those that qualified for reporting to the Crash file as well as those that did not—were matched to the cases actually reported to the MCMIS Crash file from Rhode Island.
3. Cases that should have been reported, but were not, were compared with those that were reported to identify the sources of underreporting.
4. Cases that did not qualify but which were reported were examined to identify the extent and nature of over-reporting.

## **2. Data Preparation**

The Rhode Island PAR file and MCMIS Crash file each required some preparation before the records in the MCMIS Crash file reported from Rhode Island could be matched to the Rhode Island PAR file. In the case of the MCMIS Crash file, the major tasks were to extract records reported from Rhode Island and to eliminate duplicate records. The Rhode Island PAR file was reformatted to create a comprehensive vehicle-level file from accident, vehicle, and person data.

The following sections describe the methods used to prepare each file and some of the problems uncovered.

### **2.1 MCMIS Crash Data File**

The 2008 MCMIS Crash file as of June 9, 2009, was used to identify records submitted from Rhode Island. For calendar year 2008 there were 237 cases reported to the file from Rhode Island. An analysis file was constructed using all variables in the MCMIS file. This analysis file was examined for duplicate records (more than one record submitted for the same vehicle in the same crash; e.g., the report number and sequence number were identical). No such duplicates were found.

In addition, records were reviewed to find cases with identical values on accident number, accident date/time, county, city, street, vehicle license plate number, and driver license number, even though their vehicle sequence numbers were different. The purpose of this review is to find and eliminate cases where more than one record was submitted for the same vehicle and driver in a particular accident. This can happen if records are replaced during a correction, and the

previous version is not deleted. No such duplicates were found. The resulting MCMIS file contains 237 unique records.

## **2.2 Rhode Island Police Accident Report File**

The Rhode Island PAR data for 2008 was obtained from the state in August, 2010. The data were stored as a database in Microsoft Access format, representing Accident, Vehicle, and Person information. Data for the PAR file are coded from the State of Rhode Island Uniform Crash Report (12/2006) completed by police officers (Attachment A). The Rhode Island Department of Transportation did not have a statewide instruction manual available. The Rhode Island State Police provided a copy of their training manual for electronic entry of crash data.

The PAR file was first examined for duplicate records (involvements where more than one record was submitted for the same vehicle in the same crash). A search for records with identical case numbers and vehicle numbers found no instances of duplicates. In addition, review of the case numbers verified that they were recorded in a consistent format; there is no evidence of duplicate records based on similar, but not identical, number formats (such as 123016 and 123-16, for example).

Just as in the preparation of the MCMIS Crash file, cases also were examined to determine if there were any records that appeared to be duplicate vehicles within a given crash. Two distinct crash records would not be expected to be identical on all variables. Records were examined for duplicate occurrences based on the fields for case number, accident date/time, crash county, city, street, unit type, vehicle identification number (VIN), and vehicle model year. Based on the above algorithm, 15 duplicate pairs were found. However, a more detailed examination of the pairs showed differences between the two cases with respect to one or more of the following variables: vehicle model, initial impact area, and most damaged area. Since we could not be certain these were duplicate records, they were left in the file.<sup>1</sup>

## **3. Matching Process**

The next step involved matching records from the Rhode Island PAR file to corresponding records from the MCMIS file. There were 237 Rhode Island records from the MCMIS file available for matching. After excluding witnesses, pedestrians, and bicyclists there were 72,960 records from the Rhode Island PAR file. All records from the Rhode Island PAR data file were used in the match, even those that did not meet the requirements for reporting to the MCMIS Crash file. This allows the identification of cases reported to the MCMIS Crash file that may not meet the reporting criteria.

Matching records in the two files is accomplished by using combinations of variables common to the two files that have a high probability of uniquely identifying crashes and specific vehicles within the crashes.

The most direct method of matching the crash records would be to use the crash identifier variables in the crash files. In the PAR data the unique identifier was CrashReportId.

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<sup>1</sup> Generally, in preparing and evaluating the data we try to err on the side of accepting the data at face value. We recognize that other analysts may make different judgments.

CrashReportId in the PAR file is a 6-digit numeric field, and in the MCMIS Crash file Report Number is stored as a 12-character alphanumeric value. The report number in the MCMIS Crash file is constructed to include the CrashReportID. The first two columns in the MCMIS Crash Report Number field contain the state abbreviation (RI, in this case), followed by nine digits, and a tenth numeric or alpha value. The PAR CrashReportId matched the last six digits of the MCMIS Report Number, so this variable was used in the match.

Other data items used in matching at the crash level include Crash Date, Crash Time (stored in military time as hour/minute), Crash County, Crash City, Crash Street, and Reporting Officer's Identification number. The PAR file contained all of these variables except for Reporting Officer's Badge Number. Upon closer examination, City Code in the PAR file used a different numbering system and therefore could not be used to match City Code in the MCMIS file. A new variable was created to convert PAR City Code into City Name. This variable was then used to match to the MCMIS variable Crash City Name.

Variables in the MCMIS file that are typically used to distinguish one vehicle from another within a crash include vehicle license plate number, driver license number, vehicle identification number (VIN), driver date of birth, and driver name. Only the VIN (first 11 digits) was included in the PAR 2008 file. It was unrecorded 9.7% of the time in the PAR file, but was recorded in all MCMIS cases.

The match was performed in three steps, using the available variables. At each step, records in either file with duplicate values on all the match variables for the particular step were excluded, along with records with missing values for the match variables. The first match included the variables case number, crash date (month and day), crash time (hour and minute), county, city, street, and VIN (first 11 digits). The second match step dropped crash minute. After some experimentation, the third match step included case number and truck/bus type. The latter variable was created for matching purposes in the PAR and MCMIS datasets with code levels of Tractor/trailer or combination, Other Truck, and Bus. All matches made in the third step were also individually verified, based on additional variables.

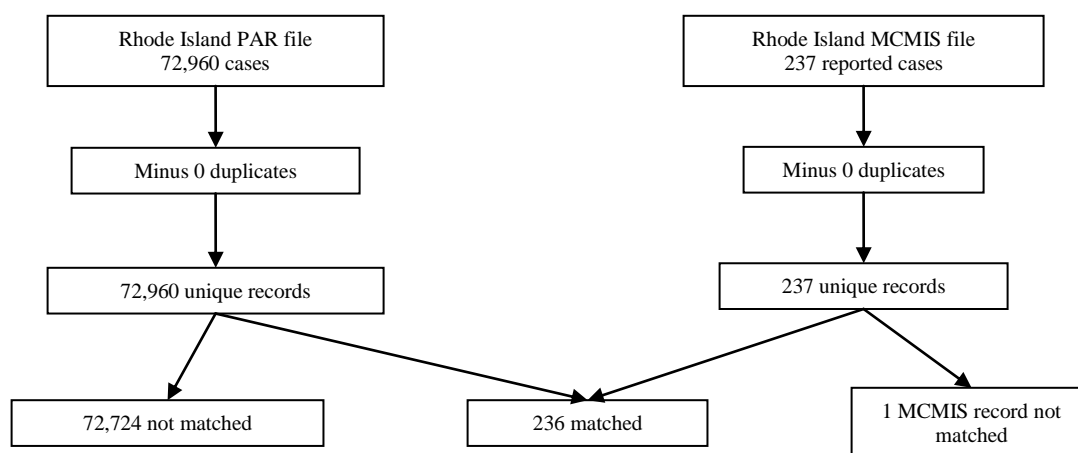
After the first three match steps, only one record reported to the MCMIS Crash file remained unmatched. An attempt was made to match this final record by hand. In this process, we reviewed all cases in the PAR file in a crash in the specific county and crash date of the record in the MCMIS file. Since the case could not be located in this manner, other searches were made based on Case Number, VIN and Street. This case could still not be located.

In total, this process resulted in matching 99.6% percent of the MCMIS records to the PAR file. Table 1 shows the variables used in each match step and the number of records matched at each step.

**Table 1 Steps in MCMIS/Rhode Island PAR File Match, 2008**

Step	Matching variables	Cases matched
Match 1	Case number, crash date (month, day), crash time (hour, minute), county, city, street, and VIN (first 11 digits)	167
Match 2	Crash date (month, day), crash hour, county, city, street, and VIN	65
Match 3	Case number and truck/bus type	4
Total cases matched		236

The matches made were verified using other variables common to the MCMIS and PAR file as a final check to ensure each match was valid. The above procedure resulted in 236 matches, representing 99.6 percent of the 237 records reported to MCMIS.

**Figure 1 Case Flow in MCMIS/Rhode Island Crash File Match**

Of the 236 matched cases, 228 apparently met the MCMIS reporting criteria (reportable), as well as that could be determined using the data supplied, and 8 did not meet the MCMIS reporting criteria (not reportable). The method of identifying cases reportable to the MCMIS Crash file is discussed in the next section.

#### 4. Identifying Reportable Cases

The next step in the evaluation of crash reporting is to identify records in the Rhode Island data that qualify for reporting to the MCMIS Crash file. Records are selected as reportable using the information available in the computerized crash files supplied by the State of Rhode Island. Reportable records meet criteria specified by the FMCSA. The reporting criteria cover the type of vehicle and the severity of the crash. These criteria are discussed in more detail below, but it is emphasized here that records transmitted to the MCMIS Crash file must be selected from among all the records in the State's crash data. The method developed to identify reportable records is intended to be separate from any prior selection by the State being evaluated. This approach provides an independent method of evaluating the completeness of reporting. Accordingly, we use the information recorded by the officers on the crash report for all crashes.

In the crash reporting system used in Rhode Island, the primary MCMIS-specific data are collected by means of a supplemental crash report. The top of the truck/bus crash supplemental form includes a check list of qualifying information. The back of the form includes a detailed description of the criteria that triggers completing the truck/bus supplemental form. The criteria as stated match FMCSA's instructions.

In the present evaluation of State reporting, a method is developed to apply FMCSA's reporting criteria independently to the Rhode Island crash data to identify reportable cases. If the evaluation were limited only to records where the supplemental form had been filled out, it would obviously miss cases that had been missed by the State selection process. Accordingly, the method of identifying reportable cases used in this report attempts to be independent, and relies on variables that describe vehicles and crash severity to determine if they meet the MCMIS Crash file reporting criteria. This approach provides the best opportunity to identify any cases that might have been overlooked, though it should be kept in mind that the method is constrained to using only the information in the crash files supplied by the State.

The MCMIS criteria for a reportable crash involving a qualifying vehicle are shown in Table 2. Reportable records must meet both the vehicle type and crash severity criteria. The method used in applying the vehicle criteria and crash severity in the Rhode Island crash file data are each discussed in turn.

**Table 2 Vehicle and Crash Severity Threshold for MCMIS Crash File**

Vehicle	Truck with GVWR over 10,000 or GCWR over 10,000, or Bus with seating for at least nine, including the driver, or Vehicle displaying a hazardous materials placard.
Accident	Fatality, or Injury transported to a medical facility for immediate medical attention, or Vehicle towed due to disabling damage.

#### 4.1 Vehicle criteria

The first step is to identify vehicles in the Rhode Island crash file that meet the MCMIS criteria. Vehicle type is captured in the Unit Type field on the crash form that classifies vehicles among 17 distinct types. Initially, qualifying trucks were identified as "Tractor Trailer or Combination (more than 10K lbs), Medium Heavy Trucks (more than 10K lbs), and Tow Truck.

In recent years, an increasing number of pickups are built with heavy duty rear axles which raise their GVWR above 10,000 pounds and thus meet that vehicle type criterion. Vehicles classified as "vans" also sometimes meet the GVWR criterion. The VIN can be decoded to determine the GVWR class of the vehicle. This was possible, since the VIN (11 digits) was included in the 2008 data file.

The PAR/MCMIS matched file had 77,025 records (including one MCMIS-only record). Witnesses, Pedestrians, and Bicyclists were excluded, using the Unit Type variable, reducing the file to 72,961 vehicle records.



David Hetzel of NISR, Inc., decoded the VINs using software that he has developed. A total of 69,457 VINs were decoded and assigned a vehicle type. (VIN was unrecorded in 3,504 cases, 4.8% of all vehicles.) The results identified 2,427 vehicles that had a GVWR of 10,000 pounds (10K) or more. Vehicles were classified as Large Van, Step Van, Step Van/Walk-In, School bus, Transit/Commuter Bus, Cross Country/Intercity Bus, Other Bus Type, Medium/Heavy Motorhome, Medium/Heavy Pickup, Single Unit Truck (SUT) (GVWR 10-19.5K), SUT (19.5-26K), SUT (>26K), Truck Tractor, and Trailer.

The approach to identifying reportable vehicles was based on the PAR Unit Type field, supplemented by the result of decoding the VIN, as well as by reviewing the Make and Vehicle Model fields in the Rhode Island crash file. For buses and potential buses, the field that records whether the vehicle has seats for 9 or more, including the driver, was used.

The initial step in identifying reportable vehicles consisted of comparing the PAR Unit Type variable with Vehicle Type as identified from the VIN. In general, if the officer on the scene indicated a light vehicle (such as Passenger car, SUV, etc.) and the VIN decoded to a GVWR under 10K, then the vehicle was considered not reportable, unless it had a hazardous materials placard. However, if PAR Unit Type indicated a light vehicle or light truck, but the Hetzel-decoded VIN found SUT (19.5+ K), or Tractor/with/without trailers, then the make and vehicle model were reviewed to determine, by the preponderance of evidence, whether the vehicle was a truck. All PAR vehicles with Unit Type Tractor/trailer/combination (>10K) or Medium/heavy truck, were designated as reportable trucks. Tow trucks, if the VIN indicated a GVWR over 10K, were also designated as reportable trucks.

Vehicles identified in the PAR Unit Type field as a bus (School bus, Transit bus, Motor coach, and Other bus) were considered reportable if the bus had nine or more seats. Motor Homes, Low Speed Vehicles, Motorcycles, Mopeds, and the following special function vehicles: Taxi, Ambulance, Police, and Fire trucks, were excluded.

Pickup trucks not determined to be heavy truck type by VIN decoding (such as a SUT) were not identified as reportable. Some are likely commercial vehicles, but in the absence of any evidence of a commercial use, it is not possible to exclude the possibility that they are personal use only vehicles.

In addition to these vehicle types, any vehicle, regardless of size, displaying a hazardous materials placard, also meets the MCMIS vehicle type definition. Rhode Island's main crash form includes a field named Hazardous Materials Placard which takes the values Y (yes) or N (no). Using this variable, 53 vehicles were identified that met this criteria.

In total, 2,183 vehicles were identified in the Rhode Island PAR data as eligible trucks, buses, and other vehicles transporting hazardous materials. Table 3 shows the distribution by vehicle type, distinguishing only trucks, buses, and other vehicle types. Medium or heavy trucks accounted for 77.8% of the vehicles, while 19.8% are buses. Another 2.4% were light vehicles with hazmat placards. These cases represent 3.0% of the vehicles in the Rhode Island crash file.

**Table 3 Vehicles Meeting MCMIS Vehicle Criteria  
Rhode Island PAR File, 2008**

Vehicle type	N	%
Truck	1,698	77.8
Bus	432	19.8
Other, transporting hazmat	53	2.4
Total	2,183	100.0

## 4.2 Crash Severity

The second primary reporting criteria is the MCMIS crash severity threshold. The severity threshold for police-reported crashes in Rhode Island is a fatality, injury, or property damage over \$500. MCMIS reportable crashes are a subset of this group. With respect to crash severity, MCMIS qualifying crashes include those involving a fatality, an injured person transported for immediate medical attention, or a vehicle towed from the scene due to disabling damage.

The Rhode Island Person file includes information about the injury severity for each person involved in the crash. Rhode Island classifies injury using the common KABCN scale, where injuries are classified as fatal (K), incapacitating (A), non-incapacitating, but evident (B), complaint of pain, but not evident (C), not injured, and unknown.

Determining whether an injured person was transported for immediate medical attention is straightforward in the Rhode Island data. The PAR records contain a Transported variable (Y/N). This variable was used in combination with the Injury Severity variable to identify persons who were injured and transported for treatment, i.e. A,B, C, and Unknown injuries, where Transported was coded “yes.” Using this information, each accident that had an injured person transported for immediate medical attention was flagged as meeting the MCMIS severity criteria.

In addition to crashes with transported injuries, crashes that have at least one vehicle towed due to disabling damage also meet the MCMIS crash severity criteria. The Rhode Island PAR file includes the information needed to identify such crashes. The PAR file data includes a field that records whether a vehicle was towed, and another field (Damage Extent) that records the extent of damage to the vehicle. One code level in the Damage Extent field explicitly identifies disabling damage. Disabling damage is defined as “damage from the crash that renders the vehicle unable to move from the scene under its own power.” The Vehicle Towed field was used in combination with the Damage Extent field to identify vehicles that were coded as disabled and towed. Crashes with at least one vehicle towed due to disabling damage were flagged as meeting the MCMIS severity criteria.

Implementing the eligible vehicle and crash severity filters identified a total of 304 cases in the Rhode Island crash data in 2008. There were 304 qualifying vehicles—either a truck or bus or hazardous placarded vehicle—involved in a crash that included either a fatality, an injured person transported to a medical facility, or a vehicle towed due to disabling damage. As noted above, this number may underestimate the true number of reportable records, because of the problem of not being able to identify qualifying pickup trucks (those with GVWR > 10,000 lbs. used in commerce).

## 5. Factors Associated with Reporting

The process described in section 4 identified 304 records in the 2008 Rhode Island crash file as meeting the MCMIS Crash file reporting criteria. This section provides a discussion of factors that apparently affected the successful identification and reporting of records to the MCMIS Crash file. As Figure 1 above shows, there were 237 records reported to the MCMIS Crash file by Rhode Island in 2008. All but one were matched to the Rhode Island PAR file. Of the 236 matched records, 228 were identified as meeting the reporting criteria under the method described above, and eight did not qualify for reporting, under that same method. Therefore, of the 304 reportable records, 228 were actually reported, for an overall reporting rate of 75.0%. (If the full 237 cases reported actually met the reporting criteria, the reporting rate would be 78.0%.) The eight cases that did not meet the reporting criteria as developed in this section are discussed below.

### 5.1 Over-reporting

Over-reporting occurs when records are reported to the MCMIS crash file which do not meet both the vehicle type and crash severity criteria. This can occur when records are incorrectly submitted to the MCMIS system, or if records once submitted are corrected in the State data file and do not meet the criteria, but the correction is not registered in the MCMIS crash file.

Eight records were reported to the MCMIS Crash file that did not meet—in the State crash file—the filter developed to identify reportable cases. That is, they were not identified in the Rhode Island crash file as either a truck or a bus involved in a crash that included either a fatality, an injury transported for treatment, or a vehicle towed due to disabling damage. Two records were valid trucks, but did not meet the crash severity criteria. The other six cases met the crash severity criteria, but were not eligible vehicles. (Three were fire trucks and the other three were light vehicles according to the VIN.) On the other hand, the records in the MCMIS Crash file for all six included values for certain variables (e.g., vehicle configuration) that would indicate they did meet the criteria.

This section discusses the discrepancies between the records as they appeared in the Rhode Island crash file and the record in the MCMIS Crash file. It cannot be determined at this point which record is correct, as there is no independent third source of information on those cases. The current evaluation has no choice but to rely on the data as recorded in the Rhode Island crash file for these records as it does for all other records.

Table 4 shows the cross-classification of the eight reported cases that apparently did not meet the MCMIS reporting criteria. Six were not eligible trucks or buses, nor could we find any evidence that they were transporting hazmat.

**Table 4 Vehicle Type and Crash Severity for Reported Cases That Did Not Meet MCMIS Reporting Criteria**

Vehicle type	Injured/transported	Towed/disabled	Other	Total
Truck	0	0	2	2
Other	2	4	0	6
Total	2	4	2	8

In the Rhode Island data, all six vehicles had a Unit Type of Medium/heavy truck (GVWR >10K). However the special function variable in combination with vehicle model, indicated that three of these vehicles were fire trucks. VIN decoding found that the other three vehicles were Class 2 or lighter. In the MCMIS Crash file, four of these six cases are identified as 2 or 3-axle SUT, one as a Tractor/semitrailer, and the other an Unknown Heavy Truck >10,000 lbs. None are coded as transporting hazmat.

In light of the information available in the Rhode Island crash record, it was not possible to include any of these records as reportable. The records may have been corrected when the record was transmitted to the MCMIS Crash file, without corresponding corrections to the State crash record being registered. However, it is not possible to determine which record is correct for these eight – or, for that matter, whether there were other records in the Rhode Island file that ought to have been corrected and reported.

## 5.2 Reporting Criteria

This section presents the results of examining reporting rates by the factors—crash severity and vehicle type—that are used to determine if a specific crash involvement is reportable. This analysis is intended to help identify characteristics of the vehicle or crash that are more likely to trigger the process that results in a reported case.

Table 5 shows reporting rates, the number of unreported cases, and the proportion of unreported cases for each level of the MCMIS crash severity criteria. Crash severity is categorized here as fatal, injured/transported, and towed/disabled. The overall reporting rate is 75.0% of reportable records. Reporting rates for injured/transported and towed/disabled are almost identical at 76.1 and 74.5% respectively, but lower for fatal involvements. The rate for fatal crashes appears to be an anomaly, as discussed below. For the other two levels of crash severity, it is notable that they are so similar, that is, that there is no significant difference in reporting rates between an injury level crash and a crash that only involved disabling damage to a vehicle.

**Table 5 Reporting Rate by MCMIS Crash Severity, Rhode Island 2008**

Crash severity	Reportable cases	Reporting rate	Unreported cases	% of total unreported cases
Fatal	4	50.0	2	2.6
Injured/transported	159	76.1	38	50.0
Towed/disabled	141	74.5	36	47.4
Total	304	75.0	76	100.0

Two of the four reportable fatal involvements were not reported. This is a surprising result, because fatal involvements typically have the highest reporting rate because of their seriousness. Given the fewness of fatal involvements, overlooking one or two would result in a large change in the reporting rate. Each record was examined for any factor that might explain the failure to report. In the Rhode Island crash file, both of the unreported were coded “other” for Unit Type, though one was listed as a “Semi” for Vehicle Model, and Vehicle Model was recorded as GMC U-Haul truck in the other case. For both vehicles, the VIN confirmed that they met the vehicle

type criteria. A search of the Person file confirmed that there was at least one fatality in each of the crashes.

NHTSA's Fatality Analysis Reporting System (FARS) file was also searched for records of these two crashes. All fatal crashes in Rhode Island on the relevant dates were reviewed. There was no record for either of the vehicles in the FARS file on the relevant dates. In addition, a search was made for any record in the FARS file from Rhode Island with the same VINs. Both FARS and the Rhode Island data only capture the first 11 characters of the VIN, which is not enough to positively identify a specific vehicle. However, the VINs were not found in the 2008 FARS file. It appears that these two fatal crashes were not reported either to the FARS file or to the MCMIS crash file. One possible explanation for this is that the crashes initially were reported as including a fatality but it was later found that there was no fatality in either and the records in the Rhode Island file were not corrected. Without reviewing the actual police reports and tracing them through the system, it is not possible to determine why these records are not included in FARS or the MCMIS crash file.

Reporting rates do differ when measured by the most severe injury in the crash. Leaving fatal involvements aside, crashes with more severe injuries are reported at a higher rate than those with less severe or no injuries. Ninety percent of the 10 crashes with A-injuries were reported, while about three-quarters of those with B- or C-injuries are reported, and a little over half of crashes with no injuries. (Table 6.) One explanation for this pattern is that crashes with more severe injuries may be more readily recognized as meeting the MCMIS criteria, either by the original reporting officer or at a later stage when records are extracted to be submitted to the MCMIS file.

**Table 6 Reporting Rate by Most Severe Injury in the Crash, Rhode Island 2008**

Most severe crash injury	Reportable cases	Reporting rate	Unreported cases	% of total unreported cases
Fatal (K)	4	50.0	2	2.6
Incapacitating (A)	10	90.0	1	1.3
Non-incapacitating (B)	29	72.4	8	10.5
Possible (C)	132	77.3	30	39.5
No injury	11	54.5	5	6.6
Unknown/not recorded	118	74.6	30	39.5
Total	304	75.0	76	100.0

The second component of the MCMIS Crash file criteria is vehicle type. As described above, trucks, buses, and other vehicles transporting sufficient amounts of hazmat to require a placard all meet the reporting requirements. Table 7 shows the rates for the different general types of vehicles. (Vehicles in the table are classified using information from the VIN, vehicle make and model, as well as the police-reported Unit Type. Some vehicles recorded as light vehicle in the Unit Type field were actually trucks or buses, based on the VIN and information in the Vehicle Model field.) The reporting rate for trucks was 71.9% and for buses, 95.1%. In almost all States evaluated, the reporting rate for buses is usually significantly lower than for trucks, so it is quite notable that the reporting rate for buses is actually higher in Rhode Island.

**Table 7 Reporting Rate by MCMIS Vehicle Class, Rhode Island 2008**

MCMIS vehicle class	Reportable cases	Reporting rate	Unreported cases	% of total unreported cases
Truck	263	71.9	74	97.4
Bus	41	95.1	2	2.6
Light vehicle w/hazmat	0	N/A	0	0.0
Total	304	75.0	76	100.0

Table 8 provides more detail about the effect of vehicle configuration on reporting rates, showing rates by each level of the Unit Type field in the Rhode Island data. Please note that all of the vehicles for which the Unit Type implies a light vehicle type were manually reviewed, and classified as a qualifying truck or bus based on the information in the VIN, Vehicle Make, and Vehicle Model fields. Vehicles identified as buses and large trucks are much more likely to be reported than light vehicle types. Note that no tow trucks were reported, even when by VIN they clearly met the GVWR threshold.

**Table 8 Reporting Rate by PAR Vehicle Configuration, Rhode Island 2008**

Unit type	Reportable cases	Reporting rate	Unreported	% of total unreported
Passenger car	9	11.1	8	10.5
Passenger van	8	75.0	2	2.6
Cargo van (<=10K)	1	0.0	1	1.3
Pickup truck	2	0.0	2	2.6
School bus	14	100.0	0	0.0
Transit bus	8	100.0	0	0.0
Motor coach	3	100.0	0	0.0
Other bus	7	100.0	0	0.0
Other light truck (<= 10K)	18	0.0	18	23.7
Tractor comb. (>10K)	112	92.9	8	10.5
Medium/heavy truck (>10K)	92	92.4	7	9.2
Tow truck	16	0.0	16	21.1
Other	14	0.0	14	18.4
Total	304	75.0	76	100.0

Reporting of buses was actually higher than the overall rate of reporting. All of the vehicles recorded as a bus in the Unit Type field that were in a crash meeting the reporting threshold were actually reported. In addition, of the eight vehicles coded as a passenger van in the Unit Type field that were identified as reportable (because they had nine or more seats, including the driver), 75% were reported. The Rhode Island crash report has a field to flag vehicles with nine or more seats and it is clear that good use is being made of it.

It may also be of interest to examine reporting rates by the cross-classification of vehicle type and crash severity. This tests if there are any interactions between vehicle type and crash severity. (See Table 9.) However, the pattern of reporting by crash severity is close to the same for both trucks and buses. Buses are reported at a higher rate than trucks, but there is no

difference in the reporting rate by crash severity among either trucks or buses. And then there is the anomalous result for fatal truck involvements, which was discussed above.

**Table 9 Reporting Rate by Vehicle Type and Crash Severity,  
Rhode Island 2008**

MCMIS Vehicle type	Crash severity			Total
	Fatal	Injured/ transported	Towed/ disabled	
Truck	50.0	72.2	72.2	71.9
Bus	n/a	96.2	93.3	95.1
Total	77.8	87.0	57.5	66.6

### 5.3 Truck/Bus Supplemental Data

Rhode Island collects some of the data required for the MCMIS crash file in a Truck/Bus Crash Report Supplemental. The reporting officer is instructed to complete the form based on the responses to a set of “qualifying information” questions. The data from the Truck/Bus Crash Report Supplemental form were included with the rest of the Rhode Island crash data. This data was used to determine whether the police officer entered data on the Truck/Bus Crash Report Supplemental form and then interpret that as an indicator of whether the reporting officer recognized the vehicle as involved in a reportable crash. Since Rhode Island uses a supplemental form to collect crash data for the MCMIS file, rather than integrating all elements into the primary crash form, this recognition by the reporting officer is a critical first step in the reporting process.

It appears that completing the Truck/Bus Crash Report Supplemental form is a necessary condition for reporting to the MCMIS crash file, though not quite a sufficient one. The reporting rate for reportable records that had a Supplemental form with data ranged from 85.7% to 100%, depending on the number of items completed. Where one or more items was completed on the form, 95.8% were reported. (Table 10) No cases were reported if the Supplemental form was left blank.

**Table 10 Reporting Rates by Items Recorded on  
Truck/Bus Supplemental Form, Rhode Island 2008**

CMV variables recorded	Reportable cases	Reporting rate	Unreported cases	% of total unreported cases
None recorded	66	0.0	66	86.8
5 recorded	1	100.0	0	0.0
6 recorded	14	85.7	2	2.6
7 recorded	36	88.9	4	5.3
8 recorded	32	96.9	1	1.3
9 recorded	155	98.1	3	3.9
Total	304	75.0	76	100.0

#### 5.4 License state and area of operations

The license state of the vehicle is typically used as a surrogate (imperfect of course) for involvement in interstate commerce, to see if vehicles clearly involved in interstate commerce are more or less likely to be reported to the national crash file, maintained by regulator of trucks and buses involved in interstate commerce. Unfortunately, the vehicle license state was not included with the Rhode Island crash data, so this analysis could not be performed.

#### 5.5 Reporting Agency

In addition to the reporting criteria, reporting rates may reflect differences in the type of enforcement agency that investigated the crash. The level and frequency of training or the intensity of supervision may also vary. Such differences can serve as a guide for directing resources to areas that would produce the greatest improvement. This section examines reporting rates by agency.

Reporting rates vary significantly by the type of investigating agency, as reflected in Table 11. There are two levels of investigating agencies identified in the Rhode Island crash file: State Police and city police. Reporting rates for both agency types are about the same. Crashes covered by the State police are reported at a 75.7%, while for city police, the rate is 74.6%. The state police covered about 38% of reportable cases, while city police covered the remaining 62%. Apparently, both city police and the State police do equally well at recognizing and reporting the appropriate crashes.

**Table 11 Reporting Rate by Investigating Agency, Rhode Island 2008**

Investigating agency	Reportable cases	Reporting rate	Unreported cases	% of total unreported cases
City Police	189	74.6	48	63.2
State Police	115	75.7	28	36.8
Total	304	75.0	76	100.0

Table 12 shows the top five police departments, in terms of the number of unreported cases. Together, these five police departments account for 56.3% of the records not reported. Providence is the largest city in the State, and accounts for almost one-third of unreported cases, with 15 of 16 reportable involvements not reported. Taken together, less than half of the reportable records from these five police departments were actually submitted to the MCMIS Crash file. Note that the reporting from the remaining police departments is necessarily higher, and in fact almost 85%.



**Table 12 Reporting Rates for Selected Police Departments, Rhode Island 2008**

Police department	Reportable cases	Reporting rate	Unreported cases	% of total unreported cases
Providence	16	6.3	15	31.3
Johnston	12	75.0	3	6.3
Lincoln	6	50.0	3	6.3
North Smithfield	9	66.7	3	6.3
South Kingstown	7	57.1	3	6.3
Five Dept. Total	50	46.0	27	56.3
All Police Depts.	189	74.6	48	100.0

## 5.6 Fire Occurrence

With respect to the occurrence of fire in reportable crash involvements, there were no instances of recorded fire among reportable crash involvements in the Rhode Island crash file for 2008.

## 5.7 Case Processing

Reporting rates by month were also examined to determine if there was any pattern. Reportable cases were transmitted to the MCMIS Crash file at a higher rate in the early months of the year as compared with later months. (Table 13) Rates were above the overall average for January and February, but significantly below in April and September. But overall there does not appear to be any seasonality of the pattern of reporting.

**Table 13 Reporting Rate by Accident Month in Rhode Island Crash File, 2008**

Crash month	Reportable cases	Reporting rate	Unreported cases	% of total unreported cases
January	25	84.0	4	5.3
February	24	79.2	5	6.6
March	20	70.0	6	7.9
April	23	65.2	8	10.5
May	23	69.6	7	9.2
June	26	92.3	2	2.6
July	33	87.9	4	5.3
August	27	77.8	6	7.9
September	25	56.0	11	14.5
October	24	70.8	7	9.2
November	25	72.0	7	9.2
December	29	69.0	9	11.8
Total	304	75.0	76	100.0

The MCMIS file used in this analysis was closed as of June 9, 2009, 160 days after the close of the year, which is well beyond the 90 grace period within which reportable involvements are required to be reported. It could be that a significant number of records were submitted after June, 2009, but this seems improbable. The last date on which records for 2008 were submitted

to the MCMIS file was May 4, 2009, when two records were submitted. The date of the prior submission was January 26, 2009, so quite a long period had elapsed. It appears the submitting records for the 2008 crash year was finished with that May upload.

## 6. Data Quality and Reporting Latency of Reported Cases

In this section, data quality of the records reported to the MCMIS crash file is considered, as well as reporting latency (time elapsed from crash occurrence to when the crash was reported). Two aspects of data quality are examined initially. The first is the proportion of records with missing data. Missing data rates affect the usefulness of a data file because records with missing data cannot contribute to an analysis. The second aspect of data quality considered here is the consistency of coding between records as they appear in the Rhode Island crash file and in the MCMIS Crash file. Inconsistencies may indicate problems in translating information recorded on the crash report to the values in the MCMIS Crash file.

In this section of the evaluation, all cases reported to the MCMIS crash file from Rhode Island for 2008 are used, since the purpose of the analysis is to examine the quality of the data as reported.

### 6.1 Missing data

Table 14 shows missing data rates for selected, important variables in the MCMIS Crash file. Missing data rates are generally low, with a handful of exceptions. On most fundamental, structural variables, such as date, time, number of fatalities and number of injuries, missing data rates are zero.

Variables related to the driver—including date of birth, license number, license state, class, and whether the license was valid—are missing in five to nine percent of records. All records are missing on roadway access, and 99.6% of records are missing on trafficway flow. Rates for some of the sequence of events variables may appear to be high, but reflect the fact that crashes typically include only one harmful event, the collision itself. The missing data rate for DOT number is calculated only for carriers coded as “Interstate,” which therefore must have a DOT number, but only 1.0% of the records in MCMIS were found to be missing that information. Overall, the rates of missing data are low, reflecting very complete data collection for most variables. The elevated rates for driver-related variables may be of concern, however.

**Table 14 Missing Data Rates for Selected MCMIS Crash File Variables, Rhode Island 2008**

Variable	Percent unrecorded	Variable	Percent unrecorded
Report number	0.0	Fatal injuries	0.0
Accident year	0.0	Non-fatal injuries	0.0
Accident month	0.0	Interstate	0.0
Accident day	0.0	Light	0.0
Accident hour	0.0	Event one	0.0
Accident minute	0.0	Event two	90.7
County	0.0	Event three	96.2
Body type	0.0	Event four	98.7
Configuration	0.0	Number of vehicles	0.0
GVWR class	0.0	Road access	100.0

Variable	Percent unrecorded	Variable	Percent unrecorded
DOT number *	1.0	Road surface	0.0
Carrier state	0.0	Road trafficway	99.6
Citation issued	5.5	Towaway	0.0
Driver date of birth	8.9	Truck or bus	0.0
Driver license number	5.5	Vehicle license number	0.0
Driver license state	5.5	Vehicle license state	0.0
Driver license class	7.2	VIN	0.0
Driver license valid	5.5	Weather	0.0

\* Based on cases where the carrier is coded interstate.

Hazardous materials variable	Percent unrecorded
Hazardous materials placard	0.4
Percentages of hazmat placarded vehicles only:	
Hazardous cargo release	0.0
Hazardous materials class (1-digit)	22.2
Hazardous materials class (4-digit)	11.1
Hazardous materials name	88.9

The second section of the table shows missing data rates for the hazardous materials (hazmat) variables. Whether the vehicle displayed a Hazmat Placard was recorded in all records. The other missing data rates shown are limited to the nine Rhode Island records showing the vehicle displayed a hazmat placard, indicating it was carrying hazmat. There were no missing data for hazmat cargo release, but two of the nine records were missing for 1-digit hazmat class code, one was missing the 4-digit hazmat identifier, and hazmat materials name was missing for eight of the nine records.

## 6.2 Inconsistent records

The second check on data quality is to compare values for the records in the Rhode Island data with values for comparable variables in the MCMIS Crash file. Inconsistencies between the files may indicate a problem in preparing the data for upload. This comparison was made for all substantive variables, other than those that were used to match records in the two files.

Variables for light condition, weather, roadway surface condition, sequence of events, and the hazmat variables were compared and they agreed in virtually all cases. Light condition, weather, and road surface condition matched exactly. There were a few records that differed on sequence of events, but the most likely explanation is that available code levels are not the same between the two files, and the closest level was chosen for the uploaded record. For example, records where the first event is coded overturn, jackknife, curb, guardrail face, guardrail end, tree, or utility pole are all coded ran off road in the MCMIS file. So there are effectively very few inconsistencies between the two files on those variables.

There are somewhat more instances of inconsistency in terms of vehicle configuration. Table 15 shows the comparison between the vehicle configuration as recorded in the MCMIS crash file and in the Unit Type field in the Rhode Island crash file. Inconsistent code levels are highlighted. Overall, there are inconsistencies for 19 of the 236 uploaded records, or 8.1%. Most of the

inconsistent records are coded as a straight truck (single unit truck, or SUT) in the MCMIS file and as a truck tractor or tractor combination vehicle in the State crash file. There are a few records identified as a combination vehicle (either tractor-semitrailer or tractor double) in the MCMIS file and a medium/heavy truck in the State file.

**Table 15 Comparison of Vehicle Configuration  
in MCMIS File with Unit Type in Rhode Island Crash File**

Vehicle Configuration	Unit Type	Records	%
MCMIS Crash File	Rhode Island Crash File		
Bus (seats 9-15,incl dr)	Passenger van	6	2.5
	Transit bus	2	0.8
	Other bus	3	1.3
Bus (seats >15,incl dr)	Passenger car	1	0.4
	School bus	14	5.9
	Transit bus	6	2.5
	Motor coach	3	1.3
	Other bus	4	1.7
SUT, 2-axle, 6-tire	Tractor/trailer/combo (>10K)	3	1.3
	Medium/heavy truck(>10K)	51	21.6
SUT, 3+ axles	Tractor/trailer/combo (>10K)	6	2.5
	Medium/heavy truck(>10K)	28	11.9
Truck trailer	Tractor/trailer/combo (>10K)	4	1.7
	Medium/heavy truck(>10K)	1	0.4
Truck tractor (bobtail)	Tractor/trailer/combo (>10K)	2	0.8
Tractor/semitrailer	Tractor/trailer/combo (>10K)	88	37.3
	Medium/heavy truck(>10K)	4	1.7
Tractor/double	Tractor/trailer/combo (>10K)	3	1.3
	Medium/heavy truck(>10K)	1	0.4
Unk heavy truck >10,000	Medium/heavy truck(>10K)	6	2.5
Total		236	100.0

In terms of cargo body type, there is no inconsistency between the files, other than that 63 records in the State data are left unrecorded but have a valid cargo body type in the MCMIS file. This is probably evidence of a step in the data preparation prior to submitting records in which each case is reviewed and missing information is completed to the extent possible.

For all 236 records, road trafficway is left missing in the MCMIS data, but there is a valid value in the Rhode Island data for those records. In most cases, the value in the Rhode Island data maps directly to a valid code level of the MCMIS road trafficway variable. In terms of area of operation (“Interstate” in the coded data), 27 records are marked interstate in the MCMIS Crash file, but intrastate in the Rhode Island data, and six are marked interstate in the Rhode Island data but intrastate in the MCMIS data. There are another 12 cases in which the area of operation is known in the Rhode Island data, but left unknown in the MCMIS data.

### 6.3 Reporting latency

Reporting latency also reflects data quality. All reportable crash involvements for a calendar year are required to be transmitted to the MCMIS Crash file within 90 days of the date of the crash. The 2008 MCMIS Crash file as of June 9, 2009, approximately 160 days after the end of 2008, was used to identify records submitted from Rhode Island, so all 2008 cases should have been reported by that date. Figure 2 shows the cumulative percent of cases submitted by latency in days, i.e. the number of days between the crash date and the date the case was uploaded to the MCMIS Crash file. Crash reports are required to be submitted to the MCMIS Crash file within 90 days of the crash. About 91% of the records that were ultimately reported were submitted within 90 days of the crash. The median time between crash occurrence and record upload was 17 days. Two-thirds were submitted within 31 days, and 99 percent were submitted within 212 days. Overall, it appears that submission of reportable records occurs in a timely fashion.

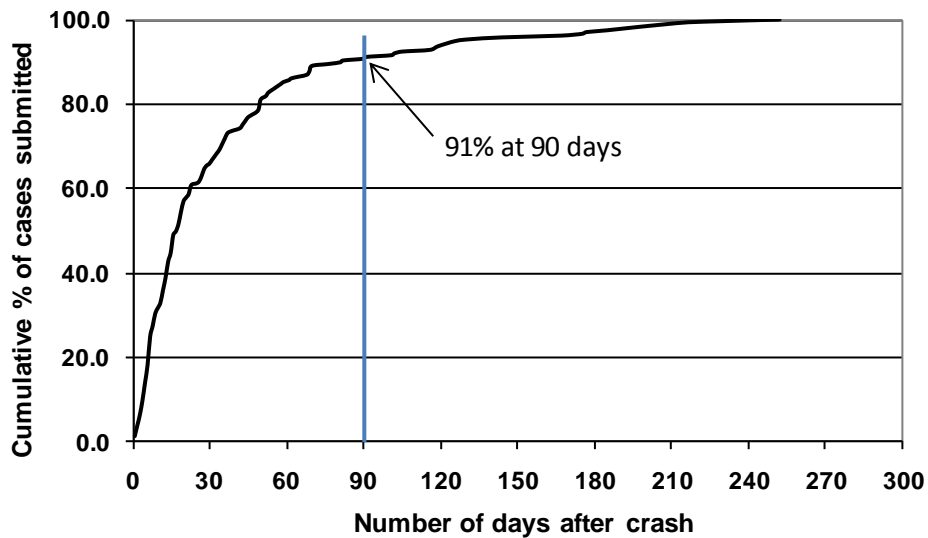


Figure 2 Cumulative Percentage of Cases Submitted to MCMIS Crash file by Number of Days After the Crash

The first date on which crash records for 2008 were uploaded was January 17, 2008, when six records were uploaded. On average, uploads occurred every 6.3 days between then and May 4, 2009, when the last upload occurred. An average of 3.2 records were submitted per upload. About half the uploads were for one or two records. The largest single upload was of 14 records. Two-thirds of the records were uploaded in batches of five or fewer.

## 7. Summary and Discussion

Overall, it appears that Rhode Island submitted about 75.0% of reportable crash involvements for 2008., though there is some uncertainty with respect to that rate. There are eight records in the MCMIS Crash file that, based on the information in the Rhode Island crash file, do not appear to meet the MCMIS reporting criteria. Those records may in fact qualify for reporting, if the information in the Rhode Island crash file was incorrect and the corrected record was submitted to the MCMIS file. We cannot exclude that possibility, since the records in the MCMIS file

appear to meet the reporting criteria. If these records are included in the rate calculation, the estimated reporting rate would be 75.6%.

Rhode Island transitioned to a new crash data collection system in 2007; 2008 was the first year entirely under the new system. The new system, on its face, includes all the information needed to identify reportable cases, i.e., to identify the vehicles that meet the vehicle type criteria involved in traffic crashes that meet the crash severity threshold.

The overall reporting rate was reasonably high. A variety of factors were reviewed in an attempt to explain systematically the reporting rate. The result of this examination showed that reporting rates were fairly uniform across most of the dimensions examined, but some elements are clearly associated with differences in reporting rates.

Typically, reporting rates vary by crash severity and there was no significant difference in the reporting rates for injury/transported crashes and for towed/disabled crashes. On the other hand, there were four fatal involvements, of which only two were reported. But this may be due to some anomaly, because the two unreported cases were also not reported to the FARS file. So there may have been some error in the records for those cases in the State crash file that had not been corrected. However, it was found that only about half of crashes with no injuries (but at least one vehicle towed due to disabling damage) were reported, so there may be some tendency for less severe crashes to be overlooked in some cases. But this does not appear to be a widespread problem.

In terms of the vehicle types reported, there appeared to be no systematic problems. Buses actually were reported at a higher rate than trucks, which is quite unusual. There is some tendency for smaller trucks to be reported at lower rates than larger trucks, but this tendency is weak.

The most clearly decisive factor is whether the reporting officer completes the Truck/Bus Supplemental form. Analysis showed that completing this form was critical to the process of identifying records to submit to the MCMIS Crash file. Of 66 reportable records which did not have a Truck/Bus Supplemental form completed, none were reported. On the other hand, the reporting rate was 95.8% for records with at least one item on the form filled in. Clearly, how well the reporting officer recognizes cases that meet the reporting criteria is highly influential in determining whether a case is reported. This is the major factor in reporting cases from Rhode Island.

Data quality appeared to be quite good across the different dimensions examined. Record submission was timely, with about 91% of reportable cases submitted within 90 days of the crash, and 99% within 212 days. Missing data rates are zero or quite low for most fields reported to the MCMIS Crash file, though they ranged from 5% to 9% for driver-related fields. In addition, road access data is not collected, and almost all records were missing on road trafficway. Hazardous materials name is missing in eight out of the nine records where the vehicle was coded as displaying a hazmat placard.

In many respects, the new forms adopted by Rhode Island in 2007 should facilitate a high reporting rate. The data seem to have the variables and code levels needed to develop a computer algorithm to identify reportable cases. Identifying reportable vehicles was challenging in some

cases, because there were inconsistencies between the type of vehicle (size and configuration) implied by the VIN, the Unit Type field as coded by the reporting officer, and the fields for make and model. Manual review of several hundred records was required to classify vehicles as either trucks, buses, or light vehicles.

The fundamental issue, however, is with reporting officers identifying vehicles that meet the reporting criteria and completing the Truck/Bus Supplemental form. Almost 90% of the unreported cases never had a Supplemental form completed for them. Thus, they had almost no chance of being reported, since no reportable records without a Supplemental were submitted to the MCMIS file. If officers had completed the forms for those crashes, the overall reporting rate would have been almost 97 percent.

## 8. References

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- 10 Matteson, A., and Blower, D., Evaluation of North Carolina Crash Data Reported to MCMIS Crash File. University of Michigan Transportation Research Institute, Ann Arbor, Michigan. May 2005. Sponsor: Federal Motor Carrier Safety Administration, U.S. D.O.T.



- 11 Matteson, A., and Blower, D., Evaluation of Illinois Crash Data Reported to MCMIS Crash File. University of Michigan Transportation Research Institute, Ann Arbor, Michigan. July 2005. Sponsor: Federal Motor Carrier Safety Administration, U.S. D.O.T.
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  - 24 Blower, D., and Matteson, A., Evaluation of 2005 Connecticut Crash Data Reported to MCMIS Crash File. University of Michigan Transportation Research Institute, Ann Arbor, Michigan. Sept 2007. Sponsor: Federal Motor Carrier Safety Administration, U.S. D.O.T.
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**Appendix A Rhode Island Traffic Accident Reports (rev. 12/2006)**

**STATE OF RHODE ISLAND UNIFORM CRASH REPORT**

Reporting Agency Name				Report Number				Crash Date				Crash Time				Walk In Report <input type="checkbox"/>													
City or Town Name						Street or Highway						<input type="checkbox"/> On Ramp <input type="checkbox"/> Off Ramp		Exit #		# of Lanes		Posted Speed Limit <input type="checkbox"/> N/A <input type="checkbox"/> Unk											
Nearest Intersection Street						Direction From Nearest Intersection to Crash Site <input type="checkbox"/> At Inter. <input type="checkbox"/> North <input type="checkbox"/> South <input type="checkbox"/> East <input type="checkbox"/> West						Distance From Nearest Inter. <input type="checkbox"/> Feet <input type="checkbox"/> Miles				Latitude				Longitude									
Unit ID		Driver's Last Name				First Name		M.I.		DOB		Unit ID		Driver's Last Name				First Name		M.I.		DOB							
Address										City				Address										City					
State		Zip		Home Phone		Cell Phone		Work Phone		State		Zip		Home Phone		Cell Phone		Work Phone											
Driver's License # <input type="checkbox"/> CDL										Lic. State				Driver's License # <input type="checkbox"/> CDL										Lic. State					
M/V Violation		M/V Violation		M/V Violation		M/V Violation		M/V Violation		M/V Violation		M/V Violation		M/V Violation		M/V Violation		M/V Violation											
<input type="checkbox"/>		Owner's Last Name				First Name		M.I.		<input type="checkbox"/>		Owner's Last Name				First Name		M.I.											
Address										City				Address										City					
State		Zip		Home Phone		Cell Phone		Work Phone		State		Zip		Home Phone		Cell Phone		Work Phone											
Insurance Company Name <input type="checkbox"/> No Ins.										Insurance Policy Number				Insurance Company Name <input type="checkbox"/> No Ins.										Insurance Policy Number					
Hit And Run <input type="checkbox"/> Yes, M/V & Driver left Scene <input type="checkbox"/> Yes, Driver left Scene <input type="checkbox"/> No <input type="checkbox"/> Unk										Hit And Run <input type="checkbox"/> Yes, M/V & Driver left Scene <input type="checkbox"/> Yes, Driver left Scene <input type="checkbox"/> No <input type="checkbox"/> Unk																			
Registration # <input type="checkbox"/> Not Reg.		State		Yr Reg.		VIN		Registration # <input type="checkbox"/> Not Reg.		State		Yr Reg.		VIN															
Veh Yr.		Make		Model		Color		Plate Type		Veh Yr.		Make		Model		Color		Plate Type											
Veh Travel Direction <input type="checkbox"/> Eastbound <input type="checkbox"/> Westbound <input type="checkbox"/> Not on Roadway <input type="checkbox"/> Unk		<input type="checkbox"/> Northbound <input type="checkbox"/> Southbound		Veh Travel Direction <input type="checkbox"/> Eastbound <input type="checkbox"/> Westbound <input type="checkbox"/> Not on Roadway <input type="checkbox"/> Unk		<input type="checkbox"/> Northbound <input type="checkbox"/> Southbound																							
Vehicle Towed? <input type="checkbox"/> Yes <input type="checkbox"/> No		Towing Company Name				Haz Mat Placard? <input type="checkbox"/> Yes <input type="checkbox"/> No		Vehicle Towed? <input type="checkbox"/> Yes <input type="checkbox"/> No		Towing Company Name				Haz Mat Placard? <input type="checkbox"/> Yes <input type="checkbox"/> No															
<b>Person Type</b>																													
1 Driver		4 Bicyclist		7 Other Ped. (Wheelchair, Person in Building, Skater, Ped. conveyance, etc.)		9 Occupant of a Non-Motor Veh Transportation Device						10 Unknown Type of Non-Motorist																	
2 Passenger		5 Other Cyclist		8 Occupant of Motor Veh. Not in Transport (Parked, etc.)		11 Unknown																							
3 Pedestrian		6 Witness																											
<b>Unit ID</b>		<b>Sex</b>		<b>Seat Position</b>				<b>Other Location</b>				<b>Air Bag Deployed</b>		<b>Ejected</b>		<b>Protection System</b>				<b>Injury</b>									
1 Unit 1 2 Unit 2 3 (etc.) or N/A		M Male F Female U Unk		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr><td>M</td></tr> <tr><td>1 2 3</td></tr> <tr><td>4 5 6</td></tr> <tr><td>7 8 9</td></tr> <tr><td>10 11 12</td></tr> </table>				M	1 2 3	4 5 6	7 8 9	10 11 12	13 Other Row (Bus) 17 N/A 14 Unk Row 18 Sleeper 15 Other Seat 19 Other Enclosed Area 16 Unk Seat 20 Other Unenclosed Area 21 Towed Unit 22 Unk				1 N/A 5 Other 2 No 6 Comb 3 Front 7 Unk 4 Side		1 No 2 Partially 3 Totally 4 N/A 5 Unk		1 N/A 7 Child - Forw Facing 2 None Used 8 Child - Rear Facing 3 Shoulder & Lap 9 Booster Seat 4 Shoulder Only 10 Child - Unk 5 Lap Only 11 Helmet Used 6 Type Unk 12 Other 13 Unk				1 Complains of Pain 2 Non-Incapacitating 3 Incapacitating 4 Fatal 5 No Injury 6 Unk				
M																													
1 2 3																													
4 5 6																													
7 8 9																													
10 11 12																													
Name: Occupants - Witnesses - Pedestrians - Bicyclists										Person Type		Unit ID		Sex		DOB		Seat Pos.		Air Bag Deployed		Ejected		Prot. System		Injury		Trans by Rescue	
																								<input type="checkbox"/> Y <input type="checkbox"/> N					
																								<input type="checkbox"/> Y <input type="checkbox"/> N					
																								<input type="checkbox"/> Y <input type="checkbox"/> N					
<b>Non-Vehicle Property Damage</b> <input type="checkbox"/> State Property <input type="checkbox"/> City/Town Property <input type="checkbox"/> Private Property																													
Owner										Address																			
Home Phone		Cell Phone		Work Phone		Damage Description																							
Reporting Officer Name										Reporting Officer Badge Number						Report Date													

Report Number

STATE OF RHODE ISLAND UNIFORM CRASH REPORT CODING GUIDE

[ ]

Type of Roadway

- 1 Two-Way, Not Divided (No Median or Barrier)
2 Two-Way, Not Divided With a Continuous Left Turn Lane
3 Two-Way, Divided, Unprotected (painted >4 feet) Median
4 Two-Way, Divided, Positive Median Barrier
5 One-Way Trafficway
6 Unknown

Traffic Controls

- 1 No Controls
2 Person
3 Traffic Control Signal
4 Flashing Traffic Control Sig.
5 School Zone Signs
6 Stop Signs
7 Yield Signs
8 Warning Signs
9 Railway Crossing Device
10 Pavement Markings
11 Other
12 Unknown

[ ]

[ ]

Road Surface Condition (Prevailing)

- 1 Dry
2 Wet
3 Snow
4 Slush
5 Ice/Frost
6 Water (Standing, Moving)
7 Sand
8 Mud, Dirt, Gravel
9 Oil
10 Other
11 Unknown

Pre-Crash Traffic Controls Malfunctioning, Damaged or Missing?

[ ] Yes [ ] No [ ] N/A

[ ]

Light Condition (Prevailing)

- 1 Daylight
2 Dawn
3 Dusk
4 Dark - Lighted
5 Dark - Not Lighted
6 Dark - Unknown Lighting
7 Other
8 Unknown

Construction Zone Crash?

(Crash Occurs in or Related to Construction, Maintenance, or Utility Work Zone. May include Vehicles Slowed or Stopped because of Work Zone)

[ ] Yes [ ] No

Construction Workers Present?

[ ] Yes [ ] No

[ ]

Weather Condition (Prevailing)

- 1 Clear
2 Cloudy
3 Fog, Smog, Smoke
4 Rain
5 Sleet, Hail (Freezing Rain or Drizzle)
6 Snow
7 Blowing Snow
8 Severe Crosswinds

Contributing Circumstances Environment

- 1 None
2 Weather Conditions
3 Physical Obstructions
4 Glare
5 Animal(s) in Roadway
6 Other
7 Unknown

1st

2nd

3rd

[ ]

Manner of Impact

- 1 Not a Collision Between Two Motor Vehicles in Transport
2 Rear End (Front-to-Rear)
3 Head-On (Front-to-Front)
4 Angle (Front-to-Side) Same Direction
5 Angle (Front-to-Side) Opposite Direction
6 Angle (Front-to-Side) Right Angle (Includes Broadside)
7 Angle-Direction Not Specified
8 Sideswipe, Same Direction
9 Sideswipe, Opposite Direction
10 Rear-to-Side
11 Rear-to-Rear
12 Other
13 Unknown

Contributing Circumstances Road

- 1 None
2 Road Surface Condition (Wet, Icy, Snow, Slush, etc.)
3 Debris
4 Rut, Holes, Bumps
5 Work Zones (Construction/Maintenance/Utility)
6 Worn, Travel-Polished Surface
7 Obstruction in Roadway
8 Traffic Control Device Inoperative, Missing or Obscured
9 Shoulders (None, Low, Soft, High)
10 Non-Highway Work
11 Other
12 Unknown

1st

2nd

3rd

School Bus Related Crash?

(Directly Involved Indicates Contact was Made)

[ ] Yes, Directly Involved [ ] No
[ ] Yes, Indirectly Involved

[ ]

Vehicle #1

Unit Types

Vehicle #2

- 1 Passenger Car
2 (Sport) Utility Vehicle
3 Passenger Van
4 Cargo Van (10K lbs [4,536 kg] or Less)
5 Pickup
6 Motor Home
7 School Bus
8 Transit Bus
9 Motor Coach
10 Other Bus
11 Motorcycle
12 Moped
13 Low Speed Vehicle
14 Other Light Trucks (10K lbs [4,536 kg] or Less)
15 Tractor Trailer or Combination (More than 10K lbs [4,536 kg])
16 Medium/ Heavy Trucks (More than 10K lbs [4,536 kg])
17 Tow Truck
18 Pedestrian
19 Bicyclist
20 Witness
21 Other

[ ] Yes [ ] No Does this Vehicle have Seats to Transport 9 or more people, including the Driver's Seat? [ ] Yes [ ] No

[ ] Yes [ ] No Was this Vehicle in Tow? [ ] Yes [ ] No

[ ]

Vehicle #1

Special Function Vehicle

Vehicle #2

- 1 No Special Function
2 Taxi
3 Vehicle Used as School Bus
4 Vehicle Used as Other Bus
5 Military
6 Police
7 Ambulance
8 Fire Truck
9 Unknown

Report Number

STATE OF RHODE ISLAND UNIFORM CRASH REPORT CODING GUIDE

Vehicle #1 [ ] Yes [ ] No [ ] Unk Police, Ambulance or Fire Truck Responding to a Call? Vehicle #2 [ ] Yes [ ] No [ ] Unk

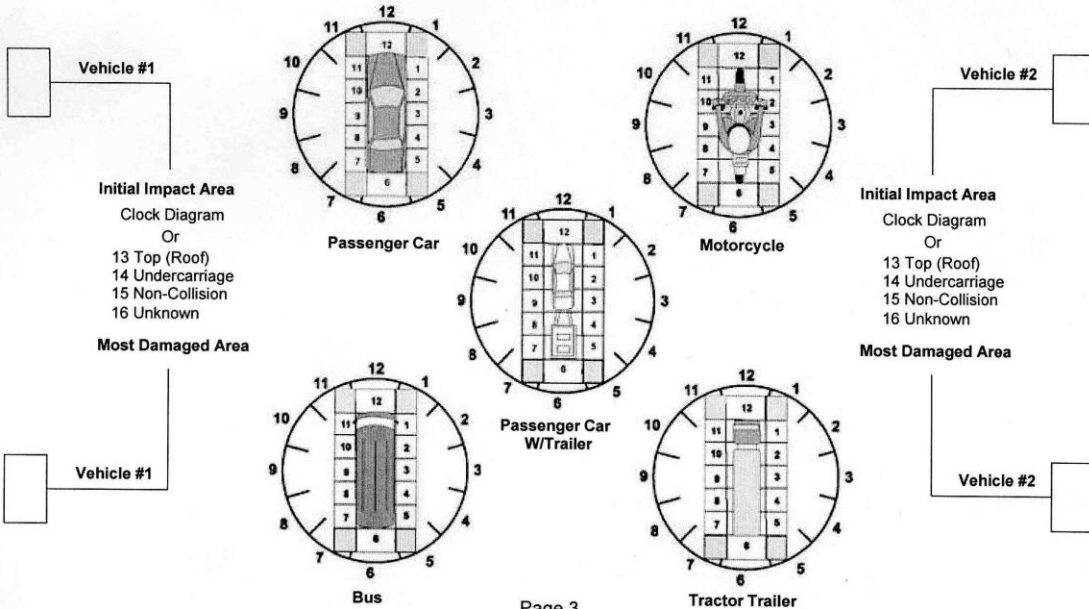
Vehicle #1 [ ] Motor Vehicle Position Vehicle #2 [ ] 1 Motor Vehicle on Roadway 2 Motor Vehicle Parked 3 Working Vehicle/Equipment

Vehicle #1 [ ] Extent of Damage Vehicle #2 [ ] 1 No Damage Observed 2 Minor damage (<= \$1000) 3 Functional Damage (> \$1000) 4 Disabling Damage (> \$1000)

Vehicle #1 [ ] Most Harmful Event Vehicle #2 [ ]

- Non-Collision: 1 Overturn/ Rollover, 2 Fire/ Explosion, 3 Immersion, 4 Jackknife, 5 Cargo/ Equip. Loss or Shift, 6 Fell/ Jumped from Motor Veh., 7 Thrown or Falling Object, 8 Other Non-Collision. Collision with Person, Motor Veh, or Non-Fixed Obj: 9 Pedestrian, 10 Pedalcycle, 11 Railway Vehicle (Train, Engine), 12 Animal, 13 Motor Vehicle in Transport, 14 Work Zone/ Maintenance Equipment, 15 Other Non-Fixed Object. Collision with Fixed Object: 16 Impact Attenuator/ Crash Cushion, 17 Bridge Overhead Structure, 18 Bridge Pier or Support, 19 Bridge Rail, 20 Culvert, 21 Curb, 22 Ditch, 23 Embankment, 24 Guardrail Face, 25 Guardrail End, 26 Jersey/ Concrete Traffic Barrier, 27 Other Traffic Barrier, 28 Tree (Standing), 29 Landscaping, 30 Utility Pole(Elec/Tele)/ Light Support, 31 Highway Lighting/ Light Standard, 32 Traffic Sign/ Support, 33 Traffic Signal/ Support, 34 Traffic Control Box, 35 Variable Message Board/ Arrow Board, 36 Other Post, Pole, or Support, 37 Fence, 38 Mailbox, 39 Other Fixed Obj. (Wall, Building, Tunnel, etc.)

Vehicle #1 [ ] Vehicle Action Prior Vehicle #2 [ ] 40 Unknown - Most Harmful Event 1 Movements Essentially Straight Ahead, 2 Backing, 3 Changing Lanes, 4 Overtaking/ Passing, 5 Turning Right, 6 Turning Left, 7 Making U-Turn, 8 Leaving Traffic Lane, 9 Entering Traffic Lane, 10 Slowing, 11 Negotiating a Curve, 12 Parked, 13 Stopped in Traffic, 14 Other, 15 Unknown



Report Number

**STATE OF RHODE ISLAND UNIFORM CRASH REPORT  
CODING GUIDE**

<b>1st</b>	Vehicle #1	Sequence of Events	Vehicle #2	<b>1st</b>
<b>2nd</b>	Non-Collision: 1 Overturn/ Rollover 2 Fire/ Explosion 3 Immersion 4 Jackknife 5 Cargo/ Equipment Loss or Shift 6 Fell/ jumped from Motor Vehicle 7 Thrown or Falling Object 8 Other Non-Collision	Collision with Fixed Object: 16 Impact Attenuator/ Crash Cushion 17 Bridge Overhead Structure 18 Bridge Pier or Support 19 Bridge Rail 20 Culvert 21 Curb 22 Ditch 23 Embankment 24 Guardrail Face 25 Guardrail End 26 Jersey/ Concrete Traffic Barrier 27 Other Traffic Barrier 28 Tree (Standing) 29 Landscaping 30 Utility Pole(Elec/Tele)/ Light Support 31 Highway Lighting/ Light Standard 32 Traffic Sign/ Support 33 Traffic Signal/ Support 34 Traffic Control Box 35 Variable Message Board/ Arrow Board 36 Other Post, Pole, or Support 37 Fence 38 Mailbox 39 Other Fixed Obj. (Wall, Building, Tunnel, etc.)		<b>2nd</b>
<b>3rd</b>	Collision with Person, Motor Veh, or Non-Fixed Obj: 9 Pedestrian 10 Pedalcycle 11 Railway Vehicle (Train, Engine) 12 Animal 13 Motor Vehicle in Transport 14 Work Zone/ Maintenance Equip. 15 Other Non-Fixed Object	40 Unknown - Sequence of Events		<b>3rd</b>
<b>4th</b>				<b>4th</b>

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<b>1st</b>	Driver Vehicle #1	Driver Distracted	Driver Vehicle #2	<b>1st</b>
<b>2nd</b>	1 Not Distracted 2 Electronic Communication Devices (Cell Phone, Pager, etc.) 3 Other Electronic Devices (Navigation Device, Palm Pilot,	4 Other Inside the Vehicle 5 Other Outside the Vehicle 6 Unknown		<b>2nd</b>

---

<b>1st</b>	Driver Vehicle #1	Physical Condition of Driver	Driver Vehicle #2	<b>1st</b>
<b>2nd</b>	1 Apparently Normal 2 Emotional (Depressed, Angry, Disturbed, etc.) 3 Ill (Sick)	4 Fell Asleep, Fainted, Fatigued, etc. 5 Under the Influence of Medications/Drugs/Alcohol 6 Other		<b>2nd</b>

---

<b>1st</b>	Vehicle #1	Non-Motorist Safety Equipment	Vehicle #2	<b>1st</b>
<b>2nd</b>	1 None 2 Helmet 3 Protective Pads Used (Elbows, Knees, Shins, etc.) 4 Reflective Clothing (Jacket, Backpack, etc.)	5 Lighting 6 Other 7 N/A 8 Unknown		<b>2nd</b>

---

<b>Alcohol and/or Drug Testing</b>					
	Driver Vehicle #1	Chemical Test	Driver Vehicle #2	Driver Vehicle #1	Alcohol Test Result
<b>Alcohol</b>	<b>Drug</b>		<b>Alcohol</b>	<b>Drug</b>	
<input type="checkbox"/>	<input type="checkbox"/>	None Given	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Test Refused	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Unknown if Tested	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Blood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Urine	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Serum	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Breath	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				<b>Driver Vehicle #1</b>	<b>Driver Vehicle #2</b>
				<b>Drug Test Result</b>	
				<input type="checkbox"/>	<input type="checkbox"/>
				Positive	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>
				Negative	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>
				Awaiting Test Result	<input type="checkbox"/>









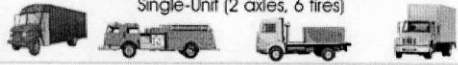
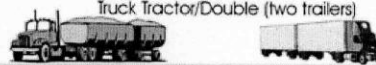



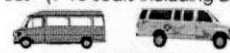

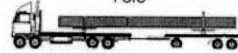

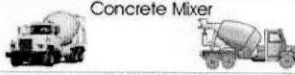



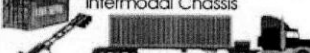



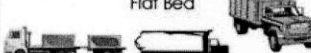

Report Number

STATE OF RHODE ISLAND UNIFORM CRASH REPORT
Additional Persons Supplemental

Main reporting form containing sections for Person Type, Unit ID, Sex, Seat Position, Other Location, Air Bag Deployed, Ejected, Protection System, Injury, and Non-Vehicle Property Damage.

State of Rhode Island
Truck/Bus Crash Report Supplemental

Report Number: MCSAP #: Unit ID:
Citation Issued (check one): License Class (check one):
General Instructions - Complete this form for EACH qualifying vehicle if the crash meets the criteria on the back of the form.
Check one: Qualifying Information
This form is being completed because this vehicle is:
Number of: (enter number in box provided)
At the time of the Crash, THIS Vehicle was:
Vehicle Information
Vehicle Configuration: Cargo Body Type:
Bus Use: Hazardous Materials Involvement:
Motor Carrier Information
Sequence of Events

Reporting Criteria for Truck and Bus Crashes		
<p><b>IF THIS CRASH INCLUDES:</b></p> <ol style="list-style-type: none"> <li><b>Any</b> truck having a gross vehicle weight rating (GVWR) of more than 10,000 pounds or a gross combination weight rating (GCWR) over 10,000 pounds used on public highways,</li> <li><b>Any</b> motor vehicle with seats to transport nine (9) or more people, including the driver's seat,</li> <li><b>Any</b> vehicle displaying a hazardous materials placard (regardless of weight).</li> </ol> <p><b>And at least one motor vehicle in-transport operating on a trafficway open to the public, which results in:</b></p> <p><b>A FATALITY:</b> <b>Any</b> person(s) killed in or outside of any vehicle (truck, bus, car, etc.) involved in the crash or who dies within 30 days of the crash as a result of an injury sustained in the crash, <b>OR</b></p> <p><b>AN INJURY:</b> <b>Any</b> person(s) injured as a result of the crash who immediately receives medical treatment away from the crash scene, <b>OR</b></p> <p><b>A TOW-AWAY:</b> <b>Any</b> motor vehicle (truck or truck combination, bus, car, etc.) disabled as a result of the crash and transported away from the scene by a tow truck or other vehicle.</p>		
Vehicle Configuration		
<p>Bus - (9-15 Seats Including Driver)</p> 	<p>Truck Tractor (Bobtail)</p> 	
<p>Bus - (16 or More Seats Including Driver)</p> 	<p>Tractor/Semi Trailer (one trailer)</p> 	
<p>Single-Unit (2 axles, 6 tires)</p> 	<p>Truck Tractor/Double (two trailers)</p> 	
<p>Single-Unit (3 or more axles)</p> 	<p>Truck Tractor/Triples (three trailers)</p> 	
<p>Truck/Trailer (Single-Unit Truck pulling a trailer)</p> 		
Cargo Body Type		
<p>Bus - (9-15 Seats Including Driver)</p> 	<p>Dump</p> 	<p>Pole</p> 
<p>Bus - (16 or More Seats Including Driver)</p> 	<p>Concrete Mixer</p> 	<p>Log</p> 
<p>Van/Enclosed Box</p> 	<p>Auto Transporter</p> 	<p>Intermodal Chassis</p> 
<p>Cargo Tank</p> 	<p>Garbage/Refuse</p> 	<p>Vehicle Towing Vehicle</p> 
<p>Flat Bed</p> 	<p>Grain, Chips, Gravel</p> 	<p>No Cargo Body</p> 