

Evaluation of Missouri Crash Data Reported to MCMIS Crash File

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<p>This is the third in a series of papers presenting the results of an evaluation of 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 significantly incomplete. This report examines the sources of underreporting for the state of Missouri.</p> <p>MCMIS Crash File records were matched to the Missouri Police Accident Report (PAR) file to determine the nature and extent of underreporting. As in other states, it appears that officers are having difficulty applying the vehicle and crash severity criteria that define a MCMIS-eligible case, resulting in underreported cases. In addition, approximately 20% of the Missouri cases were duplicate records. Cases involving a fatality are more likely to be reported than injury or towaway cases. Similarly, crashes involving larger trucks or out-of-state trucks or buses were more likely to be reported than smaller trucks and in-state vehicles. Cases covered by local police departments, primarily in the largest cities, accounted for the majority of underreported cases.</p>					
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Evaluation of Missouri Crash Data Reported to MCMIS Crash File

Introduction

It is generally acknowledged that reporting to the Motor Carrier Management Information System (MCMIS) Crash file is incomplete. An earlier study showed that approximately one-third of reportable truck crash involvements are not reported. For buses, the proportion of unreported cases amounts to 60%. [1] (See references at the end of the report.) Reporting is more complete for severe crashes, with about 90% of truck fatal involvements and 65% of bus fatal involvements appearing in the file, but rates are much lower for less severe crashes.

Since the MCMIS Crash file is created from data provided by the individual States, reporting problems originate with the States. A previous report examined the completeness of reporting from the state of Ohio [2], not because of any special problems there but because Ohio is an important industrial state with a major share of truck traffic. That report found both underreporting and overreporting to the MCMIS Crash file. About 20% of reported crash involvements did not qualify under either the MCMIS towaway or injury criteria. On the other hand, the report showed significant underreporting of smaller trucks, trucks operated by intrastate carriers, and less severe (but still qualifying) crashes. Most of the underreported crashes had been covered by local police departments.

In this report, we focus on MCMIS Crash file reporting by Missouri. Missouri has the seventh highest annual rate of fatal truck involvements, 3.4% of all fatal involvements, and, like Ohio, it lies on a major east-west transportation route.

The method employed in this study is the same as that used in the evaluation of Ohio crash data:

1. The complete police accident report file (PAR file hereafter) from Missouri was obtained for one year. This file was processed to identify all cases that qualified for reporting to the MCMIS Crash file.
2. The reportable cases extracted from the Missouri PAR file were matched to the cases actually reported to the MCMIS Crash file from Missouri.
3. We compared cases that should have been reported but were not with those that were reported to identify the sources of underreporting.
4. We evaluated cases that did not qualify but which were reported to identify the extent and nature of overreporting.

PAR data from 2001 was used in this analysis. The file contains the police-reported data for 188,637 crashes involving 348,786 vehicles that occurred in Missouri during 2001. Even though not all of the MCMIS variables appear in this crash file, because it contains all cases, we are able to determine records that should have been reported to MCMIS and compare them with cases that were in fact reported. It is through this process that we are able to analyze the degree of over- or underreporting.

Data Preparation

Both files had to be processed before the Missouri records in the MCMIS Crash file could be matched to the Missouri PAR file. This section discusses the methods used to prepare each file and some of the problems uncovered.

MCMIS Crash file

As of September 11, 2003, the MCMIS Crash file contained 5,861 records from Missouri for 2001. A number of duplicate records were identified while preparing the MCMIS crash file for matching with the Missouri PAR file. One of the elements used to match the Missouri records to the MCMIS Crash file is the time of the crash. When the data were prepared it was noticed that an unusually large proportion of crash times occurred precisely on the hour. Examination of these cases showed that there had been a processing error resulting from time data in an unexpected format.¹ The result of the error was that the minutes variable was set to missing data.

It was a relatively easy matter to correct the improperly formatted time variable, but the result was a large number of duplicate records. It appears that a number of records (1,528) had been uploaded with the accident time variable incorrectly formatted. In some cases a corrected case was later uploaded and the original, incorrect case was deleted, but in many other instances (1,159), a corrected case was transmitted to the database and the original case with the incorrect time variable was not deleted.

As noted, 1,528 records had accident time incorrectly coded; it appears that 1,159 of these records were “corrected,” yielding a duplicate record. The remaining 369 cases were not corrected with another record. An examination of the 369 cases by accident month revealed that all but one of these cases occurred in the last quarter of the year, suggesting that these later cases had not yet been “corrected,” and thus had no duplicate record.

There were also two pairs of duplicate records that differed by one minute in the accident time but which were otherwise identical. The original uncorrected record of each pair was excluded from the match.

Researchers using the original file would probably not be aware that nearly 20% of the cases were duplicate records. The problem could be identified using crash report number (RPTNUM) and crash sequence number (SEQ-NUM) in the Crash file, which uniquely identify the accident and vehicle in the accident. But duplicates could only be found if the researcher were deliberately looking for them. The transaction and change fields were not helpful since they were inconsistently used. The problem of redundant cases would not only affect the magnitude of counts for the State of Missouri, but likely the code level distributions of specific variables.

Before beginning the matching process, we excluded these 1,161 duplicate records from the file. Removing the duplicate records reduced total cases from 5,861 to 4,700. To re-verify that all the duplicate records had been found, we used a set of key variables that would uniquely distinguish a particular vehicle in a particular accident. For this purpose, we used report number, accident

¹ The technical nature of the error was that leading zeros were omitted where the number of hours in the time string was less than 10. The time data were stored as an alphanumeric string, rather than in a numeric storage mode. The storage format was hhmm, with two columns for the hour value and two for minutes. In the erroneous records, the time string was left-justified rather than padded with leading zeros.

month, accident day, accident hour, accident minute, crash county, officer's badge number, driver's date of birth, driver's license number, and vehicle's license number. All of the remaining 4,700 cases were unique on these variables, suggesting that all duplicates had been removed.

Table 1 Duplicate Records in Missouri MCMIS Crash File, 2001

Summary of file exclusions	Cases
Cases in original MCMIS file	5,861
Duplicate records excluded	1,161
due to accident time format corrections	(1,159)
due to accident minute corrections	(2)
Total records in MCMIS file excluding duplicates	4,700

Missouri PAR file

The Missouri PAR file was processed to identify records for crashes of vehicles that were reportable through SafetyNet to the MCMIS Crash file. To do this it was necessary to develop a set of criteria using the variables in the Missouri PAR file to identify records that should have been reported. The goal of the criteria 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 is shown in Table 2.

Table 2 Vehicle and Crash Severity Threshold for MCMIS Crash File

Vehicle	Truck with at least two axles and six tires, 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.

Variables available in the Missouri PAR data do not permit the MCMIS Crash file criteria to be applied exactly. Consequently it was necessary to use combinations of variables to approximate the target crash population. Attachment 1 provides details on the variables and code levels used to identify MCMIS-reportable cases for the interested reader. The discussion here outlines the general approach. Using the body type variable, we included single unit trucks and tractor-trailers with single or multiple units. Vehicles coded as a pickup truck in the body type variable were included if the number of tires variable was coded 6 or more and the number of axles variable was coded with 2 or more. Any vehicle displaying a hazardous materials placard was also included.

All vehicles with a bus code in the body type variable were selected, regardless of seating capacity. The body type variable has three bus codes: bus with 16 or more seating capacity, school bus with 16 or more seating capacity, and school bus with less than 16 seating capacity. Actually, there is another code for a van/small bus with less than 16 seating capacity, but vehicles with this code were not selected. The regulatory definition of a bus with seating capacity

of nine to 15 includes the provision that the vehicle be operated for compensation. Many small vans are operated by families or by businesses for uses other than passenger transportation. Moreover, many minivans, which clearly do not qualify as buses, are included in this code. Accordingly these vehicles were excluded. This results in an undercount of reportable cases, but the effect should be quite small.

In total, there were 20,769 vehicles identified as trucks, buses, or vehicles with a hazardous materials placard in the Missouri PAR file.

Of these vehicles, those in a crash involving a fatality, an injury transported for medical treatment, or a vehicle towed due to disabling damage should have been reported to the MCMIS Crash file. Crashes involving a fatality or injury transported for medical treatment can be identified readily in the Missouri PAR file. The Missouri PAR file includes the usual injury severity variable (identifying fatal, incapacitation, non-incapacitating but evident injuries, and complaints of pain) along with a variable that records whether the injured person was transported to a medical facility.²

However, it is not possible to identify vehicles that were towed due to disabling damage. There is only a variable to indicate that a vehicle was towed. Moreover, the section of the police accident report used in Missouri to record the supplemental data collected for the MCMIS Crash file does not specify that only vehicles towed due to disabling damage should be reported (see Attachment 2). It states that a case meeting the following criteria should be reported: “a vehicle towed from the scene of the accident.” Furthermore, the Missouri Uniform Accident Report Preparation Manual does not offer any additional clarification. There is no other variable on the PAR to distinguish disabling damage.

There were 7,356 records in the Missouri PAR file that should have been reported to the MCMIS Crash file, based on the crash severity definition above, which includes qualifying vehicles in crashes with any vehicle towed.

Including all crashes in which a vehicle was towed for any reason, rather than only those with a vehicle towed due to damage, overstates the number of cases that should be reported to the MCMIS Crash file. In a previous study analyzing Ohio MCMIS data, the criteria “towed due to disabling damage” could be precisely defined in the Ohio PAR file. Thus, it was possible to differentiate MCMIS-qualifying vehicles in towaway crashes between those in which a vehicle was towed due to disabling damage and those where the vehicle was towed for some other reason. In the Ohio PAR data, 73.9% of the towaway crashes involving a MCMIS-qualifying vehicle included a vehicle towed due to disabling damage. This proportion is a reasonable estimate that can be applied to the Missouri PAR data to calculate an adjusted count of reportable cases. Table 3 shows the result of the adjustment. The adjusted total is a best estimate of the number of records that should have been reported to the MCMIS Crash file, *if* all of the qualifying criteria were applied rigorously.

² The criteria used was “injured and transported to a medical facility for treatment.” There were ten instances of an occupant coded with a disabling injury, yet not transported to a hospital. Likewise, there were 32 cases of occupants with no injury coded, but who were coded as transported for medical care. Including these cases would have only resulted in three additional cases considered reportable to MCMIS. Because the differences were so slight, we decided to apply our original definition of “injured and transported,” without including these cases.

Table 3 Reportable Records in the Missouri PAR file, 2001

Crash severity	Unadjusted reportable records in Missouri PAR file	Adjusted reportable records in Missouri PAR file	Records actually reported to MCMIS Crash file
Fatal	155	155	119
Injury, transported	2,608	2,608	1,661
Towed	4,593	3,394	2,700
Total	7,356	6,157	4,480*
* Excludes 39 cases not reportable and 181 cases that could not be matched to PAR file			

In the matching process and subsequent analysis reported below, the number of reportable records in the Missouri file is taken to be 7,356. Since it is not possible apply the “towed due to disabling damage” criterion, there is no alternative. However, the Ohio analysis referred to above also showed that, in practice, the finer points of the MCMIS crash severity threshold are often ignored. About 20% of the records reported by Ohio to MCMIS did not have either a fatality or an injury transported for treatment or a vehicle towed due to damage. In light of the Ohio experience and the incorrect instructions on the Missouri accident report, it is reasonable to drop “disabling damage” from the crash severity threshold in determining reportable cases. We identified the 7,356 records as reportable to the MCMIS file.

Matching Process

The modified MCMIS file with 4,700 non-duplicate records was matched with the 7,356 records identified in Missouri PAR file that should have been reported to MCMIS. Since there were no common unique identifiers between the two files, it was necessary to develop an alternative match algorithm.

Matching records in the two files requires finding common variables that match at the accident level, as well as identifying specific vehicles within an accident. The report number variable assigned to MCMIS records was not the same as the accident number variable in the PAR data, so those variables could not be used to match accidents. Likewise, though the MCMIS dataset contained potentially useful variables at the vehicle level, such as vehicle and driver license number, vehicle identification number (VIN), Department of Transportation (DOT) number, and driver date of birth, those variables were not also in the PAR file. Similarly, the PAR file had vehicle make and model year, which were not in MCMIS. The only variables that could distinguish one vehicle from another within the same accident were driver age, driver license state number, and vehicle license state number. And it would be possible that all vehicles in the accident could have the same values for all three variables.

Four separate matches were performed. First, duplicate records in either file on the match variables were excluded, along with records that were missing values on the match variables. The first match included the variables accident month, day, hour, minute, crash county, driver’s age, driver license state number, and officer badge number. Subsequent match steps eliminated one of those variables or varied driver age by ± 1 year. Other variables such as vehicle license state were also tried, but yielded no additional matches. A subset of matched records was verified on other variables common to the MCMIS and PAR file to ensure the match was valid. The above procedure resulted in 4,519 matches, representing 96.1% of non-duplicate records reported to MCMIS. See Figure 1.

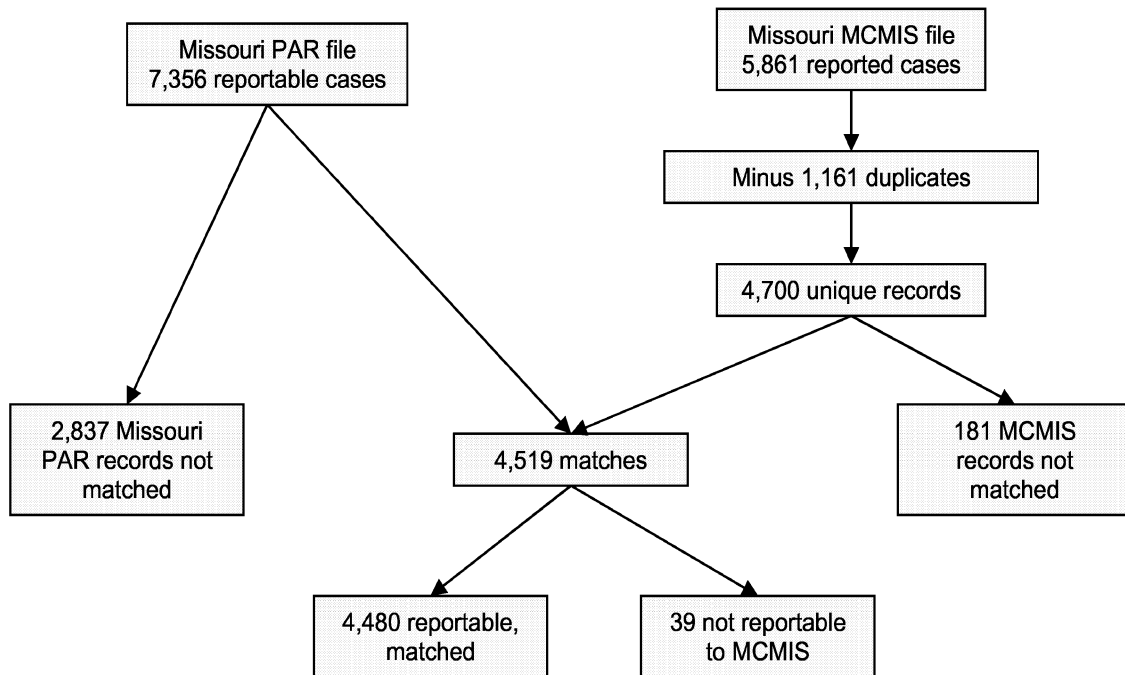


Figure 1 Results of MCMIS-Missouri PAR File Match

Only 181 MCMIS records could not be matched to the Missouri PAR file. This is a reasonable number given the absence of common case identifier variables and the limited number of variables available for matching. In addition, it is not a rare occurrence for more than one record in a file to have the same values for the match variables, and thus to be excluded from the matching process.

In addition, 39 cases were identified in the MCMIS Crash file which, while they matched the Missouri PAR file, did not qualify as reportable either because they did not meet the severity criterion or because they did not involve qualifying vehicles. Twenty-four of the cases involved qualifying vehicles (12 trucks and 12 buses) but did not have either a fatality, or an injury transported for medical attention, or a vehicle in the crash towed. Fifteen of the cases involved a vehicle other than a truck, bus, or hazardous materials placarded vehicle.

Omitting the 181 cases that could not be matched and the 39 MCMIS cases not considered reportable in the PAR file, 4,480 MCMIS records were matched to the PAR file, for a match rate of about 95%. However, only about 60.9% of the cases that should have been reported actually appeared in the Crash file.

It appears that there is relatively little overreporting that can be identified in Missouri, other than that generated by the duplicate records problem. This is not to minimize the problem of duplicate records, which, if undetected, would seriously compromise analyses and evaluations based on the Crash file. But uploading duplicate records is a problem that can be solved by technical means. It is not a matter of retraining or changing the supervision of reporting officers, but rather a problem that should be fixable by more careful software programming.

It also should be noted that measuring the fidelity of reporting of towaway crashes is difficult because towed due to disabling damage cannot be identified in the Missouri PAR data. But Table 3 shows that even if we estimate the number of reportable towaway crashes based on the Ohio

experience, about 700 crash involvements are missed in that crash type alone. Overall, then, it is clear that a substantial proportion of reportable crash involvements are not reported to the Crash file, ranging from 27.2% to 39.1%, using the adjusted and unadjusted counts of reportable cases respectively.

The Sources of Underreporting

This section explores the sources of underreporting to the MCMIS Crash file. It is necessary to use the set of records identified as reportable which we know likely overstates the number of reportable cases because it probably includes some involvements in which a vehicle was towed, but not due to disabling damage. The approach is to compare reported and unreported cases across several dimensions to search for patterns that might suggest why some cases were reported and others were not. All tables exclude the 39 MCMIS cases not considered reportable in the PAR file, and the 181 MCMIS cases that could not be matched to the PAR file. The reporting rate shown in the following tables is calculated by dividing reported cases (x100) by total reportable cases.

An obvious reason for underreporting could be that all 2001 records have not yet been submitted to the MCMIS Crash file. But an examination of reporting by accident month (see Table 4) did not show that underreporting was due to cases at the end of the year that were not yet submitted. The reporting rate was fairly even across months.

Table 4 Reporting to MCMIS Crash File by Accident Month, Missouri PAR File, 2001

Month	Total reportable cases	Reporting rate (%)	Unreported cases	% of total unreported cases
January	595	58.8	245	8.5
February	590	64.1	212	7.4
March	562	60.0	225	7.8
April	574	66.4	193	6.7
May	744	63.8	269	9.4
June	638	60.3	253	8.8
July	609	63.4	223	7.8
August	651	57.6	276	9.6
September	588	62.9	218	7.6
October	723	59.3	294	10.2
November	576	52.8	272	9.5
December	506	61.3	196	6.8
Total	7,356	60.9	2,876	100.0

Crash severity is clearly associated with underreporting, with less severe crash involvements less likely to be reported to the MCMIS Crash file. As shown in Table 5, towaway crashes are less likely to be reported than more serious crashes involving a fatality or an injury. Crashes involving a fatality are reported 76.8% of the time, compared with 63.7% for injury crashes and 58.8% for towaway accidents.

Table 5 Reporting to MCMIS Crash File by Crash Severity, Missouri PAR File, 2001

Crash severity	Total reportable cases	Reporting rate (%)	Unreported cases	% of total unreported cases
Fatal	155	76.8	36	1.3
Injury, transported	2,608	63.7	947	32.9
Towed	4,593	58.8	1,893	65.8
Total	7,356	60.9	2,876	100.0

Reporting rates also vary by vehicle type. Table 6 shows that larger trucks are more likely to be reported than smaller trucks. Single unit trucks are only reported 53.1% of the time, while tractor-semitrailers are reported at a 79.8% rate and tractors with two or more trailers at 77.8%. These differences suggest that officers do not routinely apply the “two-axles, six-tires” rule in choosing when to collect the supplemental information, but are instead focusing on “big trucks”—large trucks that are obviously commercial vehicles. Those pickup trucks that qualify for inclusion in the MCMIS Crash file because they have dual tires on the rear axle have one of the lowest reporting rates. Only 20.4% of the involvements of six-tire pickups in qualifying crashes were reported. Note also that small vehicles with hazardous materials placards were not picked up at all.

Reporting rates were even lower for the different bus types than they were for trucks. Buses with 16 or more seats have a combined reporting rate of only 52.5%. This is curious, given that the Missouri PAR specifically states “a bus or school bus with 16 or more seating capacity.” However, the PAR form was not revised to specify “seating for at least nine, including the driver” until 2002. So it is expected that buses with 9-15 seats would be underreported. Indeed, this appears to be the case, as only two of the 52 school buses with fewer than 16 seats were reported to the MCMIS Crash file. Non-school buses with 9-15 seating capacity are not identified at all in the Missouri PAR file so it is impossible to determine a reporting rate for these vehicles. Given the experience with small school buses, however, it is very likely that few, if any, small buses were reported. The change to the PAR adding a category for buses with at least nine seats may help. However, given the experience with small school buses it not expected that adding the category will result in acceptable reporting rates.

Table 6 Reporting to MCMIS Crash File by Unit Type, Missouri PAR File, 2001

Unit type	Total reportable cases	Reporting rate (%)	Unreported cases	% of total unreported cases
Passenger car (hazmat placard)	3	0.0	3	0.1
SUV (hazmat placard)	1	0.0	1	0.0
Van/small bus <16 seats (hazmat placard)	1	0.0	1	0.0
Bus – 16+ seats	236	49.6	119	4.1
School bus – <16 seats	52	3.9	50	1.7
School bus – 16+ seats	335	54.6	152	5.3
Pick-up, 2-axles, 6-tires (5 are hazmat placard)	863	20.4	687	23.9
Single unit truck	2,526	53.1	1,186	41.2
Tractor-semitrailer	3,222	79.8	651	22.6
Tractor with 2 or more trailers	117	77.8	26	0.9
Total	7,356	60.9	2,876	100.0

Reporting may also be related to a misunderstanding on the part of officers that intrastate vehicles are included, not just those in interstate commerce. This hypothesis cannot be tested directly because the Missouri PAR file does not include DOT or ICC number or any other direct indication that a vehicle was involved in interstate commerce. But vehicle license state can be used to indirectly infer interstate operations. Obviously, many trucks in interstate commerce are licensed in the state of Missouri. But trucks with a non-Missouri state license involved in a crash in Missouri must be interstate trucks.

As shown in Table 7, 68.5% of trucks or buses with out-of-state plates are reported to the MCMIS Crash file, compared with only 55.4% of vehicles with Missouri plates. This finding implies that some officers do not realize that intrastate vehicles should be reported, even though the reporting criteria do not make any distinction regarding carrier type. Looking at reporting rates by vehicle type does not show significant differences for in-state vs. out-state plates. Exceptions are school buses with 16+ seats and tractors with two or more trailers, but these reporting rates may differ due to the small number of out-state cases for buses, and small number of in-state cases for tractor-semis with two or more trailers.

Table 7 Reporting to MCMIS Crash File by Vehicle License State, Missouri PAR File, 2001³

Unit type	Total reportable cases		Reporting rate (%)		Unreported cases		% of total unreported cases	
	Missouri	Out-state	Missouri	Out-state	Missouri	Out-state	Missouri	Out-state
Passenger car (hazmat plac.)	2	1	0.0	0.0	2	1	0.1	0.1
SUV (hazmat plac.)	1	0	0.0	-	1	0	0.1	-
Van/small bus <16 seats (haz.)	1	0	0.0	-	1	0	0.1	-
Bus – 16+ seats	140	96	52.9	44.8	66	53	3.5	5.4
School bus – <16 seats	49	3	4.1	0.0	47	3	2.5	0.3
School bus – 16+ seats	324	11	55.9	18.2	143	9	7.5	0.9
Pick-up, 2-axles, 6 tires (5 haz.)	699	164	21.2	17.1	551	136	29.1	13.9
Single unit truck	1,930	596	54.6	48.2	877	309	46.3	31.5
Tractor-semitrailer	1,090	2,132	81.3	79.0	204	447	10.8	45.6
Tractor with 2 or more trailers	12	105	66.7	79.0	4	22	0.2	2.2
Total	4,248	3,108	55.4	68.5	1,896	980	100.0	100.0

Beyond the application of the reporting criteria by the officers that cover reportable crashes, there can be differences related to where the crash occurs or the type of agency that covered the crash. Different regions have different priorities and responsibilities. There can also be differences in the level and frequency of training or the intensity of supervision. 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 will examine areas of the state to see if there are inconsistencies in reporting patterns. Missouri has 114 counties, but reports St. Louis City separately. Table 8 shows reporting rates for the ten largest Missouri counties, based on total reportable cases. Counties are arranged in the table in descending number of reportable cases.

Together, these ten counties account for 63.7% (1,832) of the total unreported cases in Missouri for 2001, and the three counties of St. Louis, Jackson, and St. Louis City represent 43.2% (1,241) of unreported cases. The reporting rates for them are fairly consistent, though there is a tendency for the counties that have the most reportable cases to report the lowest proportion. St. Louis City only reports 45.2% of eligible cases, compared with the ten-county average of 55.8%. However, the state-wide average of reported cases is 60.9%. The top three counties account for 43.2% of unreported cases. These form a potential target for retraining, though these big county jurisdictions are likely the most overburdened.

³ Table 7 is a nice example of Simpson's Paradox. Note that for all but one vehicle type, the reporting rate is higher for Missouri-licensed vehicles than for out-of-state vehicles. Yet overall, the crash involvements of out-of-state vehicles were more likely to be reported! The reason for this odd result is that six-tire pickups, buses, and single-unit trucks in the Missouri crash population are much more likely to be licensed in Missouri than are tractor-semitrailers or doubles, so the table combines two different effects on reporting probability.

Table 8 Reporting to MCMIS Crash File by County, Missouri PAR File, 2001

County	Total reportable cases	Reporting rate (%)	Unreported cases	% of total unreported cases
St. Louis	1,017	56.8	439	15.3
Jackson	1,013	54.0	466	16.2
St. Louis City	613	45.2	336	11.7
Greene	316	62.0	120	4.2
St. Charles	292	59.6	118	4.1
Clay	227	58.6	94	3.3
Jefferson	205	62.9	76	2.6
Franklin	175	64.0	63	2.2
Jasper	146	58.9	60	2.1
Boone	144	58.3	60	2.1
Total top ten counties	4,148	55.8	1,832	63.7
Total all counties	7,356	60.9	2,876	100.0

Reporting levels also appear to vary significantly by the level of reporting agency. The Missouri PAR file identifies three types of reporting agencies: State highway patrol, county sheriff's departments, and local police departments.

The State Highway Patrol has the highest reporting rate, 74.7% (Table 9), and is responsible for 44.7% of all eligible cases. The largest number of reportable cases are taken by police departments, 3,910 out of the total 7,356 cases. Unfortunately, these agencies only report 49.9% of their cases to the MCMIS Crash file. The reporting rate for sheriff's departments is even lower at 44.7%; however, these departments are only responsible for 2.2% of the reportable cases.

Table 9 Reporting to MCMIS Crash File by Reporting Agency, Missouri PAR File, 2001

Agency type	Total reportable cases	Reporting rate (%)	Unreported cases	% of total unreported cases
State Highway Patrol	3,285	74.7	830	28.9
Sheriff's department	161	44.7	89	3.1
Police department	3,910	49.9	1,957	68.0
Total	7,356	60.9	2,876	100.0

Each state highway patrol post (A through I) consists of a group of Missouri counties (see map in Attachment 3). As a whole, the State Highway Patrol reports 74.7% of the qualifying crash involvements they cover; however, because the MSHP is responsible for 44.7% of reportable cases, the 25.3% underreporting rate still represents 830 cases that were not sent to the MCMIS Crash file in 2001. Data for the nine SHP posts are shown in Table 10, arranged in descending order of unreported cases. The nine SHP posts account for 28.9% of all the unreported MCMIS cases. The top four agencies (Troops D,C, A, and F) all have over 100 unreported cases. Reporting by the different troops appears to be uniformly high with the differences in the number of unreported cases driven primarily by the number of reportable cases covered by a troop. It appears that the MSHP does the best job of reporting of the different levels of policing agency.

Table 10 Reporting Rates for State Highway Patrol Posts, Missouri PAR File, 2001

Highway patrol post	Total reportable cases	Reporting rate (%)	Unreported cases	% of total unreported cases
HP Troop D	673	73.7	177	21.3
HP Troop C	656	73.2	176	21.2
HP Troop A	516	76.4	122	14.7
HP Troop F	368	72.0	103	12.4
HP Troop E	294	73.1	79	9.5
HP Troop G	161	69.6	49	5.9
HP Troop H	215	79.1	45	5.4
HP Troop B	160	75.0	40	4.8
HP Troop I	242	83.9	39	4.7
Total all SHP posts	3,285	74.7	830	100.0

Table 11 shows reporting rates by accident quarter, severity criteria, unit type, and license plate state for the nine highway patrol posts. Overall, the troops are similar in the reporting rates across these dimensions. This appears to indicate a uniformity of training and command, as would be expected. Except for post B, there is significant underreporting of buses, and several posts are not reporting all single unit trucks. Posts E, F, and G are only reporting half of their tractor-double/triple cases, but these rates are based on low numbers of cases.

Table 11 Reporting Rates for State Highway Patrol Posts, Missouri PAR File, 2001

	Missouri State Highway Patrol Post								
	A	B	C	D	E	F	G	H	I
Accident quarter									
Jan-Mar	66.4	77.8	71.2	73.9	72.3	70.9	58.1	84.4	83.3
Apr-Jun	84.0	95.0	81.6	78.8	77.9	78.6	76.7	89.1	81.3
Jul-Sep	82.7	48.3	72.3	69.1	69.7	72.4	65.6	78.6	80.3
Oct-Dec	69.9	72.7	65.6	72.3	72.9	65.1	76.7	63.0	90.6
Severity criteria									
Fatality	100.0	100.0	79.0	93.6	88.9	66.7	83.3	100.0	75.0
Injury/transported	75.8	72.6	75.2	74.1	69.9	71.1	67.7	78.3	87.7
Towed	75.9	71.7	71.6	72.0	74.4	72.8	70.1	78.3	82.8
Unit type									
Haz. placard: cars, SUVs, vans	0.0	-	0.0	0.0		0.0	-	-	-
Buses	28.6	100.0	46.2	50.0	50.0	61.5	50.0	25.0	40.0
Pick-up, 2-axes, 6 tires (5 haz.)	35.3	32.0	33.9	26.4	32.1	33.3	21.4	41.2	63.2
Single unit truck	79.3	61.4	71.7	71.3	66.2	63.5	82.9	66.0	72.3
Tractor-semitrailer	83.7	93.1	83.5	87.7	85.4	87.0	81.0	89.4	90.4
Tractor with 2 or more trailers	75.0	100.0	90.0	100.0	50.0	50.0	50.0	80.0	100.0
License plate state									
Missouri	72.1	71.1	68.8	68.5	74.0	65.2	67.6	70.3	77.5
Out-of-state	80.3	80.0	78.3	80.1	72.0	80.0	74.0	85.5	88.6

Police departments covered 53.2% of the reportable crash involvements in Missouri. There are 249 Missouri police departments with at least one case eligible for reporting to MCMIS. Many of

these departments are only responsible for a few cases. Table 12 shows the top ten police departments, ranked by total unreported cases. At the top of the list are the big-city police departments of Kansas City, Saint Louis City and County, and Springfield, accounting for 915 (46.8%) of the total unreported cases across all police departments. This is consistent with the county statistics shown above. The top ten police departments account for 1,115 (57.0%) of all police department unreported cases. Although these specific departments do not deviate substantially from the average 49.9% reporting rate by all police departments, because they were responsible for a large number of cases, securing better reporting by these departments would result in a considerable increase in the number of cases in the MCMIS Crash file.

Table 12 Reporting Rates for Ten Police Departments with Most Unreported Cases, Missouri PAR File, 2001

Police department	Total reportable cases	Reporting rate (%)	Unreported cases	% of total unreported cases
Kansas City P.D.	796	52.4	379	19.4
Saint Louis City P.D.	613	45.2	336	17.2
Saint Louis County P.D.	247	51.0	121	6.2
Springfield P.D.	187	57.8	79	4.0
Independence P.D.	111	55.9	49	2.5
Columbia P.D.	75	44.0	42	2.1
Joplin P.D.	55	41.8	32	1.6
Maryland Heights P.D.	56	44.6	31	1.6
Saint Joseph P.D.	53	50.9	26	1.3
Saint Peters P.D.	38	42.1	22	1.1
Total top 10 police departments	2,231	50.0	1,115	57.0
All police departments	3,910	49.9	1,957	100.0

Reporting rates do not appear to be related to the time of year. One hypothesis to explain underreporting is that there might be a delay in uploading reports at the end of a calendar year. But a look at the top ten police departments by accident quarter reveals that unfinished end-of-year case submission was not the reason for the large numbers of unreported cases (Table 13). In each instance, reporting rates were fairly consistent across all quarters. None of the departments was missing cases for an entire month, except where there were very few cases to report.

Table 13 Reporting Rates for Top Ten Police Departments by Accident Quarter, Missouri PAR File, 2001

Police department	Reporting rates (%) by accident quarter			
	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
Kansas City P.D.	58.7	45.8	52.9	51.7
Saint Louis City P.D.	40.0	46.3	44.9	49.4
Saint Louis County P.D.	57.4	45.6	56.5	46.2
Springfield P.D.	76.2	56.1	52.2	48.6
Independence P.D.	53.9	53.9	57.1	60.0
Columbia P.D.	23.5	61.5	37.5	57.1
Joplin P.D.	25.0	47.4	50.0	41.7
Maryland Heights P.D.	45.5	60.0	35.7	37.5
Saint Joseph P.D.	45.5	50.0	64.3	44.4
Saint Peters P.D.	20.0	44.4	41.7	50.0
Total top 10 police departments	51.6	48.0	50.4	50.0
All police departments	51.8	49.1	50.7	48.3

It appears that reporting rates vary by crash severity, with more serious crash involvements more likely to be reported than minor crashes. Table 14 shows reporting rates for the top ten police departments by the severity of crash involvement. Since police departments only covered 37 of the 155 fatal crash involvements, reporting rates for those crashes can be disregarded, since they are based on so few crashes. But note that injury crashes are more likely to be reported than towaway crashes, and that this is true for six of the top ten police departments. This pattern is similar to that found for crash involvements covered by the state highway patrol. Although there is some variation within the top ten police departments, generally individual departments report more injured, transported cases than towed cases. Although among the top ten departments there were only 22 cases involving a fatality, just 8 (36.4%) were reported.

Table 14 Reporting Rates for Top Ten Police Departments by Crash Severity, Missouri PAR File, 2001

Police department	Reporting rates by severity criteria		
	Fatal*	Injured, transported	Towed
Kansas City P.D.	42.9	61.3	48.6
Saint Louis City P.D.	16.7	51.4	38.5
Saint Louis County P.D.	50.0	52.8	50.0
Springfield P.D.	0.0	56.9	59.2
Independence P.D.	50.0	65.0	50.7
Columbia P.D.	0.0	52.6	41.8
Joplin P.D.	100.0	33.3	40.9
Maryland Heights P.D.	-	40.0	46.3
Saint Joseph P.D.	-	55.0	48.5
Saint Peters P.D.	-	40.0	42.4
Total top 10 police departments	36.4	55.1	47.0
All police departments	40.5	55.0	47.2

* Note that reporting rates for fatal crashes are based on a small number of cases. The top 10 departments have 22 reportable fatal crash involvements combined, and all departments have 37.

When cases for the top ten Missouri police departments are examined by vehicle type, it is apparent that single unit trucks are consistently underreported, averaging a reporting rate of only 38.7%. This compares with a reporting rate of 71.0% for tractor-semitrailers and 80.0% for tractors with two or more trailers. This pattern is similar to that found for MSHP troops (see Table 11) but the reporting rate for single unit trucks here is much lower. Reporting rates for tractor-semitrailers and doubles are much higher than for single unit trucks, and in fact the rates are comparable to those recorded by the MSHP. It is likely that a higher proportion of the crashes that police departments cover occur on local roads, and, particularly single-unit trucks will be more likely to be local. If the reporting officers believe that they should only report crash involvements of trucks in interstate commerce, they would be less likely to report the crashes of smaller trucks. That explanation is consistent with the pattern observed here. Buses are also underreported, with the top ten departments only reporting 49.9% of their eligible cases.

Table 15 Reporting Rates for Top Ten Police Departments by Unit Type, Missouri PAR File, 2001

Police department	Reporting rates (%) by vehicle type			
	Buses	Single unit trucks	Tractor-semitrailers	Tractor – two or more trailers
Kansas City P.D.	45.2	38.9	71.2	64.3
Saint Louis City P.D.	51.9	28.3	63.3	100.0
Saint Louis County P.D.	52.9	44.6	76.3	-
Springfield P.D.	45.5	57.7	77.1	100.0
Independence P.D.	66.7	39.5	88.6	-
Columbia P.D.	25.0*	30.6	72.0	100.0
Joplin P.D.	-	22.7	68.2	100.0
Maryland Heights P.D.	66.7*	34.4	62.5	100.0
Saint Joseph P.D.	42.9	54.6	76.9	-
Saint Peters P.D.	0.0 *	40.0	60.0	-
Total top 10 police departments	49.9	38.7	71.0	80.0
All police departments	48.7	41.5	71.4	72.1

* Note that the Saint Peters P.D. only had one reportable bus crash for 2001, the Columbia P.D. had four eligible cases, and the Maryland Heights P.D. had three.

Table 16 shows that all but one of the top ten departments have a lower reporting rate for vehicles with Missouri license plates than for out-of-state vehicles. The difference is not large, but it is consistent across police departments, and also consistent with other levels of policing, such as the state police. As argued above, license state can be used as a rough marker for involvement in interstate commerce. It is likely that some officers are applying a use criterion before filling out the truck/bus supplemental data.

Table 16 Reporting Rates Ten Police Departments by License Plate State, Missouri PAR File, 2001

Police department	Reporting rates (%) by license plate state	
	Missouri plate	Out-of-state plate
Kansas City P.D.	49.0	55.7
Saint Louis City P.D.	43.9	47.2
Saint Louis County P.D.	48.0	58.1
Springfield P.D.	56.9	60.0
Independence P.D.	42.9	72.9
Columbia P.D.	32.0	68.0
Joplin P.D.	22.6	66.7
Maryland Heights P.D.	30.8	76.5
Saint Joseph P.D.	47.1	57.9
Saint Peters P.D.	44.4	40.0
Total top 10 police departments	46.0	55.5
All police departments	45.5	56.9

Data Quality Issues

In addition to examining the number of records reported to the MCMIS Crash file, it is informative to look at the quality of data reported. Missing data rates are important in evaluating the utility of a data file, since records with missing data do not contribute to an analysis. Table 17

shows the unrecorded rates for some of the most useful variables. Overall, missing data rates are very low for variables reported to the MCMIS Crash file. For vehicles displaying a hazardous materials placard, the three variables referring to the type of materials carried were unrecorded in at least 14.1% of the cases.

Table 17 Unrecorded Rates for Selected MCMIS Variables, Missouri MCMIS File, 2001

Variable	Percent unrecorded	Variable	Percent unrecorded
Accident year	0.0%	Interstate	0.0%
Accident month	0.0%	Light	0.0%
Accident day	0.0%	Number of vehicles	0.0%
Accident hour	0.2%	Officer badge number	0.0%
Accident minute	0.2%	Report number	0.0%
Body type	0.0%	Road access	0.0%
Configuration	0.0%	Road surface	0.0%
County	0.0%	Road trafficway	3.6%
DOT number	15.5%*	Towaway	0.0%
Driver date of birth	2.5%	Truck or bus	0.0%
Driver license number	2.1%	Vehicle license number	<0.1%
Driver license state	2.1%	Vehicle license state	2.0%
Fatal injuries	0.0%	VIN	0.8%
Non-fatal Injuries	0.0%	Weather	0.0%

* Counting only cases with a non-Missouri license plate. Of cases coded interstate in the MCMIS Crash file, 12.7% do not have DOT numbers.

Hazardous materials variable	Percent unrecorded
Hazardous materials placard	<0.1%
Percentage of placarded vehicles:	
Hazardous cargo release	1.0%
Hazardous materials class (1-digit)	14.1%
Hazardous materials class (4-digit)	24.2%
Hazardous materials name	66.7%

Table 18 displays the consistency between the vehicle configuration as recorded in the MCMIS Crash file and the coding of the configuration in the original Missouri PAR data. The MCMIS Crash file configuration variable as of 2001 distinguishes nine different truck and bus configurations. These data are recorded by the reporting officer in a supplemental data area on the accident reporting form. Elsewhere on the form, the officer records the unit type and whether the vehicle was pulling a trailer. Since the MCMIS configuration variable incorporates trailer information into a single field, we combined the PAR unit type variable with the PAR trailer variable to compare with the MCMIS configuration variable.

In Table 18, the left column displays the configuration as it appears in the MCMIS Crash file, while the right column shows the configuration as it appears in the Missouri PAR file. For cases coded as two- or three-axle SUTs in MCMIS, 81 were designated tractor-trailer combinations in the PAR file, instead of as a single unit truck, a coding choice also available on the PAR file. This seems to be the most obvious discrepancy, given the limited truck choices in the PAR file. Buses appear to be consistently coded as such in both files.

Table 18 Comparison of MCMIS Configuration with PAR Unit Type, Missouri, 2001

MCMIS Configuration	PAR unit type / pulling trailer	Number
Bus (seats >15)	Bus (seats 16+)	117
	School bus (seats <16)	2
	School bus (seats 16+)	180
SUT, 2-axle, 6 tire	Pick-up/ with trailer	27
	Pick-up/ without trailer	93
	Single-unit truck /with trailer	44
	Single-unit truck/ without trailer	648
	Tractor-trailer, single unit	31
	Tractor-trailer, multi unit	1
SUT, 3-axle, 6 tire	Pick-up/without trailer	5
	Single-unit truck/with trailer	14
	Single-unit truck/without trailer	472
	Tractor-trailer, single unit	48
	Tractor-trailer, multi unit	1
Truck trailer	Pick-up/with trailer	45
	Single-unit truck/with trailer	84
	Single-unit truck/without trailer	8
	Tractor-trailer, single unit	118
Truck tractor (bobtail)	Single-unit truck/with trailer	1
	Single-unit truck/without trailer	55
	Tractor-trailer, single unit	23
Tractor/semitrailer	Pick-up/without trailer	2
	Single-unit truck/with trailer	2
	Single-unit truck/without trailer	6
	Tractor-trailer, single unit	2,345
	Tractor-trailer, multi unit	3
Tractor/double	Single-unit truck/with trailer	1
	Tractor-trailer, single unit	3
	Tractor-trailer, multi unit	86
Tractor/triple	Single-unit truck/with trailer	1
Unknown heavy truck	School bus (seats 16+)	3
	Pick-up/ with trailer	2
	Pick-up/ without trailer	2
	Single-unit truck/with trailer	1
	Single-unit truck/without trailer	3
	Tractor-trailer, single unit	3
Total		4,480

Summary

That MCMIS Crash file reporting is problematic is widely acknowledged. Evaluation of individual states by comparison with the original computerized record of all traffic crashes for a state provides one means of understanding the nature and sources of the reporting problems. This report considered MCMIS Crash file reporting from Missouri for the 2001 calendar year. The patterns of underreporting are similar to those found in a previous report on Ohio crash reporting, although we also found a significant problem with duplicate records, which was not found in Ohio. It is likely that many states share the same general obstacles to complete reporting—primarily applying the reporting criteria properly—but there are also problems specific to

individual states. If the goal of a reasonably complete MCMIS Crash file is to be achieved, each state will require specific attention.

Approximately 20% of the 2001 records from Missouri in the MCMIS Crash file are duplicates. This could potentially be a significant problem for unsuspecting users of the data, producing inflated counts and inaccurate results. Fortunately, this problem appears to be merely a data formatting error, which ought to be easily correctable.

Except for the duplicate record problem, Missouri does not seem to be overreporting cases to the MCMIS file, i.e. reporting cases that do not meet the reporting criteria. Only 24 cases were reported that did not meet either the injury or towaway criteria. And only 15 cases were reported that involved vehicles other than a truck or bus. There may be some overreporting of towaway crashes, but since the Missouri crash data does not distinguish between vehicles towed due to damage or for some other reason, we cannot judge the extent of overreporting in that regard.

The primary reporting problem in Missouri is simply the failure to report all reportable cases. Between 27% and 39% of eligible cases were not reported to the MCMIS file for 2001. In this regard, Missouri is similar to other states.

The proportion of reported cases varies according to the reporting criteria, indicating that there is a fundamental problem with applying those criteria. Crashes involving a fatality are most likely to be reported, while those involving only a towed vehicle are least likely. Over 75% of fatal involvements of trucks are reported, but only about 59% of towaway crashes are covered. Similarly, crashes involving the biggest trucks—tractor-semitrailers or tractors with two trailers—are much more likely to be reported than those involving smaller trucks. Only 20% of two-axle, six-tire pickups are reported, even though they clearly meet the vehicle threshold. Only 53.1% of single-unit truck crash involvements are reported. In contrast, almost 80% of tractor-semitrailers and 78% of tractor-doubles are reported.

Buses are reported at a lower rate, even large buses or school buses. Only about 50% of the involvements of such buses are reported. It is likely that smaller buses go largely unreported. The change in 2000 to extend reporting to nine-passenger buses operated for compensation will certainly pose significant problems in terms of reporting.

Though we could not measure directly, the evidence is consistent with the hypothesis that officers do not think that the crashes of intrastate vehicles are reportable. Trucks and buses with out-of-state license plates were more likely to be reported than in-state vehicles. About 69% of out-of-state reportable involvements were in fact reported, compared with only 55.4% of Missouri-plated vehicles.

The State Highway Patrol has the best agency reporting rate, 75%, but still is responsible for 830 unreported cases. Local police departments have the lowest agency reporting rate, 50%, amounting to 1,957 cases not reported for 2001. A total of 915 unreported cases are the responsibility of the large Kansas City, St. Louis City and County, and the Springfield departments. Targeting the largest police departments for improvement would result in a substantial increase in reporting, since they work so many vehicles. The top three police departments—Kansas City, St. Louis City, and St. Louis County—account for almost 43% of the missed cases policed by local departments and 30% of all unreported cases. Unfortunately, such large jurisdictions are probably the least susceptible to improvement.

Overall, the findings for the state of Missouri reinforce the results from Ohio: The primary problem is simply a failure to accurately and consistently apply the reporting criteria for the MCMIS Crash file. Across each area of the criteria—crash severity and vehicle type—officers are not recognizing crash involvements that must be reported. As in the case of Ohio, other than the duplicate-records problem, the problems uncovered here are not susceptible to a simple technical fix. They require training and continual supervision to insure that officers understand and can recognize the cases that must be reported.

Some simplification of the reporting criteria may help. For example, reporting of all injury crashes could be specified, rather than just those in which an injured person is transported for treatment. Or, reporting all towaway crashes may be considered, rather than just those towed due to damage. In any case, it appears that the “due to damage” requirement is widely ignored.

But unlike the case of Ohio, it is not so clear that the complexity of the reporting rules are causing a problem, so much as that the rules are not being applied. “Two-axles, six tires” could hardly be simpler. Yet clearly the officers have another filter in mind, and are much more likely to report a “big truck” than a qualifying truck. To realize significant improvements in the level of reporting, the message must be repeatedly disseminated to all levels of enforcement, and jurisdictions must be educated about their own levels of performance. Continuous monitoring and feedback is an essential tool for improvement.

References

- 1 Blower, D., and Matteson, A., *Evaluation of the Motor Carrier Management Information System Crash File, Phase One*. University of Michigan Transportation Research Institute, Ann Arbor, Michigan. March 2003. Sponsor: Federal Motor Carrier Safety Administration, U.S. D.O.T.
- 2 Blower, D., and Matteson, A., *Patterns of MCMIS Crash File Underreporting in Ohio*. University of Michigan Transportation Research Institute, Ann Arbor, Michigan. August 2003. Sponsor: Federal Motor Carrier Safety Administration, U.S. D.O.T.
- 3 Federal Motor Carrier Safety Administration (FMCSA) Crash File Documentation, March 2000.
- 4 Missouri Data Set Codebook, Transportation Data Center, University of Michigan Transportation Research Institute, August 2002 (from documentation supplied by the Missouri State Patrol for data from the State Traffic Accident Reporting System).
- 5 Missouri Uniform Accident Report Preparation Manual, prepared under the direction of the Missouri Traffic Records Committee, Revised Jan. 1, 2002.
- 6 Missouri Uniform Accident Report Form, 2001, from NHTSA Crash Forms Catalogue on CD, version Feb. 2, 2001.
- 7 State Highway Patrol Posts map data from website www.mshp.state.mo.us, Troop Headquarters.

Attachment 1: Variables Used for Missouri PAR Data to Identify a MCMIS-Reportable Crash**Truck with at least 2 axles and 6 tires**

V104 (vehicle body type) = codes 18 (Single-unit truck), 19 (Tractor-trailer with single unit), and 20 (Tractor-trailer with multi units). We also included Pickups with 6+ tires and 2+axles (vehicle body type code=17) and v142 (no. of tires) \geq 6 and v141 (no. of axles) \geq 2.

or Bus with seating for at least nine, including the driver

v104 (vehicle body type)= codes 5 (bus-16+ seating capacity), 6 (school bus – less than 16 seating capacity) and 7 (School bus – 16+ seating capacity)

or Vehicle displaying a hazardous materials placard

v143 (placard displayed) = 1 (yes)

AND**at least one fatality**

V16 (number killed), accident level = 1 or more

or at least one person injured and transported to a medical facility for immediate medical attention

Injured and transported to a hospital, occupant level - defined by v205 (person injury level) =codes 2 (injury-disabling), 3 (injury-evident), and 4 (injury-probable) *and* v216 (transported to medical facility)=codes 2 (transported by ambulance to medical facility) and 3 (transported by 'other' to medical facility).

or at least one vehicle towed due to disabling damage

If any vehicle in the accident met this vehicle-level criteria:

V108 (Did the vehicle need to be towed?) = 1 (yes)

Attachment 2: Commercial Motor Vehicle Section of Missouri Police Accident Report Form

26.	26A. CMV CRITERIA (Complete the following to determine if this section should be updated.)				
	Does this accident involve any of the following: <ol style="list-style-type: none"> 1. a person fatally injured; or 2. a person transported for medical attention; or 3. a vehicle towed from the scene of the accident 	<input type="checkbox"/> NO <input type="checkbox"/> YES →	Examine each vehicle to determine if any are a commercial vehicle based on the following:	<input type="checkbox"/> YES <input type="checkbox"/> NO →	DO NOT COMPLETE SECTIONS 26 B - K
		DO NOT COMPLETE SECTIONS 26 B - K	Complete Sections 26 B - K for each commercial vehicle involved		
	26B. CARRIER ID NUMBER	26C. SOURCE OF CARRIER NAME ENTERED IN SECTION 4 OR 5.	26D. TRAILERING UNITS		
	V1 ICC NO. MC _____ USDOT NO. _____	V1 <input type="checkbox"/> 1. Log Book <input type="checkbox"/> 2. Shipping Papers <input type="checkbox"/> 3. Driver <input type="checkbox"/> 4. Side of Vehicle	V1 _____ Axles _____ Tires		
	V2 ICC NO. MC _____ USDOT NO. _____	V2 <input type="checkbox"/> 1. Log Book <input type="checkbox"/> 2. Shipping Papers <input type="checkbox"/> 3. Driver <input type="checkbox"/> 4. Side of Vehicle	V2 _____ Axles _____ Tires		
	26E. VEHICLE CONFIGURATION	26F. CARGO BODY TYPE	26G. SEQUENCE OF EVENTS (Circle 1, 2, 3, 4 in order of occurrence)		
	V1 V2 <input type="checkbox"/> <input type="checkbox"/> 1. Bus <input type="checkbox"/> <input type="checkbox"/> 2. Single-unit Truck: 2 axle, 6 tires <input type="checkbox"/> <input type="checkbox"/> 3. Single-unit Truck: 3 or more axles <input type="checkbox"/> <input type="checkbox"/> 4. Single-unit Truck Pulling Trailer <input type="checkbox"/> <input type="checkbox"/> 5. Truck Tractor With No Units <input type="checkbox"/> <input type="checkbox"/> 6. Truck Tractor With One Unit <input type="checkbox"/> <input type="checkbox"/> 7. Truck Tractor With Two Units <input type="checkbox"/> <input type="checkbox"/> 8. Truck Tractor With Three Units <input type="checkbox"/> <input type="checkbox"/> 9. Unknown Heavy Truck/Other	V1 V2 <input type="checkbox"/> <input type="checkbox"/> 1. Bus <input type="checkbox"/> <input type="checkbox"/> 2. Van/Enclosed Box <input type="checkbox"/> <input type="checkbox"/> 3. Cargo Tank <input type="checkbox"/> <input type="checkbox"/> 4. Flatbed <input type="checkbox"/> <input type="checkbox"/> 5. Dump <input type="checkbox"/> <input type="checkbox"/> 6. Concrete Mixer <input type="checkbox"/> <input type="checkbox"/> 7. Auto Transporter <input type="checkbox"/> <input type="checkbox"/> 8. Garbage/Refuse <input type="checkbox"/> <input type="checkbox"/> 9. Other	V1 V2 1 2 3 4 1 2 3 4 A. Ran Off Road 1 2 3 4 1 2 3 4 B. Jackknife 1 2 3 4 1 2 3 4 C. Overturn 1 2 3 4 1 2 3 4 D. Downhill Runaway 1 2 3 4 1 2 3 4 E. Cargo Loss or Shift 1 2 3 4 1 2 3 4 F. Explosion or Fire 1 2 3 4 1 2 3 4 G. Separation of Unit 1 2 3 4 1 2 3 4 H. Collision Inv. Pedestrian 1 2 3 4 1 2 3 4 I. Collision Inv. MV in Transport 1 2 3 4 1 2 3 4 J. Collision Inv. Parked Motor Vehicle 1 2 3 4 1 2 3 4 K. Collision Inv. Train 1 2 3 4 1 2 3 4 L. Collision Inv. Pedalcycle 1 2 3 4 1 2 3 4 M. Collision Inv. Animal 1 2 3 4 1 2 3 4 N. Collision Inv. Fixed Object 1 2 3 4 1 2 3 4 O. Collision Inv. Other Object 1 2 3 4 1 2 3 4 P. Other		
	26I. HAZARDOUS MATERIAL PLACARD NUMBER / NAME INDICATOR <input type="checkbox"/> NA	26J. TRAFFICWAY	26H. APPARENT DRIVER CONDITION If Probable Contributing Circumstance 20 marked above, indicate the physical impairment.		
	V1 4-Digit Placard Number/Name from Diamond/Box _____	<input type="checkbox"/> 1. Two-Way Trafficway	V1 V2 <input type="checkbox"/> <input type="checkbox"/> 1. Sick		
	V2 4-Digit Placard Number/Name from Diamond/Box _____	<input type="checkbox"/> 2. Divided Highway W/O Traffic Barrier	<input type="checkbox"/> <input type="checkbox"/> 2. Fatigue		
	V1 Number From Bottom of Diamond _____	<input type="checkbox"/> 3. Divided Highway With Traffic Barrier	<input type="checkbox"/> <input type="checkbox"/> 3. Asleep		
	V2 Number From Bottom of Diamond _____	<input type="checkbox"/> 4. One-Way Trafficway	<input type="checkbox"/> <input type="checkbox"/> 4. Medication		
			<input type="checkbox"/> <input type="checkbox"/> 5. Other		
			26K. GVW RATING		
			V1 _____ lbs.		
			V2 _____ lbs.		

Attachment 3: Missouri State Highway Patrol Posts

