

**EVALUATION OF 2006 SOUTH CAROLINA
CRASH DATA REPORTED TO MCMIS
CRASH FILE**

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**Evaluation of 2006 South Carolina Crash Data Reported to the MCMIS
Crash File**

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July 2008

Technical Report Documentation Page

1. Report No. UMTRI-2008-41		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle Evaluation of 2006 South Carolina Crash Data Reported to the MCMIS Crash File			5. Report Date July 2008		
			6. Performing Organization Code		
7. Author(s) Green, Paul E. and Matteson, Anne			8. Performing Organization Report No. UMTRI-2008-41		
9. Performing Organization Name and Address The University of Michigan Transportation Research Institute 2901 Baxter Road Ann Arbor, Michigan 48109-2150 U.S.A.			10. Work Unit no. (TRAIS) 052702		
			11. Contract or Grant No. DTMC75-06-H-00003		
12. Sponsoring Agency Name and Address U.S. Department of Transportation Federal Motor Carrier Safety Administration 400 Seventh Street, SW Washington, D.C. 20590			13. Type of Report and Period Covered Special report		
			14. Sponsoring Agency Code		
15. Supplementary Notes					
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 South Carolina.</p> <p>MCMIS Crash File records were matched to the South Carolina PAR file to determine the nature and extent of underreporting. The vehicle type variable in the PAR file has only two levels for identifying medium/heavy trucks: truck tractors, and other trucks. Overall, it appears that South Carolina is reporting 77.9 percent of crash involvements that should be reported to the MCMIS Crash file. The reporting rate for truck tractors is 84.7 percent, while the reporting rate for other trucks is 64.5 percent.</p> <p>Fatal crashes are reported at about 90 percent, but injured/transported and towed/disabled crashes are reported at about 79 and 76 percent, respectively. With respect to timing issues, there is a declining trend in reporting rates towards the end of the calendar year. The reporting rate in December is 62.7 percent. The Highway Patrol has a reporting rate of 85.2 percent, while the reporting rate for police departments is 57.6 percent and for sheriff's offices is 60.6 percent.</p> <p>Missing data percentages in the MCMIS Crash file are generally low, with a few exceptions. Because the South Carolina PAR file has only two categories for medium/heavy trucks, the vehicle configuration variable does not match well between the PAR file and the MCMIS file.</p>					
17. Key Words MCMIS, South Carolina Crash File, accident statistics, underreporting				18. Distribution Statement Unlimited	
19. Security Classification (of this report) Unclassified		20. Security Classification (of this page) Unclassified		21. No. of Pages 38	22. Price

SI* (MODERN METRIC) CONVERSION FACTORS

APPROXIMATE CONVERSIONS TO SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
LENGTH				
in	inches	25.4	millimeters	mm
ft	feet	0.305	meters	m
yd	yards	0.914	meters	m
mi	miles	1.61	kilometers	km
AREA				
in ²	square inches	645.2	square millimeters	mm ²
ft ²	square feet	0.093	square meters	m ²
yd ²	square yard	0.836	square meters	m ²
ac	acres	0.405	hectares	ha
mi ²	square miles	2.59	square kilometers	km ²
VOLUME				
fl oz	fluid ounces	29.57	milliliters	mL
gal	gallons	3.785	liters	L
ft ³	cubic feet	0.028	cubic meters	m ³
yd ³	cubic yards	0.765	cubic meters	m ³
NOTE: volumes greater than 1000 L shall be shown in m ³				
MASS				
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")
TEMPERATURE (exact degrees)				
°F	Fahrenheit	5 (F-32)/9 or (F-32)/1.8	Celsius	°C
ILLUMINATION				
fc	foot-candles	10.76	lux	lx
fl	foot-Lamberts	3.426	candela/m ²	cd/m ²
FORCE and PRESSURE or STRESS				
lbf	poundforce	4.45	newtons	N
lbf/in ²	poundforce per square inch	6.89	kilopascals	kPa

APPROXIMATE CONVERSIONS FROM SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
LENGTH				
mm	millimeters	0.039	inches	in
m	meters	3.28	feet	ft
m	meters	1.09	yards	yd
km	kilometers	0.621	miles	mi
AREA				
mm ²	square millimeters	0.0016	square inches	in ²
m ²	square meters	10.764	square feet	ft ²
m ²	square meters	1.195	square yards	yd ²
ha	hectares	2.47	acres	ac
km ²	square kilometers	0.386	square miles	mi ²
VOLUME				
mL	milliliters	0.034	fluid ounces	fl oz
L	liters	0.264	gallons	gal
m ³	cubic meters	35.314	cubic feet	ft ³
m ³	cubic meters	1.307	cubic yards	yd ³
MASS				
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
TEMPERATURE (exact degrees)				
°C	Celsius	1.8C+32	Fahrenheit	°F
ILLUMINATION				
lx	lux	0.0929	foot-candles	fc
cd/m ²	candela/m ²	0.2919	foot-Lamberts	fl
FORCE and PRESSURE or STRESS				
N	newtons	0.225	poundforce	lbf
kPa	kilopascals	0.145	poundforce per square inch	lbf/in ²

*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 2006 South Carolina Crash Data Reported to the MCMIS Crash File

1. Introduction

The Motor Carrier Management Information System (MCMIS) Crash file has been 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 selection criteria and crash severity threshold. FMCSA maintains the MCMIS file to support its mission to reduce crashes, injuries, and fatalities involving large trucks and buses. It is essential to assess the magnitude and characteristics of motor carrier crashes to design effective safety measures to prevent such crashes. The usefulness of the MCMIS Crash file depends upon individual states transmitting a standard set of data items on all trucks and buses involved in traffic crashes that meet a specific severity threshold.

The present report is part of a series evaluating the completeness and accuracy of the data in the MCMIS Crash file. Previous reports on a number of states showed underreporting due in large part to problems in interpreting and applying the reporting criteria. The problems were more severe in large jurisdictions and police departments. Each state also had problems specific to the nature of its system. Some states also had overreporting of cases, often due to technical problems with duplicate records [See references 1 to 29]. The states are responsible for identifying and reporting qualifying crash involvements. Accordingly, improved completeness and accuracy must ultimately reside with the individual states.

In this report, we focus on MCMIS Crash file reporting by South Carolina. In recent years, South Carolina has reported from 2,600 to 3,400 involvements annually to the MCMIS Crash file. According to the 2002 Vehicle Inventory and Use Survey (the last available), in 2002, South Carolina had over 67,000 trucks registered, ranking 30th among the states and accounting for 1.2 percent of all truck registrations [30]. South Carolina is the 25th largest state by population [31] and generally ranks 17th in terms of the number of annual truck and bus fatal involvements [32, 33].

The method employed in this study is similar to previous studies.

1. The complete police accident report file (PAR file hereafter) from South Carolina was obtained for the most recent year available, 2006. This file was processed to identify all cases that qualified for reporting to the MCMIS Crash file.
2. All cases in the South Carolina 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 South Carolina.
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 overreporting.

Police accident report (PAR) data recorded in South Carolina's statewide files as of May, 2008 were used in this analysis. The 2006 PAR file contains the computerized records of 210,890 units involved in 112,949 crashes that occurred in South Carolina.

2. Data Preparation

The South Carolina PAR file and MCMIS Crash file each required some preparation before the South Carolina records in the MCMIS Crash file could be matched to the South Carolina PAR file. In the case of the MCMIS Crash file, the only processing necessary was to extract records reported from South Carolina and to eliminate duplicate records. The South Carolina PAR file required more extensive work to create a comprehensive vehicle-level file from accident, vehicle, and occupant 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 2006 MCMIS Crash file as of June 4, 2007 was used to identify records submitted from South Carolina. For calendar year 2006 there were 3,044 cases. An analysis file was constructed using all variables in the file. The file was then examined for duplicate records (those involvements where more than one record was submitted for the same vehicle in the same crash; i.e., the report number and sequence number were identical). No such duplicate pairs were found.

In addition, records were examined for identical values on accident number, accident date/time, county, city, officer badge number, vehicle license number, and driver license number, even though their vehicle sequence numbers were perhaps different. One would not expect two records for the same vehicle and driver within a given accident. No such duplicates were found.

2.2 South Carolina Police Accident Report File

The South Carolina PAR data for 2006 (as of May, 2008) was obtained from the state of South Carolina. The data were stored as Statistical Analysis System (SAS) datasets, representing Accident, Vehicle, and Person information. The combined files contain records for 112,949 crashes involving 210,890 vehicles. Data for the PAR file are coded from the South Carolina Traffic Collision Report Form (TR-310, Rev. 01/2001) completed by police officers (Appendix B).

The PAR file was first examined for duplicate records. A search for records with identical case number and unit number found no such instances. In addition, inspection of case numbers verified that they were recorded in a consistent format, so there was no reason to suspect duplicate records based on similar, but not identical, case numbers (such as 06103589 and 061-3589).

Cases were also examined to determine if there were any records that contained identical case number, time, place, investigating officer, and vehicle/driver variables, even though their vehicle numbers were perhaps different. Two cases would not be expected to be identical on all variables. To investigate this possibility, records were examined for duplicate occurrences based

on the variables case number, accident date/time, county, jurisdiction, officer ID, vehicle license plate number, and driver license number.

Based on the above algorithm, 54 duplicate instances were found, representing 27 unique occurrences of the examined variables. Further examination of the pairs revealed that although license plate number and driver license number were identical, in a few cases, driver last name and driver birth date were different. However, since vehicle make and model were always the same, these pairs were considered to be duplicate cases. One member of the pair could have mistakenly been entered while updating the original record. Since it was not possible to determine which member of the pair is the duplicate, one member of the pair was deleted. The resulting PAR file has 210,863 unique records.

3. Matching Process

The next step involved matching records from the South Carolina PAR file to corresponding records from the MCMIS file. There were 3,044 South Carolina records from the MCMIS file available for matching, and 210,863 records from the South Carolina PAR file. All records from the South Carolina PAR data file were used in the match, even those that were not reportable to the MCMIS Crash file. This allowed the identification of cases in the MCMIS Crash file that did not meet the MCMIS Crash file reporting criteria.

Matching records in the two files requires finding combinations of variables common to the two files that have a high probability of uniquely identifying accidents and specific vehicles within the accidents. Collision Number, used to uniquely identify a crash in the South Carolina PAR data, and Report Number in the MCMIS Crash file, are obvious first choices. Collision Number in the South Carolina PAR file is an eight-digit numeric field, while 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 as follows: The first two columns contain the state abbreviation (SC, in this case), followed by nine numeric digits, and one alphanumeric digit. It appears the rightmost eight numeric digits correspond to the Collision Number. These digits were then used in the match.

Other variables typically available for 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 did not contain a Crash City variable, and Crash Street on the MCMIS file was not well-recorded. Thus, these two variables could not be used in the matching process.

Variables in the MCMIS file that distinguish one vehicle from another within the same crash include vehicle license plate number, driver license number, vehicle identification number (VIN), driver date of birth, and driver last name. All of these variables were present in the PAR file. VIN was unrecorded approximately 99.9% of the time in the PAR data and was unknown in 98.6% of MCMIS cases. In the PAR file, Driver License Number and Vehicle License Plate Number were each unrecorded about 8% of the time, compared to about 3% of MCMIS cases.

Four separate matches were performed using the available variables. At each step, records in either file with duplicate values on all the match variables were excluded, along with records that were missing values on the match variables. The first match included the variables case number, crash date (month, day), crash time (hour, minute), county, officer ID, vehicle license plate

number, and driver license number, and driver last name. The second match step matched on case number, crash date, county, and vehicle license plate number. The third match step replaced vehicle license plate number with driver license number. After some experimentation, the fourth match included variables case number and driver last name. All of the matched cases in the second, third and fourth match steps were hand-verified. This process resulted in matching 98.0% of the MCMIS records to the PAR file.

Matched records were verified using other variables common to the MCMIS and PAR file as a final check to ensure the match was valid. Table 1 shows the variables used in each match step along with the number of records matched at each step. The above procedure resulted in 2,983 matches, representing 98.0% of the 3,044 non-duplicate records reported to MCMIS.

Table 1 Steps in MCMIS/South Carolina PAR File Match, 2006

Step	Matching variables	Cases matched
Match 1	Case number, crash date, crash time, county, officer ID, vehicle license plate number, driver license number, and driver last name	2,796
Match 2	Case number, crash date, county, and vehicle license plate number	119
Match 3	Case number, crash date, county, and driver license number	58
Match 4	Case number and driver last name	10
Total cases matched		2,983

Figure 1 shows the flow of cases in the matching process. Of the 2,983 matched cases, 364 are not reportable and 2,619 are reportable. The method of identifying cases reportable to the MCMIS Crash file is discussed in the next section.

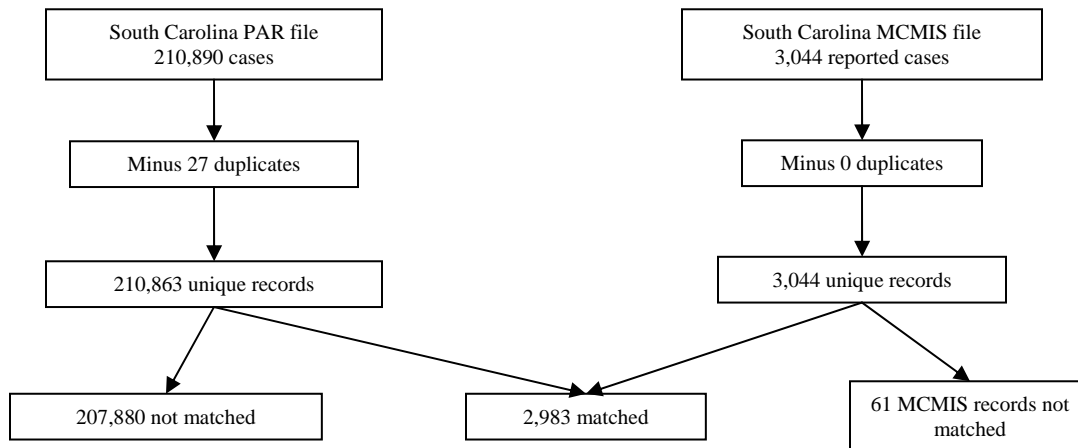


Figure 1 Case Flow in MCMIS/South Carolina Crash File Match

4. Identifying Reportable Cases

The next step in data preparation is to identify records in the South Carolina data that qualified for reporting to the MCMIS Crash file. Records are identified using the information available in the computerized crash files that were sent by South Carolina. To identify reportable records, we use the information that is completed by the officers for all vehicles. That is, some police reports place certain data elements that are to be collected for the MCMIS file in a special section or supplemental form, with the instruction to the officer to complete that section if the vehicle and crash meets the MCMIS reporting criteria. This is the case in South Carolina.

Like many other states, South Carolina has a separate Supplemental Bus and Truck Collision Report (last page in Appendix B) for recording additional information pertaining to vehicles that meet specific criteria. The instruction manual states that officers must complete the form for qualified vehicles in qualified crashes. The screening criteria on the form describe qualifying vehicles and crashes as follows:

1. A truck having a GVWR of 10,001 lbs. or more for the power unit, or
2. A vehicle with a hazardous materials placard, or
3. A bus that is designed or used to carry 16 or more persons, including the driver
4. A motor vehicle engaged in interstate commerce that is designed or used to carry 9-15 persons, including the driver, for compensation

In addition, the officer is instructed to indicate the number of persons involved:

Sustaining fatal injuries

Transported for immediate medical services

Towed from the scene due to damage.

The supplemental form is not to be completed unless one or more qualifying vehicles were involved AND

one or more qualifying injuries were sustained OR one or more vehicles (not necessarily a truck or bus) were towed from the scene.

These criteria accurately reflect cases that should have been reported to the MCMIS file. But since our goal is to evaluate the completeness of reporting, we attempt to identify all reportable cases, even those an officer may have overlooked. For this purpose, we use the data from the primary crash form that is completed for all cases. The goal of the selection process is to approximate as closely as possible the reporting threshold of the MCMIS file. The MCMIS criteria for a reportable crash involving a qualifying vehicle are shown in Table 2.

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.

The Unit Type variable in the South Carolina PAR file has eighteen levels and was used to identify qualifying trucks and buses. Table 3 shows the relevant code levels of the Unit Type variable that meet the vehicle criteria. There are only two categories for identifying qualifying trucks: Truck Tractor and Other Truck. On the Supplemental Bus and Truck Collision Report, the Vehicle Configuration variable defines trucks, buses, and hazmat placarded vehicles in much greater detail. For example, there are separate levels for single unit trucks (SUT) with 2-axles and six tires, and SUT with three or more axles. For truck tractors there are separate levels for bobtail, semitrailer, and double trailer configurations (last page Appendix B). However, for reasons described above, the Unit Type Variable is used to identify qualifying vehicles because it is recorded on the main PAR form.

Table 3 Relevant Vehicle Unit Type Codes in South Carolina PAR file

13 - Truck Tractor
14 - Other Truck
61 - School Bus
62 - Passenger Bus

In addition to these vehicle types, any vehicle, regardless of size, displaying a hazardous materials placard, also meets the MCMIS vehicle type definition. Hazmat information is recorded on the Supplemental Bus and Truck Collision Report, but there appears to be no such variable on the main form. Experience based on previous MCMIS evaluations of other state data files suggests that light vehicles with hazmat placards represent a very small percentage of all qualifying vehicles. Typical percentages are less than 0.2 percent [20,22,25,27,28].

In total, there were 7,837 vehicles identified as qualifying trucks or buses in the South Carolina PAR file. Table 4 shows the distribution of vehicle type. The great majority of qualifying vehicles are trucks, while about 7.8 percent are buses. The 7,837 eligible vehicles represent 3.7 percent of all 210,863 vehicles in the PAR file. This percentage, while possibly somewhat low in comparison, falls within the range of other MCMIS evaluations in which the percentage of eligible vehicles has ranged from 2.6 percent to 6.1 percent.

Table 4 Vehicles Meeting MCMIS Vehicle Criteria, South Carolina PAR File, 2006

Vehicle type	N	%
Trucks	7,225	92.2
Buses	612	7.8
Non-trucks with hazmat placard	0	0.0
Total	7,837	100.0

Having identified qualifying vehicles, the next step is to identify crashes of sufficient severity to qualify for reporting to the MCMIS Crash file. Qualifying crashes include those involving a fatality, an injury transported for immediate medical attention, or a vehicle towed from the scene due to disabling damage. The South Carolina PAR file contains all the necessary variables for determining whether a qualifying vehicle in a crash meets the threshold for reporting to the MCMIS Crash file.

In the Occupant file of the South Carolina PAR data, there are two variables related to injury and the transport of victims for medical care. The Injury Status variable follows the usual KABCO scale. The Transported to Medical Facility variable indicates whether a person was transported from a collision site to a medical facility for treatment of injuries sustained in the collision. These two variables are recorded on the Traffic Collision Report Form (Appendix B, second page). Following the strict sense of the definition, an injured and transported variable was created from the injury and the medical transport variables in the Occupant file. This variable was merged into the Vehicle file to create a crash-level injured and transported variable. Therefore, any crash involving an A, B, or C-injury, and a person transported for medical care satisfied the criterion.

Identifying crashes in which a vehicle was towed due to disabling damage was straightforward. There are two variables in the South Carolina Vehicle file that can be used in combination to determine if a vehicle was towed due to disabling damage. The Towed variable indicates whether a vehicle was towed or not. The Extent of Deformity variable has six levels: none/minor, functional damage, disabling damage, severe/totaled, not applicable, unknown. If a vehicle was towed and extent of deformity was disabled or severe/totaled, it was considered to meet the criterion. Analysis of the towed variable in the 2006 General Estimates System (GES) database [35] shows that approximately 27 percent of vehicles are towed due to damage. Other MCMIS evaluations tend to support an estimate of about 30 percent [20,22,27,28]. Based on the method established here, the percentage in the South Carolina PAR file is 28.2 percent. A towed and disabled flag variable was created at the crash level to be used for estimating the number of qualifying vehicles satisfying this criterion.

Table 5 shows the numbers of qualifying vehicles that meet the threshold for a MCMIS reportable crash according to the MCMIS criteria. In total, it is estimated that 3,362 vehicles were reportable to the MCMIS Crash file. Of these, 102 were involved in fatal crashes and 1,544, or about 45.9 percent, were involved in crashes where at least one person was transported for medical treatment. Based on the towed due to damage variable described above, it is estimated that 1,716 or about 51.1 percent of reportable vehicles were involved in crashes where at least one vehicle was towed due to disabling damage.

Table 5 Reportable Records in South Carolina Crash File, 2006

Crash type	N	%
Fatal	102	3.0
Injury transported for treatment	1,544	45.9
Vehicle towed due to damage	1,716	51.1
Total	3,362	100.0

5. Factors Associated with Reporting

The procedure described in the previous section identified 3,362 vehicles involved in crashes as reportable to the MCMIS Crash file. The match process described in Section 3 determined that 3,044 unique cases were reported to the MCMIS Crash file, of which 2,983 could be matched to the South Carolina PAR data. Of the 2,983 cases that could be matched, 2,619 were determined to meet the MCMIS Crash file reporting criteria. Therefore, of the 3,362 reportable vehicles in 2006, South Carolina reported 2,619, for an overall reporting rate of 77.9 percent. In this section, some of the factors that affect the chance that a vehicle in a qualifying crash would be submitted through the SafetyNet system and appear in the MCMIS Crash file are identified. The results are presented in five subsections: overreporting, case processing, reporting criteria, reporting agency and area, and truck/bus fire and explosion occurrence. Analysis of overreporting attempts to identify why cases were submitted that do not meet the MCMIS reporting criteria as defined by Table 2. Case processing deals with timing issues related to reporting such as crash month and time lag between crash date and uploading date to the MCMIS Crash file. Reporting criteria includes factors such as vehicle type and crash severity. Reporting agency is associated with differences in reporting rates due to the agency, such as state police or local police, while area investigates reporting by location, such as the county where the crash occurred. Truck/bus fire occurrence examines reportable cases of crashes involving fire or explosion.

5.1 Overreporting

MCMIS evaluations tend to focus on underreporting because sources of underreporting tend to be more prevalent than overreporting. However, almost all states overreport cases to some degree. Overreporting results when cases are submitted to the MCMIS Crash file that do not meet the criteria for a reportable crash. Since 2,983 MCMIS cases could be matched to the South Carolina PAR data, and 2,619 were determined to meet the reporting criteria, the difference, or 364 cases, were not reportable, and should not have been reported.

Table 6 shows a two-way classification of vehicle type and crash severity, and provides some explanation as to why these vehicles should not have been reported to the MCMIS Crash file. The majority of vehicles are qualifying trucks or buses. Of the 364 reported, 313 are identified as trucks, and 22 are identified as buses. However, they do not meet the crash severity threshold for a MCMIS reportable crash according to the data provided in the South Carolina PAR file and the definitions established in this report. In addition, 29 vehicles were reported that meet neither the crash severity criteria nor the vehicle criteria since they are not trucks, buses, or hazmat placarded vehicles.

Table 6 Distribution of Non-reportable Vehicles in MCMIS Crash File, 2006

Vehicle type	Crash severity				Total
	Fatal	Transported injury	Towed/disabled	Other crash severity	
Truck	0	0	0	313	313
Bus	0	0	0	22	22
Other vehicle (not transporting hazmat)	0	0	0	29	29
Total	0	0	0	364	364

5.2 Case Processing

Delays in transmitting cases may partially account for the incompleteness of the MCMIS Crash file. The time lag in extracting and submitting reports to the file might explain some portion of the unreported cases. 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 2006 MCMIS Crash file as of June 4, 2007 was used to identify records submitted from South Carolina, so all 2006 cases should have been reported by that date.

Table 7 shows reporting rates according to month of the crash. There is a clear declining trend in rates, especially towards the end of the year. From January through April, rates are greater than 80 percent. From May through October, rates range from 75 percent to 79.7 percent. However, the rate in November is 73.4 percent, and in December the rate falls significantly lower to 62.7 percent. The range from the highest rate to the lowest rate is 83.7-62.7, or 21 .0 percent. The percentages of unreported cases also tend to be highest at the end of the year. October accounts for 10.4 percent of unreported cases, November accounts for 9.0 percent, and December accounts for 12.1 percent.

Table 7 Reporting Rate by Accident Month in South Carolina Crash File, 2006

Crash month	Reportable cases	Reporting rate	Unreported cases	% of total unreported cases
January	314	82.8	54	7.3
February	258	82.6	45	6.1
March	305	81.3	57	7.7
April	276	83.7	45	6.1
May	295	79.7	60	8.1
June	300	75.0	75	10.1
July	213	79.3	44	5.9
August	295	78.6	63	8.5
September	305	78.4	66	8.9
October	308	75.0	77	10.4
November	252	73.4	67	9.0
December	241	62.7	90	12.1
Total	3,362	77.9	743	100.0

Figure 2 shows the median latency in case submission by month, where latency is the number of days between crash date and the date the case was uploaded to the MCMIS Crash file, minus the 90-day grace period. Therefore, a positive number for a month gives the median number of days cases were submitted after the 90-day grace period. Negative numbers give the median number of days that cases were submitted within the 90-day grace period for a month. Figure 2 shows that among the 2,619 cases reported, South Carolina tended to report well within the grace period. As shown by the horizontal line, over the entire twelve months, cases were submitted approximately 57 days (about two months) prior to the end of the grace period, or about one month after the date of the crash. Even in March, which represents the worst month, cases were submitted about 52.5 days prior to the end of the grace period. There does not appear to be any kind of systematic trend in the plot.

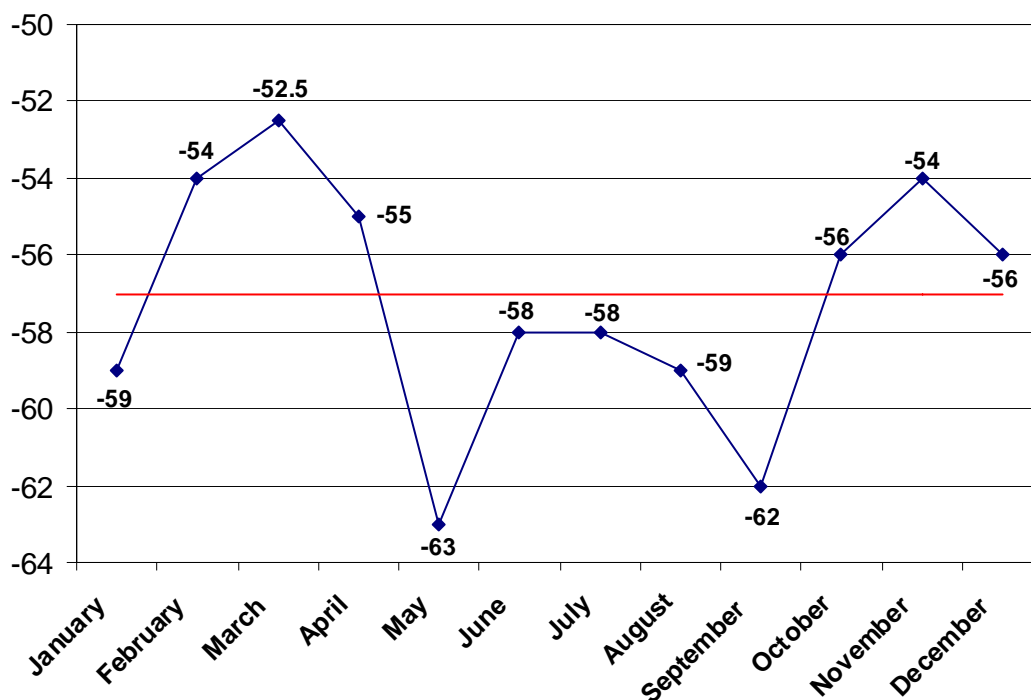


Figure 2 Median Latency (in Days, Minus 90) in Reporting to the MCMIS Crash File, South Carolina Reported Cases, 2006

5.3 Reporting Criteria

In this subsection, reporting is investigated according to variables in the South Carolina PAR file related to the reporting criteria for a MCMIS-reportable crash, as outlined in Table 2. Previous studies have consistently shown that trucks are more likely to be reported than buses and that fatal crashes are more likely to be reported than injury involvements. Since the criteria revolve around attributes associated with the vehicle type and crash severity, calculating reporting rates for these two variables is a logical starting point for assessing where improvements can be gained.

Table 8 shows reporting rates by vehicle type. The reporting rate for trucks is close to the overall rate since trucks represent the majority of reportable cases. In addition, trucks account for 94.8 percent of the total unreported cases. The reporting rate is about 5 percent higher for buses than trucks. As shown in Table 4, no vehicles in the South Carolina PAR file are identified with a hazmat placard. Examination of the separate South Carolina CMV file, however, shows seven light vehicles with a hazmat placard. A cross-tabulation of the vehicle configuration variable in the CMV file with the vehicle type variable in the main PAR file shows that the light vehicles with a hazmat placard are classified as trucks in the main PAR file, and are captured under the truck category in Table 8 below.

Table 8 Reporting Rate by Vehicle Type, South Carolina 2006

Vehicle type	Reportable cases	Reporting rate	Unreported cases	% of total unreported cases
Truck	3,140	77.6	704	94.8
Bus	222	82.4	39	5.2
Total	3,362	77.9	743	100.0

Results from previous MCMIS evaluations suggest that certain trucks such as tractor semitrailers are more likely to be reported than single unit trucks. Table 9 shows reporting rates according to the vehicle type variable in the South Carolina PAR file. The number of categories identifying medium/heavy trucks is limited to truck tractors and other trucks. The vehicle configuration variable in the South Carolina CMV file, however, has categories similar to those in the MCMIS Crash file for identifying single unit trucks, trucks with trailers, truck tractor only (bobtail), tractor with semitrailer, tractor with double trailers, and so on. For purposes of this evaluation, vehicle type information as recorded in the main PAR file is used, since information in the CMV file is likely tied to reporting to the MCMIS Crash file.

The reporting rate for truck tractors is about 20 percent higher than for other trucks. It is likely that the other truck category consists largely of single unit trucks, which may also include trucks with trailers. The other truck category has the lowest reporting rate of 64.5 percent and also has the highest percentage of total unreported cases of 52.9 percent. School buses have the highest reporting rate of 86.1 percent, which is about 10 percent higher than for passenger buses. Overall, buses account for little more than 5 percent of the total unreported cases.

Table 9 Reporting Rate by Detailed Vehicle Body Style, South Carolina 2006

Vehicle body type	Reportable cases	Reporting rate	Unreported cases	% of total unreported cases
Truck tractor	2,034	84.7	311	41.9
Other truck	1,106	64.5	393	52.9
School bus	144	86.1	20	2.7
Passenger bus	78	75.6	19	2.6
Total	3,362	77.9	743	100.0

Table 10 shows reporting rates by crash severity. Reporting rates tend to decrease as the severity of the crash decreases. More than 90 percent of fatal involvements were reported. The rates decline to 78.8 percent for the injured/transported criterion and 76.4 percent for the towed/disabled criterion. While fatal crashes account for a small fraction of the total percentage of unreported cases, the towed/disabled crashes account for 54.5 percent, and the injured/transported crashes account for 44.1 percent.

Table 10 Reporting Rate by Crash Severity, South Carolina 2006

Crash severity	Reportable cases	Reporting rate	Unreported cases	% of total unreported cases
Fatal	102	90.2	10	1.3
Injured/transported	1,544	78.8	328	44.1
Towed/disabled	1,716	76.4	405	54.5
Total	3,362	77.9	743	100.0

Table 11 shows reporting rates to the MCMIS Crash file by maximum injury severity in the crash. The fatal involvement results are identical to those shown in Table 10. Note the declining trend in reporting rates as injury severity decreases. In addition, the percentage of total unreported cases increases as injury severity decreases. Crashes involving no injury account for 48.6 percent of the unreported cases.

Table 11 Reporting Rate by Detailed Injury Severity, South Carolina 2006

Crash severity	Reportable cases	Reporting rate	Unreported cases	% of total unreported cases
Fatal (K)	102	90.2	10	1.3
Incapacitating (A)	236	82.2	42	5.7
Non-incapacitating (B)	491	80.0	98	13.2
Possible (C)	975	76.3	231	31.1
No injury (O)	1,554	76.8	361	48.6
Unknown (U)	4	75.0	1	0.1
Total	3,362	77.9	743	100.0

5.4 Reporting Agency and Area

Beyond the application of the reporting criteria, there can be differences related to where the crash occurs or the type of agency that covered the crash. More densely populated areas with a large number of traffic accidents may not report as completely as areas with a lower work load. The level and frequency of training or the intensity of supervision can also vary. If there are such differences, they may serve as a guide to focus resources in areas and at levels that will produce the greatest improvement. The next set of tables examines areas of the state to see if there are inconsistencies in reporting patterns.

In the 46 counties of South Carolina, the number of reportable cases ranges from 3 to 258. Therefore, numbers of reportable cases vary considerably based on population density, traffic density, and other geographic characteristics. Table 12 shows the top fifteen counties in South

Carolina, ordered in descending order by the number of reportable cases. The combined reporting rates for the top fifteen counties and the remaining thirty-one counties are also shown. The two combined rates are both close to the overall reporting rate of 77.9 percent. However, there is some variation in individual county rates. Cherokee and Orangeburg Counties have rates close to 90 percent. On the other hand, Charleston County has a reporting rate of 65.0 percent and also accounts for 11.6 percent of the unreported cases.

Table 12 Reporting Rate by County, South Carolina 2006

County	Reportable cases	Reporting rate	Unreported cases	% of total unreported cases
Richland	258	77.5	58	7.8
Charleston	246	65.0	86	11.6
Greenville	244	76.2	58	7.8
Spartanburg	209	78.0	46	6.2
Lexington	176	80.1	35	4.7
Horry	160	72.5	44	5.9
Orangeburg	143	88.1	17	2.3
Florence	142	76.1	34	4.6
Anderson	127	79.5	26	3.5
York	118	75.4	29	3.9
Berkeley	102	78.4	22	3.0
Aiken	100	86.0	14	1.9
Jasper	90	76.7	21	2.8
Dorchester	82	69.5	25	3.4
Cherokee	77	89.6	8	1.1
Top 15 counties	2,274	77.0	523	70.4
Other counties	1,088	79.8	220	29.6
Total	3,362	77.9	743	100.0

It is also possible that reporting rates are related to the level of reporting agency. Here, agency type may be taken as an indicator of the focus and training of the department. Table 13 shows reporting rates by the various agencies in South Carolina. Most cases are handled by the Highway Patrol and the reporting rate is 85.2 percent. Reporting rates by the remaining agencies, namely police departments and sheriff's offices, are considerably lower at about 60 percent or lower. In addition, police departments account for 45.8 percent of the unreported cases. It appears that improvement in reporting by police departments would have a positive effect on the

Table 13 Reporting Rate by Reporting Agency, South Carolina 2006

Reporting agency	Reportable cases	Reporting rate	Unreported cases	% of total unreported cases
Highway patrol	2,466	85.2	366	49.3
Police department	801	57.6	340	45.8
Sheriff	94	60.6	37	5.0
Other	1	100.0	0	0.0
Total	3,362	77.9	743	100.0

overall reporting rate.

5.5 Fire Occurrence

There are two variables in the South Carolina PAR file related to fire or explosion. One variable is the Most Harmful Event which is recorded at the vehicle level. The other is the First Harmful Event which is recorded at the crash level. For the 3,362 cases found to be reportable to the MCMIS Crash file, none were coded with fire/explosion as the first harmful event. Only three cases were coded with fire/explosion as the most harmful event to the vehicle. Of these, one case was not reported to MCMIS, giving a reporting rate of 66.7 percent. However, the number of fire/explosion occurrences seems to be too small to make any definite conclusions.

6. Data Quality of Reported Cases

In this section, we consider the quality of data reported to the MCMIS crash file. Two aspects of data quality are examined. The first is the amount of missing data. Missing data rates are important to 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 South Carolina file and in the MCMIS Crash file. Inconsistencies can indicate errors in translating information recorded on the crash report to the values in the MCMIS Crash file.

Table 14 shows missing data rates for selected, important variables in the MCMIS Crash file. Missing data rates are generally quite 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 either zero or extremely low. DOT number is not recorded for 5.3 percent of interstate cases. Three of the four event variables are missing for over 99% percent of cases, though this is not necessarily an indication of a problem, since most crashes consist of a single impact. VIN is unrecorded in 98.6% of cases, and GVWR class, Driver License Class, Number of Vehicles, and Road Trafficway are missing in greater than 95% of cases.

Table 14 Missing Data Rates for Selected MCMIS Crash File Variables, South Carolina 2006

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	99.8
County	0.0	Event three	99.9
Body type	0.0	Event four	99.9
Configuration	0.0	Number of vehicles	95.7
GVWR class	99.9	Road access	0.0

Variable	Percent unrecorded	Variable	Percent unrecorded
DOT number *	5.3	Road surface	0.0
Carrier state	0.0	Road trafficway	95.7
Citation issued	2.7	Towaway	0.0
Driver date of birth	2.8	Truck or bus	0.0
Driver license number	2.9	Vehicle license number	3.1
Driver license state	2.9	Vehicle license state	2.3
Driver license class	100.0	VIN	98.6
Driver license valid	2.7	Weather	0.0

* Based on cases where the carrier is coded interstate.

Hazardous materials variable	Percent unrecorded
Hazardous materials placard	0.1
Percentages of hazmat placarded vehicles only:	
Hazardous cargo release	0.0
Hazardous materials class (1-digit)	96.6
Hazardous materials class (4-digit)	94.8
Hazardous materials name	94.8

The second section of the table shows missing data rates for the hazardous materials (hazmat) variables. Hazmat Placard was unrecorded in only 0.1 % of cases. However, rates for the variables describing the hazardous material (where present) were higher. The percentages only pertain to the 58 cases in which it was coded that the vehicle displayed a hazmat placard. The three variables describing hazardous materials were unrecorded in greater than 95% of cases.

We also compared the values of variables in the MCMIS Crash file with the values of comparable variables in the South Carolina crash file. The purpose of this comparison is to identify any errors in translating variables from the values in the state crash file to the values required for Safetynet. South Carolina has adopted in many instances the same code levels for certain variables as are used in the MCMIS Crash file.

Table 15 shows the coding of vehicle configuration in the MCMIS Crash file and the record as it appears in the South Carolina Crash file. The consistency between coding in the two files is excellent for buses and light trucks. However, there were 1,735 truck tractors in the South Carolina PAR data that were not coded as Truck tractor (bobtail) in the MCMIS file. Because tractor semitrailers typically represent a large proportion of all trucks, it appears that tractor/semitrailers in the MCMIS file were coded correctly, and the PAR file is incorrect. The PAR file is limited in the sense that there are only two categories for trucks, Truck Tractor and Other. Truck Tractor typically refers to a tractor without a semitrailer, also known as a bobtail.

Table 15 Comparison of Vehicle Configuration in MCMIS and South Carolina Crash Files, 2006

Vehicle Configuration		Cases	%
MCMIS Crash File	South Carolina Crash File		
Light trk(only if HM plac)	Other Truck	4	0.1
Bus(seats 9-15,incl dr)	Full Size Van	1	0.0
	School Bus	5	0.2
	Passenger Bus	8	0.3
Bus(seats >15,incl dr)	School Bus	133	4.5
	Passenger Bus	59	2.0
SUT, 2-axle, 6-tire	Truck Tractor	1	0.0
	Other Truck	389	13.0
SUT, 3+ axles	Other Truck	278	9.3
	SUV	4	0.1
	Other	1	0.0
	Unknown (Hit & Run Only)	1	0.0
Truck trailer	Pickup Truck	1	0.0
	Other Truck	52	1.7
	SUV	1	0.0
	Other	1	0.0
Truck tractor (bobtail)	Truck Tractor	165	5.5
Tractor/semitrailer	Truck Tractor	1707	57.2
	Other Truck	1	0.0
Tractor/double	Truck Tractor	27	0.9
Unk heavy truck>10,000	Pickup Truck	7	0.2
	Truck Tractor	56	1.9
	Other Truck	69	2.3
	Full Size Van	2	0.1
	SUV	3	0.1
	Other	7	0.2
Total		2983	100.0

There were a few inconsistencies in the Light Condition variable. Sixteen cases in the PAR file coded as Dark (Street Lamps Not Lit) were coded as Other in the MCMIS file, and should probably have been coded as Dark-not Lighted. An additional five cases coded as Dawn in the PAR file were also coded as Other in the MCMIS file, even though there was a code for Dawn. In a few other instances Light Condition was also coded inconsistently among the two files.

Table 16 Comparison of Light Condition in MCMIS and South Carolina Crash Files, 2006

Light Condition		Cases	%
MCMIS Crash File	South Carolina Crash File		
Daylight	Daylight	2285	76.6
Dark-not lighted	Daylight	1	0.0
	Dark (Street Lamps Not Lit)	1	0.0
	Dark (No Lights)	415	13.9
Dark-lighted	Dark (Street Lamp Lit)	83	2.8
Dark,unk rd lighting	Dark (Lighting Unspecified)	54	1.8
	Dark (No Lights)	1	0.0
Dawn	Dawn	86	2.9
Dusk	Dusk	28	0.9
	Dark (No Lights)	4	0.1
Other	Dawn	5	0.2
	Dusk	1	0.0
	Dark (Street Lamp Lit)	3	0.1
	Dark (Street Lamps Not Lit)	16	0.5
Total		2983	100.0

There were minor inconsistencies among some of the other variables examined. Code values for the Weather Condition variable varied for eight cases, in which Cloudy in the PAR file was coded as Fog in the MCMIS file. Since the MCMIS file does not have a code for Cloudy, these cases probably should have been coded as No Adverse Condition. The License State variable also varied for four cases, Road Surface Condition was not consistent in two instances, and Number of Fatales varied for three cases. Among the Hazardous Placard and Hazardous Materials Released variables there were a few cases coded as No in one file and as Unrecorded in the other file.

7. Summary and Discussion

This report is an evaluation of reporting to the MCMIS Crash file by the state of South Carolina in 2006. Records were matched between the South Carolina PAR file and the MCMIS Crash file using variables common to both files with low percentages of missing data. After 27 duplicate records were removed from the PAR file, 210,863 unique records were available for matching with 3,044 unique records in the MCMIS Crash file. No duplicate records were found in the MCMIS Crash file. In total, 2,983, or 98.0 percent of the MCMIS records were matched (Figure 1).

The next step in the evaluation process focused on identifying reportable cases using the South Carolina PAR file based on the MCMIS vehicle and crash severity criteria. Overall, 7,837 vehicles were identified as qualifying trucks or buses (Table 4). It should be noted that the vehicle type variable in the South Carolina PAR file has only two levels for identifying medium and heavy trucks: truck tractors, and other trucks. This is quite different from the vehicle configuration variable recorded from the Supplemental Bus and Truck Collision Report (Appendix B) in the separate CMV file. In the Supplemental Report, officers can choose among single unit trucks (SUTs) either with 2 axles and 6 tires, 3 or more axles, or trucks with trailers. In addition, there are categories for tractors with or without trailers.

The table below shows why we use the vehicle type variable in the main PAR file instead of the vehicle type variable recorded from the Supplemental form in the CMV file. Of the 7,837 qualifying vehicles identified in the South Carolina PAR file, 58.4 percent, shown as the shaded cells in the table, are not recorded in the CMV file. Note that seven light trucks with hazmat placards in the CMV file are identified as other trucks in the PAR file. Since this evaluation uses the information recorded in the PAR file, no hazmat placarded vehicles are identified. However, they are included as other trucks. In addition to many unrecorded values for trucks, many of the buses are also not recorded in the CMV file. It should also be noted that 7,837 represents 3.7 percent of all 210,863 vehicles in the PAR file. While this percentage is low compared to percentages from MCMIS evaluations in other states, it does fall within the usual range. If the real number of qualifying vehicles is greater than 7,837, then not all qualifying vehicles would be identified. The effect of this underestimation would cause the reporting rate calculated in this evaluation for South Carolina to appear higher than it really is.

PAR file vehicle type	CMV file vehicle type	N	%
Truck tractor	Not recorded	2,269	29.0
	Truck/trac (bobtail)	181	2.3
	Trac w/semitrailer	1,831	23.4
	Trac w/double trailers	31	0.4
	Other/unable to classify	43	0.5
	Unk/hit&run	76	1.0
Other truck	Not recorded	1,914	24.4
	Light truck(only haz)	7	0.1
	SUT (2axle/6tires)	430	5.5
	SUT (3+ axles)	286	3.6
	Truck w/trailer	67	0.9
	Trac w/semitrailer	1	0.0
	Other/unable to classify	67	0.9
	Unk/hit&run	22	0.3
School bus	Not recorded	212	2.7
	Bus-seats 9-15 people	6	0.1
	Bus-seats 16+ people	138	1.8
Passenger bus	Not recorded	183	2.3
	Bus-seats 9-15 people	11	0.1
	Bus-seats 16+ people	62	0.8
Total		7,837	100.0

After identifying qualifying vehicles, it is necessary to determine which of these vehicles meet the crash severity criteria for reporting to MCMIS. There are two variables in the South Carolina Occupant file that can be used to determine injury severity and whether an injured person was transported for medical care. The Injury Status variable follows the usual KABCO scale. The Transported to Medical Facility variable indicates whether a person was transported from a collision site to a medical facility for treatment of injuries sustained in the collision. Based on these two variables, an injured and transported variable was created following the strict sense of the definition outlined in the MCMIS criteria. This variable was merged into the Vehicle file to create a crash-level injured and transported variable. Therefore, any crash in which a person sustained an A, B, or C-injury and was transported for medical care satisfied the criterion.

There are two variables in the South Carolina Vehicle file that can be used in combination to determine if a vehicle was towed due to disabling damage. The Towed variable indicates whether a vehicle was towed or not, and the Extent of Deformity variable describes damage to the vehicle. If a vehicle was towed and extent of deformity was disabled or severe/totaled, it was considered to meet the criterion. Application of this definition gives the approximate 30 percent of vehicles towed due to disabling damage found in other state and the national GES databases [35]. A towed and disabled flag variable was created at the crash level to be used for estimating the number of qualifying vehicles satisfying this criterion.

Using the procedure described above resulted in identification of 3,362 vehicles involved in crashes that were reportable to the MCMIS Crash file (Table 5). Of these, 102 were involved in fatal crashes, 1,544 were involved in injury crashes where at least one person was transported for medical attention, and 1,716 were involved in crashes where at least one vehicle was towed due to disabling damage. Of the 2,983 records that were matched between the South Carolina PAR file and the MCMIS Crash file, 2,619 were determined to meet the MCMIS Crash file reporting criteria. Therefore, the overall reporting rate in South Carolina in 2006 is estimated at $2,619/3,362 = 77.9$ percent. The difference between 2,983 and 2,619 suggests that 364 cases were overreported to the MCMIS Crash file. According to this analysis, all 364 cases did not meet the crash severity threshold for reporting to MCMIS (Table 6).

Since the overall reporting rate is estimated at 77.9 percent, specific variables were examined to identify sources of underreporting. Reporting rates were calculated and presented in four groups. The four groups are case processing, reporting criteria, reporting agency and area, and fire/explosion. Case processing considers timing issues, reporting criteria deals with vehicle and crash severity issues, agency and area are related to the reporting agency and the county of the crash, and fire/explosion considers fire or explosions in reportable vehicles.

Reporting rates showed a declining trend from January through December. Between January and April rates are greater than 80 percent. From May through October, rates range from 75 to 80 percent. In November the rate is 73.4 percent, and in December the rate decreases more than 10 percent to 62.7 percent. December also accounts for 12.1 percent of the unreported cases. South Carolina tended to submit cases well within 90-days of the date of the crash. There does not appear to be any kind of systematic seasonal trend associated with timeliness of case submission (Figure 2).

Overall, the reporting rate for trucks is 77.6 percent and the rate for buses is 82.4 percent. A closer inspection of the vehicle type variable shows that the lower rate for trucks is in large part due to the low reporting rate for other trucks (Table 9). While the reporting rate for truck tractors is close to 85 percent, the reporting rate for other trucks is close to 65 percent. The majority of other trucks are likely single unit trucks (SUTs), which tend to have lower reporting rates than those for truck tractors according to the results published in other MCMIS evaluations. Among buses, school buses have a reporting rate of 86.1 percent, compared to 75.6 percent for passenger buses.

With respect to crash severity, the reporting rate for fatal crashes is 90.2 percent. The rate declines to 78.8 percent for injured and transported crashes, and 76.4 percent for towed and disabled crashes. Based on the KABCO scale, rates also decline as severity declines. For A-

injuries and B-injuries the crash rates are 82.2 percent and 80.0 percent, respectively, while the rate for C-injuries is 76.3 percent.

Previous MCMIS evaluations suggest that reporting rates in larger jurisdictions tend to be lower than those in smaller ones. Wisconsin has 46 counties, but according to numbers of reportable cases, the reporting rate for the top 15 counties and the rate for the remaining counties do not differ greatly (Table 12). However, some of the larger counties in terms of reportable cases have lower than average reporting rates. For Charleston County the reporting rate is 65.0 percent, and the percent of total unreported cases is 11.6.

Based on reporting agency, the South Carolina PAR file identifies the highway patrol, police departments, and sheriff's offices. The highway patrol has the highest rate at 85.2 percent, and also accounts for 49.3 percent of total unreported cases. Police departments and sheriff's offices have much lower rates. The reporting rate for police departments is 57.6 percent, and accounts for 45.8 percent of the unreported cases. While the reporting rate for sheriff's offices is 60.6 percent, they account for only 5.0 percent of the unreported cases.

Missing data rates in the MCMIS Crash file were also examined for key variables. Except for a few variables such as GVWR class, number of vehicles, driver license class, road trafficway, and VIN, percentages of missing data are generally less than 5 percent. The Event variables, after the first event, typically have high percentages of missing data.

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- 24 Green, P.E., and Matteson, A., Evaluation of 2005 Alabama Crash Data Reported to MCMIS Crash File. University of Michigan Transportation Research Institute, Ann Arbor, Michigan. October 2007. Sponsor: Federal Motor Carrier Safety Administration, U.S. D.O.T.
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- 30 U.S. Bureau of Census, 2002 Economic Census, Vehicle Inventory and Use Survey.
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- 34 South Carolina Traffic Collision Report Form (TR-310) and Supplemental Bus and Truck Report Form Instruction Manual (Revised 10/2006).
- 35 National Automotive Sampling System (NASS) General Estimates System (GES) 2006, National Center for Statistics and Analysis, NHTSA.

MCMIS Reporting Criteria	Implementation in South Carolina PAR Data
<p>or at least one vehicle towed due to disabling damage</p>	<p>The towed variable and the extent of damage variable were used to create a towed and disabled variable at the crash level. The extent of damage variable has categories:</p> <p>0 – None/minor 2 – Functional damage 3 – Disabling damage</p> <p>4 – Severe/totaled 5 – Not applicable 9 – Unknown</p> <p>Towed/disabled: towed=yes and extent of damage in (disabling damage, severe/totaled)</p>

Unit	Date of Birth	Sex	Race	INJ	Seat	R/SD	A,B,D	Eject	LAI	Tran	Name	Street Address	Zip Code
Race: A - Asian/Pacific Islander W - Caucasian a) Injury Status: 2- Non-incapacitating Seating Loc.: 20- Pedestrian 60- Sleeper of Cab Restraint/Safety Device B - African American H - Hispanic O - Other 0- Not Injured 3- Incapacitating 30- Trailing Unit 70- Riding on Unit Exterior 00- None Used 21- Child I - Alaskan Native or American Indian U - Unk. 1- Possible 4- Fatal 40- Bus or Van (4th row or Higher) 80- Lap 11- Shoulder Belt Only Safety Seat Air Bag Deployment / Switch Ejection b) Motorcycle Only Head Injury: 1-Yes 2-No 50- Other Enclosed Area (nontrailing) 99- Unk./NA 12- Lap Belt Only 88- Other 1- Deployed Front 4-Not Deployed 1- Not Ejected 2- Part Ejected 51- Other Unenclosed Area (nontrailing) 13- Shoulder & Lap Belt 99- Unk. 2- Deployed Side 7-Not Applicable 3- Tot. Ejected Location After Impact 3- Freed (non-mech.) a) Transported to Medical Facility Pedestrian, Motor/Pedalcycle Only 3- Deployed Both 9-Deployment Unk. 1- Not Trapped 4- Not Applicable 1- Yes 2- No 3- Unknown 31- Helmet 51- Reflective Clothing 1- Switch in On Position 3- No Switch 7- Not App. 2- Extricated (Mechanical Means) 9- Unknown b) By: 1- EMS 2- Police 8- Other 9- Unk. 41- Protective Pads 61- Lighting 2- Switch in Off Position 9- Unknown 9- Unk. Sequence of Events Mail Orig. TR-310 to: Office of Financial Responsibility, PO Box 1498, Columbia, SC 29216													
Non-Collision 04- Equipment Failure Collision: Not Fixed 27- Pedestrian Collision: Fixed Object 47- Embankment 55- Mail Box 68- Other 01- Cargo/Equip Loss or Shift 05- Fire/Explosion 08- Overturn/Rollover 20- Animal (Deer Only) 28- Railway Veh. 40- Bridge Overhead Structure 48- Equipment 56- Median Barrier 69- Unk. 02- Cross Median/Center Line 05- Immersion 09- Ran off Road Left 21- Animal (All Other) 29- Work Zone Maint. Equip. 41- Bridge Parapet End 49- Fence 57- Overhead Sign Support 03- Downhill Runaway 07- Jackknife 10- Ran off Road Right 22- Motor Veh. (In Transport) 42- Bridge Pier or Abutment 50- Guardrail End 58- Other (Post, Pole, Support, Etc.) Event 1 Event 2 Event 3 Event 4 Must Have 1st Harmful 11- Separation of Units 23- Motor Veh. (Stopped) 38- Other Movable Object 43- Bridge Rail 51- Guardrail Face 59- Other (Wall, Building, Tunnel, Etc.) 1 1 1 1 1 12- Spill (Two-Wheeled Veh.) 24- Motor Veh. (Other Roadway) 39- Unk. Movable Object 44- Culvert 52- Highway Traffic Sign Post 60- Tree 2 2 2 2 2 18- Other Non-collision 25- Motor Veh. (Parked) 39- Unk. Movable Object 45- Curb 53- Impact Attenuator/Crash Cushion 61- Utility Pole 3 3 3 3 3 19- Unk. Non-collision 26- Pedalcycle 46- Ditch 54- Light/Luminaire Support 62- Work Zone Maint. Equipment													
Manner of Collision (Struck Veh.) 30- Rear-to-Rear 50- Sideswipe Same Dir. 1st / Most Deformed Area 1st Deformed 2nd Deformed 3rd Deformed 4th Deformed 00- Not Coll. w/ Motor Veh. 41- Angle (↖↗) 60- Sideswipe Opposite Dir. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 1 1st Harmful Collision 10- Rear End 42- Angle (→ ←) 70- Backed Into 2 20- Head On 43- Angle (↘ ↙) 99- Unknown													
Vehicle Type: 15- Full Size Van 27- Pedalcycle 61- School Bus 01- Automobile 16- Mini Van 38- Animal Drawn Veh 62- Passenger Bus 12- Pickup Truck 17- Sport Utility 39- Animal (Ridden) 98- Other 13- Truck Tractor 25- Motorcycle 41- Pedestrian 99- Unk. (Hit and Run Only) 14- Other Truck 28- Other Motorbike 51- Train													
Vehicle Use Code 04- Ambulance 08- Farm Use 12- Fire Fighting 01- Personal 05- Military 09- Wrecker or Tow 13- Logging 02- Driver Training 06- Transport Passengers 10- Police 18- Other 03- Construction/Maint 07- Transport Property 11- Government 41- Pedestrian													
Vehicle Attachment 4- Utility Trailer 8- Towed Motor Vehicle C- Other Tanker 1- None 5- Farm Trailer 9- Petroleum Tanker D- Flat Bed 2- Mobile Home 6- Trailer w/Boat A- Lowboy Trailer E- Twin Trailers 3- Semi-Trailer 7- Camper Trailer B- Autocarrier Trailer F- Other													
Action Prior to Impact (Vehicle) (Non-motorist) 01- Backing 08- Parked 21- Approaching/Leaving Vehicle 02- Changing Lanes 09- Slowing or Stopping 22- Entering/Crossing Location 03- Entering Traffic Lane Stopped in Traffic 23- Playing/Working on Vehicle 04- Leaving Traffic Lane 10- Turning Left 24- Pushing Vehicle 05- Making U-turn 11- Turning Right 25- Standing 06- Movements Essentially Straight Ahead 26- Walking, Playing, Cycling 07- Overtaking/Passing 18- Other 99- Unk. 27- Working													
Weather Condition 3- Cloudy 6- Fog, Smog, Smoke 1- Clear (no adverse conditions) 4- Sleet, Hail 7- Blowing Sand, 8- Severe Crosswinds 2- Rain 5- Snow Oil, Dirt or Snow 9- Unk.													
Light Condition 3- Dusk 6- Dark (Street Lamp Not Lit) 1- Daylight 4- Dark (Lighting Unspecified) 7- Dark (No lights) 2- Dawn 5- Dark (Street Lamp Lit)													
Junction Type 03- Five/More Points 07- Shared Use Paths or Trail 12- Y-Intersection 01- Crossover 04- Four-way Intersection 08- T-Intersection 13- Nonjunction 02- Driveway 05- Railway Grade Crossing 09- Traffic Circle 99- Unk.													
Primary Contributing Factors 09- Made an Improper Turn Driver 10- Medical Related 30- Debris 48- Other 50- Inattentive 60- Animal in Road 63- Weather Cond. 01- Disregarded Signs, Signals, Etc. 12- Aggressive Operation of Vehicle 31- Non-highway Work 49- Unk. 51- Lying &/or Illegally in Roadway 61- Glare 68- Other 69- Unk. 02- Distracted/Inattention 13- Over-correcting/Over-steering 32- Obstruction in Roadway 52- Failure to Yield R. of W. 62- Work Zone Location 03- Driving Too Fast for Conditions 14- Swerving to Avoiding Object 33- Road Surface Condition (i.e., Wet) 53- Not Visible (Dark Clothing) 63- Vehicle Defect 04- Exceeded Authorized Speed Limit 15- Wrong Side or Wrong Way 34- Rut, Holes, Bumps 54- Disregard Signs, Signals, Etc. 70- Brakes 76- Windows/Shield 05- Failed to Yield Right of Way 16- Under the Influence 35- Shoulders (None, Low, Soft, High) 55- Improper Crossing 71- Steering 77- Restraint System 06- Ran off Road 17- Vision Obscured (Within Unit) 36- Traffic Control Device (i.e., Missing) 56- Darting 72- Power Plant 78- Truck Coupling 07- Fatigued/Asleep 18- Improper Lane Usage/Change 37- Work Zone (Constr./Maint./Utility) 57- Wrong Side of Road 73- Tires/Wheel 79- Cargo 08- Followed Too Closely 28- Other Improper Action 29- Unk. 38- Worn, Travel-Polished Surface 58- Other 59- Unk. 74- Lights 80- Fuel System 75- Signals 88- Other 89- Unk.													

Mail FR-10 to: Office of Financial Responsibility SC Department of Public Safety PO Box 1498, Columbia, SC 29216			SOUTH CAROLINA DEPARTMENT OF PUBLIC SAFETY FR-10 (REV. 01/01) NOTICE OF REQUIREMENT								
Date	Time	County	1- Interstate 2- US Primary 3- SC Primary	4- Secondary 5- County	Collision Location (Rt. # / Name)	0- Main line 2- Alternate 5- Spur	6- Connection 7- Business	Miles: <input type="text"/>	Dir. <input type="text"/>	In / Near City or Town of: <input type="text"/>	
<p>To Vehicle Owner/Operator: Failure to comply could result in appropriate action under 56-10-270 and 56-10-20 of the 1976 code of laws of S.C. as amended, if vehicle subject to registration in S.C., and upon conviction thereof, the Department must suspend your driving and/or registration privileges until all compliances have been met under the above sections of law.</p>											
N-267436			Driver/Pedestrian's Full Name				N-267437			Driver/Pedestrian's Full Name	
Unit #	Sex	Race	Street/R.F.D.			Unit #	Sex	Race	Street/R.F.D.		
Birth Date		City, State, & Zip				Birth Date		City, State, & Zip			
State	Driver's License #		Insurance Company				State	Driver's License #		Insurance Company	
Year	Body	Vehicle Make	VIN #			Year	Body	Vehicle Make	VIN #		
State	Year	License Plate #	Owner's D.L. #			State	Year	License Plate #	Owner's D.L. #		
Home Telephone ()		Owner's Full Name				Home Telephone ()		Owner's Full Name			
Bus. Telephone ()		Street/R.F.D.				Bus. Telephone ()		Street/R.F.D.			
Contributed To Collision		City, State, & Zip				Contributed To Collision		City, State, & Zip			
Yes		No				Yes		No			
N-267438			Driver/Pedestrian's Full Name				State	Year	License Plate #	Owner's D.L. #	
Unit #	Sex	Race	Street/R.F.D.			Home Telephone ()		Owner's Full Name			
Birth Date		City, State, & Zip				Bus. Telephone ()		Street/R.F.D.			
State	Driver's License #		Insurance Company				Contributed To Collision		City, State, & Zip		
Yes		No				Yes		No			
Year	Body	Vehicle Make	VIN #			Accident Insurance Information for Unit #					
Company Name						Area Code/Phone Number ()					
Agency Name						Policy Number					
All Units Insurance Information (to be completed by Investigating Officer)											
Accident Insurance Information for Unit #						Accident Insurance Information for Unit #					
Company Name						Area Code/Phone Number ()					
Agency Name						Policy Number					
Insurance Information											
Notice of Requirement Accepted <input type="checkbox"/>						Signature			Y N Refused to Affix Signature?		
									Y N Vehicle Subject to Registration in SC?		
To Be Completed By Insurance Agency, Broker, Or Other Company Representative						The information as contained herein is based solely upon my knowledge and belief as a representative of the above insurance company and no warranty of liability is imputed into the above mentioned insurance as I have listed herein.					
Reference to Unit #: _____, I hereby affirm that to the best of my knowledge the vehicle described above was insured by the below stated Insurance company on the date of the collision.						Signature					
Insurance Company						Title					
Beginning Date:		Ending Date:		Policy Holder:		NAIC# (Assigned by S.C. Dept. of Ins.)			Bus. Telephone ()		
<p>Notice: Failure to have this form completed by your insurance broker, agent, or representative and returned to the South Carolina Department of Public Safety within 15 days may result in suspension of your driving and/or registration privileges.</p>											
If any of the below are applicable, disregard the above portion.						Form FR-10 Not Issued: Section 56-10-270 56-10-520					
<input type="checkbox"/> Check here if a Form SR-23, Fleet Policy of 25 or more vehicles is on file with the Department covering the vehicle.						No FR-10 Issued to Operator/ Owner of Unit #: _____					
<input type="checkbox"/> Check here if a certificate of self-insurance has been issued by the Department covering the vehicle and indicate the certificate number: SI - _____						Summons Issued to: _____					
<input type="checkbox"/> Check here if liability insurance was not in effect to comply with South Carolina statutory requirements.						For operating or allowing the operation of an uninsured vehicle					
Signature						Summons Number:					
Date						Signature					
Investigating Officer's Name			Rank	Badge #	Code	Date	Reviewer's Name			Rank	Internal Agency Code

ORIGINAL		D.P.S. USE ONLY		South Carolina Uniform Traffic Collision Report (For Investigating Officers) Supplemental Bus & Truck Collision Report		Amended-Attach Copy of Original Report	Corrected
				Page _____ of _____ Pages			
Date	Time	County	Route Category 1-Interstate 2-US Primary 3-SC Primary	4-Secondary 5-County	Collision Location (Route Number and Name if Any)	Auxiliary 0-Mainline 2-Alternate 5-Spur 6-Connection 7-Business	
SCREENING INFORMATION						Access Control	
NUMBER OF QUALIFYING VEHICLES INVOLVED						Vehicle Information	
A Truck Having a GVWR of 10,001 lbs. or More For the Power Unit			→ <input type="text"/>			1- No Access Control 2- Full Access Control 3- Partial Access Control	
OR							
A Vehicle with a Hazardous Materials Placard			→ <input type="text"/>			Gross Vehicle Weight Rating Weight Rating of the Power Unit of the Truck 01- Less Than or Equal to 10,000 Pounds 02- 10,001-26,000 Pounds 03- More Than 26,000 Pounds 99- Unknown/Hit and Run	
OR							
A Bus That is Designed or Used to Carry 16 or More Persons, Including the Driver			→ <input type="text"/>			Vehicle Configuration 00- Passenger Car (only w/ HAZMAT placard) 01- Light Truck (only w/ HAZMAT placard) 02- Bus (seats for 9-15 people) 03- Bus (seats for 16+ people) 04- Single Unit Truck (2 axles/6+ Tires) 05- Single Unit Truck (3 or more axles) 06- Truck w/ Trailer 07- Truck-Tractor Only (Bobtail) 08- Tractor w/ Semi-Trailer 09- Tractor w/ Double Trailers 10- Tractor w/ Triple Trailers 98- Other/Unable to Classify 99- Unknown/Hit and Run	
OR							
A Motor Vehicle Engaged in Interstate Commerce that is Designed or Used to Carry 9-15 Persons, Including the Driver, for Compensation			→ <input type="text"/>				
Number of Persons Involved:						Cargo Body Type	
Sustaining Fatal Injuries			→ <input type="text"/>			00- Bus (seats for 9-15 people) 01- Bus (seats for 16+ people) 02- Enclosed Box 03- Cargo Tank 04- Flat Bed 05- Dump 06- Concrete Mixer 07- Auto Transport 08- Garbage/Refuse 09- Grain, Chips, Gravel 10- Pole 11- Intermodal Container 97- Not Applicable 98- Other 99- Unknown/Hit and Run	
Transported for Immediate Medical Services			→ <input type="text"/>				
Number of Vehicles Towed						Trailer Length and Width	
Towed From the Scene Due to Damage			→ <input type="text"/>			Length 00- No Trailer 01- Less than 480 in. (40 ft.) 02- 481 in. - 575 in. (48 ft.) 03- 577 in. or more 99- Unknown/Hit and Run Width 00- No Trailer 01- Less than 60 in. (5 ft.) 02- 61 in. - 84 in. (7 ft.) 03- 85 in. or more 99- Unknown/Hit and Run	
Do Not Complete This Form Unless:							
One or More Qualifying Vehicles was Involved - AND							
One or More Qualifying Injuries was Sustained - OR							
One or More Vehicles (not necessarily the truck or bus) Was Towed from the Scene							
Total Number of Supplemental Forms Required for this Collision: <input type="text"/>						Hazardous Material Involvement	
Unit Number _____		FR-10 Number _____		Carrier Information		Was This Vehicle Carrying Hazardous Materials? 1- Yes 2- No 3- Unknown/Hit and Run <input type="text"/>	
Name: _____				Address: _____			
City: _____				State: <input type="text"/>		Did the Vehicle Have a Hazardous Material Placard? 1-Yes 2- No 3- Unknown/Hit and Run <input type="text"/>	
Business Phone Number: _____				Zip: <input type="text"/>			
Identification Numbers						If "Yes", What Class of Hazardous Material (from placard/shipping papers)? 01- Class 1 (Explosives) 06- Class 6 (Poison/Infectious Substance) 02- Class 2 (Gases) 07- Class 7 (Radioactive) 03- Class 3 (Flammable Liquids) 08- Class 8 (Corrosives) 04- Class 4 (Flammable Solids) 09- Class 9 (Misc. Goods) 05- Class 5 (Oxidizing Substance) 10- No Placard 99- Other/Unknown/Hit and Run If "YES", enter 4 digit HAZMAT ID (from placard/shipping papers) <input type="text"/>	
U.S. DOT <input type="text"/>		None = 0 <input type="text"/>		ICC MC <input type="text"/>			
State Number <input type="text"/>		State: <input type="text"/>		Is this vehicle an (1) Interstate or a (2) Intrastate carrier? <input type="text"/>		Was Hazardous Material Released From This Vehicle's Cargo? 1-Yes 2-No 3- Unknown/Hit and Run <input type="text"/>	
Was a Citation Issued to this Vehicle? 1- Yes 2- No 3- Pending <input type="text"/>							
Investigator's Name _____				Rank _____		Date _____	
Investigator's Name _____				Rank _____		Date _____	