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EVALUATION OF 2009 NEW YORK CRASH DATA REPORTED TO MCMIS CRASH FILE

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16. Abstract

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 New York.

MCMIS Crash File records were matched to the New York crash file to determine the nature and extent of underreporting. Because all levels of the MCMIS crash file reporting criteria could not be applied, the evaluation of reporting completeness was restricted to crashes that involved either a fatality or an injury transported for immediate medical attention. Of these crashes, an estimated 36.7 percent were properly reported.

Reporting rates were found to be related to crash severity and the configuration of the vehicle. Over 82 percent of fatal crash involvements were reported, but only 34.6 percent of injury/transported involvements. Crashes in which a vehicle was towed due to disabling damage could not be identified in the New York crash data supplied, so reporting rates for that subset cannot be estimated. Trucks were reported at a slightly higher rate than buses. Large trucks, especially truck tractors, were reported at a higher rate than smaller trucks.

Missing data rates are low for most variables. Corresponding data elements in the MCMIS and New York crash files were quite consistent, though specific problems were noted with respect to one truck configuration. The timeliness of reporting was good, with about 91 percent of records submitted to the MCMIS file within 90 days of the crash.

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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)		
^oF	Fahrenheit	5 (F-32)/9 or (F-32)/1.8	Celsius	^oC
		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)		
^oC	Celsius	1.8C+32	Fahrenheit	^oF
		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)

Table of Contents

List of Tables

List of Figures

Evaluation of 2009 New York Crash Data Reported to the MCMIS Crash File

1. Introduction

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

The present report is one of a series of reports that evaluate the completeness and accuracy of the data in the MCMIS Crash file. Previous reports showed some underreporting which seemed to be related in large part to problems in interpreting and applying the reporting criteria within the States' respective crash reporting systems. Smaller trucks, buses, and less severe crashes were more often not recognized as meeting the reporting criteria. States also had issues specific to the nature of their own systems. [See references 2 to 40.] The States are responsible for identifying and reporting qualifying crash involvements. Accordingly, improved completeness and accuracy ultimately depends upon the efficiency and effectiveness of individual state systems.

This report focuses on MCMIS Crash file reporting by New York in 2009. Between 2004 and 2008, New York reported 3,394 to 3,696 involvements each year to the MCMIS Crash file. New York is the 3rd largest state by population and in most years ranks about 11th among the states in terms of the number of annual truck and bus fatal involvements. In recent years the number of fatal truck and bus involvements in New York has ranged widely, with 166 in 2004, 171 in 2005, 213 in 2006, 178 in 2007, and 137 in 2008.

Police accident report (PAR) data recorded in New York's statewide files as of March 2011 were used in this analysis. The 2009 PAR file contains the crash records for 579,365 vehicles.

The process of evaluating state reporting consists of the following steps:

1. The complete police accident report file (PAR file hereafter) from New York was obtained for the most recent year available, which was 2009.

2. An algorithm was developed, using the data coded in the New York file, to identify cases that qualified for reporting to the MCMIS Crash file.

3. All cases in the New York 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 New York.

4. Cases that should have been reported, but were not, were compared with those that were reported to identify the sources of underreporting.

5. Cases that did not qualify but which were reported were examined to identify the extent and nature of overreporting.

Identifying crashes in the New York crash data that qualified for reporting to the MCMIS crash file presented special challenges. It was not possible to identify all levels of the crash severity reporting rules. In order for the evaluation to proceed, it was necessary to identify a subpopulation of crashes that met some levels of the reporting requirements and evaluate how well those crashes were reported. Accordingly, this report does not provide a comprehensive evaluation of reporting by New York State, but it does thoroughly evaluate a critical subset of those crashes.

2. Data Preparation

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

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

2.1 MCMIS Crash Data File

The 2009 MCMIS Crash file as of May 31, 2010, was used to identify records submitted from New York. For calendar year 2009 there were 3,138 cases reported to the file from New York. An analysis file was constructed using all variables in the MCMIS file. This analysis file was examined for duplicate records (more than one record submitted for the same vehicle in the same crash; i.e., the report number and sequence number were identical). No such duplicates were found.

In addition, records were reviewed to find cases with identical values on accident number, accident date/time, county, officer badge number, vehicle identification number (VIN), and driver date of birth, but with different vehicle sequence numbers. The purpose of this review is to find and eliminate cases where more than one record was submitted for the same vehicle and driver within a given accident. Duplicates can be generated when, for example, a record is corrected and the original record is not deleted. No such duplicates were found. The resulting MCMIS file contains 3,138 unique records.

2.2 New York Police Accident Report File

The New York PAR data for 2009 was obtained from the State in March 2011. The data were stored as Statistical Analysis System (SAS) files, representing Accident, Vehicle, and Person information. The files contained records for 314,974 traffic crashes involving 579,365 units.

Data for the PAR file are coded from the New York State Department of Motor Vehicles Police Accident Report (MV-104A; MV-14N for New York City agencies) completed by police officers.

The PAR file was first examined for duplicate records (involvements where more than one record was submitted for the same vehicle in the same crash). A search for records with identical case numbers and vehicle numbers found no instances of duplicates. In addition, examination 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, number formats (such as 33077283 and 33-77283, for example).

Just as in the preparation of the MCMIS Crash file, cases also were examined to determine if there were any records that contained identical time, place, and vehicle/driver variables, regardless of vehicle number. Records from two different crashes would not be expected to be identical on all variables. Records were examined for duplicate occurrences based on the fields for case number, accident date/time, crash county, city, VIN (first eleven characters), and driver age. Based on the above process, no duplicate pairs were found. The PAR file has 579,365 unique records.

3. Matching Process

The next step involved matching records from the New York PAR file to corresponding records from the MCMIS file. There were 3,138 records from the MCMIS file available for matching, and 579,365 records from the New York PAR file. All records from the New York PAR data file were used in the match, even those that apparently did not meet the requirements for reporting to the MCMIS Crash file. This allowed the identification of cases reported to the MCMIS Crash file that did not meet the reporting criteria.

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

Crash ID, used to uniquely identify a crash in the New York PAR data, and Report Number, in the MCMIS Crash file, are obvious first choices. Crash ID in the New York PAR file is an 8-digit numeric field, and in the MCMIS Crash file Report Number is stored as a 12-character alphanumeric value. The report number in the MCMIS Crash file is constructed as follows: The first two columns contain the state abbreviation (NY, in this case), followed by ten alphanumeric values. Unfortunately, there appears to be no correspondence between PAR Crash ID and MCMIS Report Number, so this variable could not be used in the match.

Other data items that are useful in matching at the crash level include Crash Date, Crash Time (stored in military time as hour/minute), Crash County, Crash City, Crash Street, and Reporting Officer's Identification number. The PAR file contained all of these variables, except for Crash Street and Officer Badge Number. There is a Reference Marker variable on the PAR file that is recorded about 34 percent of the time, and is frequently among the digits of the MCMIS Crash Street variable. It can be used for match verification. City Name was recorded in 98.7 percent of PAR cases, but was present in only 0.4 percent of MCMIS cases. As a consequence, this variable

could not be used in the match. The only matching PAR variable pertaining to crash location was County.

Variables in the MCMIS file that can be used to distinguish one vehicle from another within the same crash include vehicle license plate number, driver license number, VIN, driver date of birth, and driver last name. Of these, the PAR data file contains only the first eleven characters of the VIN and Driver Age. The first eleven characters of the VIN omit the identifying serial numbers, but are nevertheless useful for matching purposes. The VIN was unrecorded in 19.2 percent of PAR cases, but in only one percent of MCMIS cases. Driver Age was not present in 15.9 percent of PAR cases, but was missing in only 2.5 percent of MCMIS cases.

The match was performed in five steps, using the available variables. At each step, records in either file with duplicate values on all the match variables for the particular step were excluded prior to attempting the match, along with records with missing values for the match variables. The first match included the variables crash date (month, day), crash time (hour, minute), county, VIN, and driver age. The second match step dropped driver age, and matched on crash date, crash time, county, and VIN. After some experimentation, the third match step included crash date, crash time, county, driver age, and vehicle configuration type. The latter variable was created for matching purposes in the PAR and MCMIS datasets with code levels of Single Unit Truck, Truck Trailer, Tractor/Combination, Double, Other Truck, and Other Unknown. A fourth match used variables crash date, crash time, county, driver age, and truck/bus (a variable created with code levels of truck, bus, or other). Eliminating county, the variables used in the final attempt at a computer-based match were crash date, crash time, and VIN. The resulting matched records in steps 3, 4, and 5 were each verified by reviewing each entire record in both crash files to ensure the records corresponded.

After the five steps of the match were complete, there were still 295 unmatched MCMIS cases. Seven of these records were fatal crashes, according to the MCMIS data. Each of these seven were searched for manually in the crash data, which resulted in finding four of these cases in the PAR file. The remaining three fatal involvements could not be located, despite a diligent manual review. These three cases were searched for in the PAR file by county, month, and day. That is, all the crash records occurring in the same county and on the same day, were manually reviewed. For each case, there were no fatal crashes on that day in the relevant county. The VINs and vehicle types of all cases in that county on that date were also compared to the MCMIS case to see if any vehicles in *non-fatal* crashes matched. No match was found. In addition, a search was done based on MCMIS county, hour, and minute of crash. Again, no matches were found when comparing VIN, vehicle type, and driver age with corresponding MCMIS variables. Even with an exhaustive manual review, the cases could not be located in the New York crash data.

An intensive search for 25 of the unmatched MCMIS cases was made to make sure that all possibilities had been exhausted to increase the number of MCMIS records matched to the New York crash data. In this process, for each unmatched MCMIS case, all cases in the New York PAR file that occurred in the same county and on the same date were examined for any evidence that they referred to the same crash. Variables inspected included crash time, reference marker, VIN, body type, and driver age. Matching by this means did not result in any definitive matches. The twenty-five cases were also searched for in the PAR file by MCMIS VIN (first 11 digits). A few cases with a match on VIN appeared in the PAR file. But closer examination of crash date, time, county, reference marker, body type, and driver age found no matches. Since only the first

11 digits of the VIN are available in the PAR data, which omits the 6-digit serial number, there can be more than one vehicle with the same shortened VIN. Consequently to make a match, it is necessary that crash date/time and location match. Since these two attempts to find matches for the remaining MCMIS cases did not result in any additional matches, the hand-matching process was not continued for the remaining 266 unmatched cases.

The computerized and hand-matching resulted in matching 90.7 percent of the MCMIS records to the PAR file. A total of 291 cases could not be matched. The matching process was hindered by the lack of common variables between the NY PAR and MCMIS files. In particular, since crash number did not match between the two files, it was not possible to search for a particular accident, and proceed to examine all vehicles in the crash for the matching MCMIS truck or bus. In addition, some of the variables had high rates of missing values and so were not useful to the matching process. Table 1 shows the variables used in each match step and the number of records matched at each step.

Table 1 Steps in MCMIS/New York PAR File Match, 2009

Step	Matching variables	Cases matched
Match 1	Crash date (month, day), crash time (hour, minute), county, vehicle identification number(11 digits), and driver age	2,603
Match 2	Crash date, crash time, county, and vehicle identification number(11 digits)	94
Match 3	Crash date, crash time, county, driver age, and vehicle configuration	24
Match 4	Crash date, crash time, county, driver age, and truck/bus	97
Match 5	Crash date, crash time, and vehicle identification number (11 digits)	25
Match 6	Hand-matching attempt, using all available variables	4
Total cases matched		2,847

The matches made were verified using other variables common to the MCMIS and PAR file as a final check to ensure each match was valid. The above procedure resulted in 2,847 matches, representing 90.7 percent of the 3,138 records reported to MCMIS.

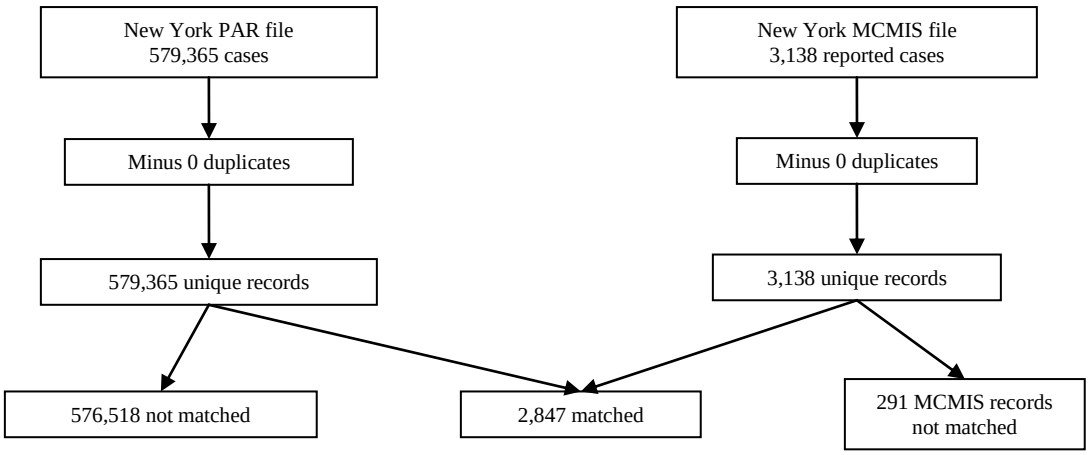

Figure 1 Case Flow in MCMIS/New York Crash File Match

The method of identifying cases reportable to the MCMIS Crash file is discussed in the next section.

4. Identifying Reportable Cases

To evaluate the completeness of reporting to the MCMIS crash file, it is necessary as a first step to identify records that qualify for reporting. This requires identifying vehicles that meet the vehicle type reporting criteria, as well as crashes that meet the crash severity criteria. Records are selected as reportable using the information available in the computerized crash files supplied by the State of New York. Reportable records meet criteria specified by the FMCSA. The reporting criteria cover the type of vehicle and the severity of the crash. These criteria are discussed in more detail below, but the critical point is that records transmitted to the MCMIS Crash file must be selected from among all the records in the State's crash data, using the data that are available in the State's crash data.

The method developed to identify reportable records is deliberately designed to be independent of any prior selection by the State being evaluated. This approach is necessary if there is to be an independent determination of the completeness of reporting. Accordingly, this process uses the information recorded by the officers on the crash report for all crashes.

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

Table 2 Vehicle and Crash Severity Threshold for MCMIS Crash File

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

Some States place some of the data elements intended for the MCMIS Crash file in a special section of the main form, with instructions to the reporting officer to complete that information only for vehicles and crashes that meet the MCMIS selection criteria. New York uses a form (Truck and Bus Supplemental Police Accident Report, MV104S) supplemental to the Police Accident Report (MV-104A) to collect some additional information on vehicles meeting the following criteria (see Section 3, p. 54 of Police Accident Report Manual - reference 1):

"The accident involved a qualifying vehicle, as listed below:

- any commercial truck having a Gross Vehicle Weight Rating (GVWR) or Gross Combined Weight Rating (GCWR) > 10,000 lbs;
- any vehicle displaying hazardous materials (Haz Mat) placard; or

- a bus designed to carry 9 or more persons, including the driver.

AND

One of the following events occurred:

- at least one vehicle was towed/transported from the scene (other than for a flat tire);
- at least one person sustained fatal injuries; **or**
- at least one person was transported for immediate medical treatment."

The instructions on the New York supplemental form accurately specify the vehicle criteria for the MCMIS file. It should be noted, however, that there is no reminder or directive on the primary crash form to complete the supplemental form for qualifying vehicles in qualifying crashes.

Much of the information for the MCMIS crash file is extracted from the MV-104A (MV-104AN), which should be completed on all vehicles in the crash. But there are a number of variables for the MCMIS file that come from the Truck and Bus Supplement, which is only completed for vehicles meeting the description quoted above.

4.1 Vehicle Type

The first step in determining reportable cases is to identify vehicles that qualify for reporting to the MCMIS Crash file. Vehicle type for both commercial and non-commercial vehicles is captured in the Vehicle Type field on the crash form. The officer enters an alphanumeric string with up to four characters from a list specified in the manual. For most vehicles, the string is a recognizable abbreviation, e.g.,"2DSD" for two-door sedan and "PICK" for pickup truck. For trucks and buses, the officer is referred to a naming matrix that identifies eleven truck combinations by three cargo body types, as well as "over-the-road" motorcoaches and transit buses. The possible truck configurations are discriminated by the number of axles, number of trailers, and type of power unit (tractor or single unit truck). Possible cargo bodies are box (van), tank, and platform (i.e., flatbed). In the data file, however, there are separate variables for commercial and non-commercial vehicles. Commercial vehicle types are coded in the Truck Bus Code variable, with 38 codes used in the crash data file. The Vehicle Body variable records 72 types of "non-commercial" vehicles – note that actual data field (and format) contains many more codes than the 17 specified in manual, which is probably because the field accepts a text string, which officers use according to their own experience.

Vehicle Body and the VIN were primarily used to identify vehicles that meet the vehicle type qualifications of the MCMIS reporting criteria. Where the two variables were consistent and identify a vehicle that met the reporting criteria, those vehicles were taken. The VIN was used to eliminate vehicles that are not reportable, such as those with GVWR less than 10,000 lbs., or to identify reportable vehicles misclassified as light vehicles.

The VINs were decoded by David Hetzel of NISR, Inc., using software that he has developed. Hetzel decoded 468,111 VINs that were recorded in the New York crash data. (VIN was unrecorded in 111,254 cases, 19.2 percent of all vehicles.) The vehicles with valid VINs were classified as light vehicles (<10,000 GVWR), minivans, utility station wagons, chassis-based

cabs, motorhomes/campers, compact utility trucks, compact , standard, and medium/heavy pickups, medium and heavy trucks, several different bus types (cross-country, school, transit, etc.), and trailer. Since GVWR was also provided, vehicles with a GVWR <10K were transferred to the Light vehicle (GVWR <10K) category. Table 3 shows the distribution of vehicle types identified by the VIN. Note that not all the vehicles identified by the software are necessarily reportable trucks or buses. For example, motorhomes do not qualify, since they are designed for private transportation. In addition, some medium/heavy (GVWR class 3) pickups are used solely for personal transportation and not part of a business. But most of the categories, such as single unit trucks and truck tractors, identify vehicles that are virtually never used solely for personal transportation and thus always qualify.

Table 3 VIN-based Vehicle Type Classification, New York PAR file, 2009

VIN vehicle	N	Percent
Camper or motor home	20	0.0
Medium/heavy truck based motor home	33	0.0
Medium/heavy pickup (>10k lbs)	731	0.1
School bus	1,411	0.2
Cross country/intercity bus	235	0.0
Transit/commuter bus	1,023	0.2
Other bus type	2	0.0
Single unit truck (10k-19.5k lbs)	2,871	0.5
Single unit truck (19.5k-26k lbs)	1,318	0.2
Single unit truck (>26k lbs)	3,673	0.6
Step van	300	0.1
Trailer	150	0.0
Truck tractor (cab only with/without trailer(s))	3,079	0.5
Van, truck, or bus	1,765	0.3
Light vehicle, VIN not decodable, or missing	562,754	97.1
Total	579,365	100.0

Special care and review was given to vehicle type code levels that were ambiguous or that did not seem to clearly indicate that the vehicle fell on one side or the other of the 10K GVWR dividing line. Codes in the crash data such as “delivery truck,” “van truck,” “flat bed truck,” and “stake truck” might be used for light trucks as well as class 3 trucks. For all such vehicles, we reviewed the make, model, and vehicle type used in the crash record, along with the make, GVWR class, and truck type as decoded from the VIN. The review determined if the police-coded make matched the VIN-derived make and whether all the pieces of information were consistent. If they were, the vehicle was flagged appropriately as either meeting the MCMIS vehicle type criteria or not.

Special attention also was given to pickup trucks, since an increasing number of pickups with a class 3 GVWR are used for personal transportation only, i.e., just like any other light passenger vehicle. If the PAR Body Type variable denoted a pickup truck, and the decoded VIN indicated that the vehicle was a Medium/Heavy Pickup or an SUT(10-19.5K), then the vehicle was included as a qualifying truck if there was evidence that the vehicle was used for commercial purposes. Commercial use was determined by using the Registration Type variable.

In addition to these vehicle types, any vehicle, regardless of size, displaying a hazardous materials placard, also meets the MCMIS vehicle type definition. New York's main crash form includes a field named Hazardous Materials Code (4-digits). Using this variable, one additional vehicle was identified that met this criteria.

The full method of identifying reportable vehicles is documented in Appendix B. Please see that appendix for the details.

Overall, this approach, while it uses available information to the fullest, is appropriately conservative. Many vehicles classified in the vehicle body style variable as delivery, utility, and van were found to be light vehicles by VIN. And most of the medium/heavy pickups were not included because no evidence could be found of commercial use. Given available information, it is believed the result is the most reasonable classification of the vehicles.

4.2 Crash severity

With respect to crash severity, qualifying crashes involve two criteria, one covering injury to people and the other damage to vehicles. In terms of personal injury, crashes in which a person is fatally injured or an injured person is transported for immediate medical attention meet the crash severity criteria. With respect to damage to vehicles, any crash in which at least one vehicle is towed from the scene due to disabling damage also qualifies under the crash severity criteria. Any crash meeting either one of those rules satisfies the crash severity criteria. If the crash also involves a vehicle that meets the reporting criteria for vehicles, then the record for that vehicle is reportable to the MCMIS crash file.

The crash data file supplied by New York has sufficient information to identify crashes that meet the personal injury criterion (an injured person transported for medical attention), but not the vehicle damage criterion (a vehicle towed due to disabling damage).

The New York Individual file includes information about the injury severity for each person involved in the crash. New York classifies injury using the common KABCO scale, where injuries are classified as killed (K); severe (A); moderate (B); minor (C); not injured (O); injured, but severity unknown (Z). This information was used to identify crashes that had one or more injured persons.

Fatal crashes can be readily identified using the Accident Type Class variable. Any crash with a fatally injured person qualifies. If the most severe injury in the crash was a nonfatal injury, it is also necessary to determine if the person was transported for medical attention. For this, there are two fields that can be used. There is a "Taken By" field on the Individual file, which specifies the mode of transport to a medical facility, and a "Taken to" field, which is supposed to contain a code for the specific hospital or medical facility.

Crashes meeting the injured/transported criteria were thus identified as crashes involving an individual with an A-, B-, or C-injury, or Injured but Severity Unknown *and* transport to a medical facility was indicated (either using the Taken_By *or* Taken_To variables). If the injured person was Taken By police car or private vehicle, then they were only considered Transported if a valid hospital code was indicated. Note that the injury criteria is applied at the *crash* level,

meaning any person involved in the crash, not just in a vehicle that meets the MCMIS reporting criteria.

Note that this is a more stringent interpretation of the codes than a literal reading of the instructions in the crash reporting manual would warrant. The manual states (page 28) that the "Taken by" field is to be completed "only if the injured person was taken directly from the scene of the accident to a medical facility/provider or to a morgue." However, there was a substantial number of records with discrepancies between the "Taken by" and "Taken to" fields—e.g., records with no valid or an unrecorded hospital code, but the Taken by field indicated the person was transported. In many of these, the type of transport was coded as a police car, fire truck, or private vehicle. There were also records of uninjured persons transported by various means. In using these fields, we recognized the possibility that in some cases officers might enter information incorrectly. Therefore, we used the injury codes and the "Taken by" and "Taken to" fields together to find crashes in which an injured person was transported for medical attention.

The other reporting criteria related to crash severity has to do with vehicle damage, i.e., whether any vehicle in the crash was towed due to disabling damage. Again, this criteria is applied at the crash level, not just to the trucks or buses that meet the vehicle type criteria. Such information is recorded on the New York PAR crash report (MV-104A or –N). The crash report provides an area for the officer to record the name of the tow trucking company or the person who towed the vehicle, and the location to which the vehicle was towed. In addition, the officer can indicate damage to the vehicle caused by the accident in the appropriate boxes in the Vehicle Damage Coding section of the crash report. Unfortunately these variables related to tow status and vehicle damage were not included in the PAR data file supplied by the State.

5. Limitations to the evaluation

The inability to identify towed/disabled crashes significantly limits the evaluation that can be done on the completeness and accuracy of State reporting. Without being able to identify all reportable crash records, it is not possible to determine the overall reporting rate. However, it is still possible to identify fatal and injury/transported crashes, which is an important subset of the records that should be reported. The completeness and accuracy of the reporting of these critical records can be determined, along with the factors that may contribute to failing to report them all. It is likely that the reporting rate for the more serious crashes for which we can calculate a reporting rate also is valid for the less severe crashes that cannot be identified, so the reporting rate determined here is a good first approximation to the overall rate.

However, the typical State evaluation also includes a discussion of crash records that were over-reported to the MCMIS crash file, that is, records that were reported but that did not meet the reporting threshold. That obviously cannot be accomplished here, because, without knowing whether the truck was involved in a towed/disabled crash, it is impossible to determine whether a case that did not include a fatality or injury/transported was properly reported.

This report, therefore, is limited to the reporting of crash records that involve either a fatality or an injury transported for treatment. These cases typically account for about 40 to 50 percent of the total number of records that meet the MCMIS reporting criteria in a State. It is unfortunate that it is not possible to identify towed/disabled crashes in the crash data that were supplied, but it is still possible to provide a useful evaluation of the reportable records that can be identified.

As crashes involving a fatality or injured/transported person, these are the most important records to report (though of course it is important to report all qualifying records). The reporting rate for this subset is probably reflective of the overall MCMIS reporting rate; if anything, it may overstate that rate because more serious crashes tend to be reported at a higher rate than less serious crashes. However, the factors associated with the low reporting rate for the serious crashes probably also are operative for the towed/disabled group. Therefore, the weaknesses identified here should be useful in improving the overall rate, even though they cannot be specifically shown to be a factor for the towed/disabled group.

6. Factors Associated with Reporting

Reportable cases here are defined as those involving a vehicle that meets the vehicle type criterion in a crash that includes either a fatality or an injury transported for immediate medical attention.

In total, there were 2,983 vehicles identified as eligible trucks and buses in crashes with either a fatality or an injury transported for treatment. Table 4 shows the distribution by vehicle type. Medium or heavy trucks accounted for 77.3 percent of the vehicles, while 22.7 percent are buses. No light vehicles with hazmat placards were involved in the serious crashes used for the evaluation.

Table 4 Vehicles Meeting MCMIS Accident and Vehicle Criteria
New York PAR File, 2009

Vehicle type	N	%
Truck	2,307	77.3
Bus	676	22.7
Other, transporting hazmat	0	0.0
Total	2,983	100.0

As Figure 1 above shows, there were 3,138 records reported to the MCMIS Crash file by New York in 2009. Of these, 2,847 were matched to the New York PAR file. Matches could not be found for 291 of the MCMIS records. However, as explained in the previous section, it is only possible to identify records that meet the fatality or injury/transported crash severity criteria. Of the 2,983 fatality or injury/transported crash records identified in the New York crash data, 1,096 were actually reported to the MCMIS crash file. This implies a reporting rate for that subset of 36.7 percent. If all 291 unmatched records were all correctly reported, and met the MCMIS crash file reporting standard, the reporting rate would increase to 46.5 percent. It is very unlikely that all 291 unmatched records really were reportable, but that rate forms the upper limit for the possible range of reporting.

6.1 Overreporting

It is not possible to perform the usual analysis of records reported to the MCMIS crash file that do not meet the reporting thresholds because we cannot determine for each reported record whether it did or did not meet the threshold. There were 1,751 records reported to MCMIS that were not for crashes that involved a fatality or an injury/transported. But they may have included towed/disabled vehicles, and so been correctly reported.

The records are almost all for trucks or buses that meet the vehicle type standard. There was also one light vehicle with a hazmat placard. However, 101 of the records were for light vehicles, with no hazmat placard indicated, which would not qualify. It appears that these records almost certainly should not have been reported. As to the other 1,650, they may have met the tow/disabled standard and been correctly reported. There simply is not enough information in the data set to determine.

6.2 Reporting Criteria

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

Table 5 shows reporting rates, the number of unreported cases, and the proportion of unreported cases for the two levels of the MCMIS crash severity criteria that can be identified. The format of the table will be used throughout this report. The column giving the proportion of unreported cases can be used to identify opportunities where the greatest improvement in reporting rates may be realized.

Crashes that resulted in a fatality were reported at a much higher rate than injury/transported cases. Over 82 percent of fatal involvements were reported, compared with only 34.6 percent of the injury transported cases. Non-fatal, yet reportable, crashes are apparently much less likely to be recognized as meeting the requirements of the MCMIS Crash file. Fatal crashes are likely given a higher level of scrutiny than non-fatal, and so are more likely to be included.

Table 5 Reporting Rate by MCMIS Crash Severity, New York 2009

Crash severity	Reportable cases	Reporting rate	Unreported cases	% of total unreported cases
Fatal crash	134	82.1	24	1.3
Injury/transported crash	2,849	34.6	1,863	98.7
Total	2,983	36.7	1,887	100.0

The relationship between injury severity and reporting probability is strong and almost linear. Figure 2 shows the reporting rate by crash severity, where crash severity is measured by the most severe injury in the crash. New York uses the KABCO scale for injury severity, as do other states. A linear regression line has been fitted to the data, and as can be seen, the data fall fairly neatly along the line. The R^2 shows that variations in injury severity explain about 91% of the variation in reporting rates. In other words, the most important factor in whether a crash is submitted to the MCMIS crash file is injury severity. The more severe the worst injury in the crash, the more likely it will be reported correctly.

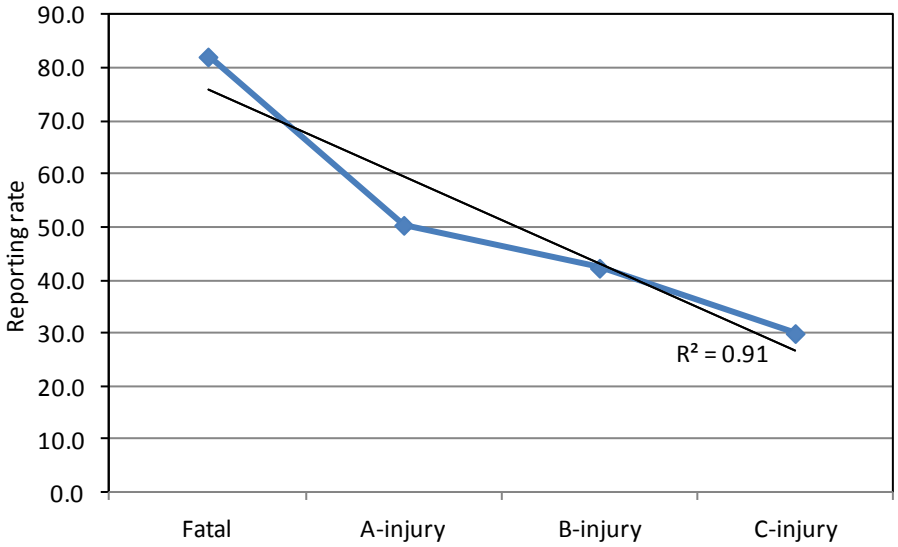

Figure 2 Reporting Rate by Most Severe Injury in the Crash, New York 2009

The second component of the MCMIS Crash file criteria is the vehicle type. As described above, trucks, buses, and other vehicles transporting sufficient amounts of hazmat to require a placard all meet the reporting requirements. There were no light vehicles transporting hazmat among the serious crashes evaluated in this report, so only reporting rates for trucks and buses are considered here. Table 6 shows the rates for the different top level types of vehicles. The reporting rate for trucks was 40.1 percent, a bit higher than the overall rate, while the rate for buses is somewhat lower. Both rates are low, though it is clear that trucks are significantly more likely to be recognized as meeting the reporting requirements than buses.

Table 6 Reporting Rate by MCMIS Vehicle Class, New York 2009

MCMIS vehicle class	Reportable cases	Reporting rate	Unreported cases	% of total unreported cases
Truck	2,307	40.1	1,382	73.2
Bus	676	25.3	505	26.8
Total	2,983	36.7	1,887	100.0

Table 7 provides more insight into the effect of vehicle configuration on reporting rates. It shows reporting rates by vehicle type as recorded on the police report. The first thing to note is the variety of truck types captured in the file. This is a product of entering the information as an alphanumeric string, which allows a virtually unlimited number of possibilities. The vehicle types that seem to be light vehicles were all shown to be qualifying vehicles by decoding the VIN, and in each case the VIN decode was verified against the make recorded by the police officer. Note the higher percentage of tractors reported—this shows that the officers tend to be more likely to recognize large trucks as reportable. But note also the low percentage of delivery trucks, stake trucks, vans, and pickups. Again, each of those vehicles were verified as reportable by VIN. In the case of pickups, there was the further requirement that there be some evidence of commercial use, usually verified by the registration type. Most of these vehicles were medium

duty trucks by VIN, usually class 3, 4, or 5. So they are not physically large trucks. (The 11 "semi-trailers" were all confirmed to be tractors, likely pulling a semitrailer.)

Table 7 Reporting Rate by PAR Vehicle Type, New York 2009

PAR Vehicle Type	Reportable cases	Reporting rate	Unreported	% of total unreported
Suburban	19	5.3	18	1.0
4-door sedan	1	100.0	0	0.0
2-door sedan	3	0.0	3	0.2
Unknown truck	21	100.0	0	0.0
Unknown vehicle	1	100.0	0	0.0
Road building machine	2	50.0	1	0.1
Road sweeper	4	25.0	3	0.2
Sand or agricultural	1	0.0	1	0.1
Snow plow	1	100.0	0	0.0
Traction engine	7	100.0	0	0.0
Tractor crane	1	0.0	1	0.1
Truck crane	7	28.6	5	0.3
Truck with small wheels	1	100.0	0	0.0
Tractor	720	71.3	207	11.0
Delivery truck	188	19.1	152	8.1
Dump	417	35.5	269	14.3
Flat bed truck	84	23.8	64	3.4
Pickup truck	129	2.3	126	6.7
Stake truck	45	22.2	35	1.9
Tank truck	66	57.6	28	1.5
Refrigerator truck	49	14.3	42	2.2
Tow truck	71	11.3	63	3.3
Van truck	284	20.8	225	11.9
Utility	159	20.8	126	6.7
Semi-trailer	11	45.5	6	0.3
Bus (omnibus)	672	25.3	502	26.6
Cement Mixer	17	41.2	10	0.5
DLR/transporter	2	100.0	0	0.0
Total	2,983	36.7	1,887	100.0

Larger trucks are more readily recognized as fitting the reporting requirements than smaller trucks, even though the smaller ones also qualify. Table 8 shows the vehicle type indicated by the VIN, including the GVWR range. Just looking at single unit trucks (SUT) and truck tractors, there is a clear linear relationship between the GVWR of the truck and the probability that the record will be reported. SUTs with a GVWR between 10,000 lbs. and 19,500 lbs. (class 3 through 5) are reported at a 12.0 percent rate, trucks rated between 19,500 and 26,000 (class 6) at 23.1 percent, and SUTs rated over 26,000 lbs. (class 7 and 8) were reported at a 40.8 percent rate. Over 80 percent of truck-tractors, which are almost all class 7 and 8, were reported. There is a clear relationship between size and reporting rates. The information reinforces the earlier conclusions.

Table 8 Reporting Rate by Vehicle Type from the VIN, New York 2009

VIN Vehicle Type	Reportable cases	Reporting rate	Unreported	% of total unreported
School bus	196	34.7	128	6.8
Cross country/intercity bus	49	30.6	34	1.8
Transit/commuter bus	260	16.2	218	11.6
Step van	48	14.6	41	2.2
Medium/heavy pickup truck (>10K lbs)	96	2.1	94	5.0
Single unit truck (10K-19.5K lbs)	490	12.0	431	22.8
Single unit truck (19.5K-26K lbs)	216	23.1	166	8.8
Single unit truck (>26K lbs)	578	40.8	342	18.1
Truck tractor with or without trailer(s)	663	80.5	129	6.8
Van, truck, or bus	164	21.3	129	6.8
Trailer	15	46.7	8	0.4
Unknown VIN or GVWR <10K lbs	208	19.7	167	8.9
Total	2,983	36.7	1,887	100.0

Reporting rates for buses are generally lower than for trucks. Rates for school buses and cross country/intercity buses are about the same, while transit/commuter buses are about half of that. It is possible that the significantly lower rate for transit buses, in comparison to the other bus types, is because they are not considered to be relevant to the Federal crash file since the vehicles are operated by urban transit authorities. But these vehicles clearly meet the MCMIS reporting requirements.

In the two bottom rows, the VIN decoded either as a trailer, or indicated a VIN less than 10,000 lbs., or the VIN could not be decoded. These records were included as reportable because the officer coded a vehicle type that clearly met the vehicle type criteria. In the case of the trailers, the officer recorded a truck tractor and wrote down a truck make (such as Freightliner or Mack) but may have inadvertently entered the trailer license plate. (VINs are apparently added to the crash data by matching the license plate.) For the unknown VINs, a reportable vehicle was identified, verified by make and model. Vehicles where the VIN indicated the GVWR was less than 10,000 lbs. were included if they were coded as a bus or if the decoded make did not match what the police officer recorded and the make and vehicle type were consistent in identifying a qualifying truck.

6.3 Case Processing

It was also tested whether delays in transmitting cases may account for some proportion of the underreporting observed in the 2009 data. However, that does not appear to be the case. Figure 3 shows reporting rates according to month of the crash. The overall reporting rate appears to be reasonably stable over the course of the year. There are no marked lows or highs. The overall rate was 36.7 percent and the reporting rate for most months was within a few percentage points of that number. April saw the lowest rate, but that was only 30.4 percent, and both the preceding and following months were very near or a few points higher than the overall rate. There do not appear to be any seasonal factors that might account for the low overall rate of reporting. As will be shown below reporting latency was outstanding, with over 90 percent of records reported within 90 days of the date of the crash.

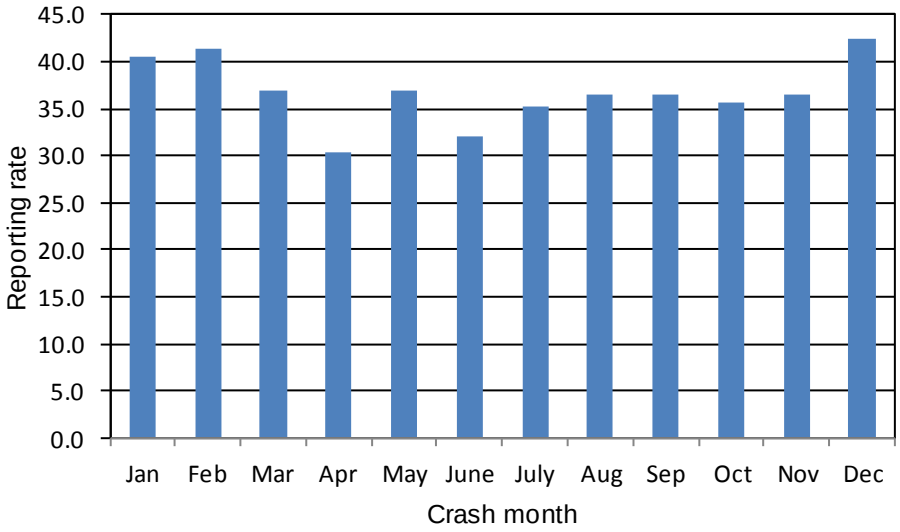

Figure 3 Reporting Rate by Crash Month, New York 2009

6.4 License state

The State within which the truck is licensed could be taken as a proxy for whether the carrier operates in interstate commerce. Overall, trucks (or buses) involved in a reportable crash are much more likely to be properly reported if they had out-of-state license plates than trucks plated in-state. Almost 78 percent of out-state registered vehicles were reported, compared with only 29.1 percent of in-state vehicles that should have been reported. The size of this difference clearly suggests that there is some misunderstanding that the reporting requirement applies only to vehicles in interstate commerce. Possibly some believe that since the reporting is to a Federal agency, they are only interested in interstate carriers, even though the rules are clear that all records that meet the vehicle type and crash severity thresholds must be reported. Almost 95 percent of the unreported records are for in-state vehicles, so correcting this problem would contribute in a very substantial way to improving the overall reporting rate.

Table 9 Reporting Rate by Vehicle Registration State, New York 2009

Registration state	Reportable cases	Reporting rate	Unreported	% of total unreported
In-state	2,505	29.1	1,777	94.2
Out-state	471	77.9	104	5.5
Unrecorded	7	14.3	6	0.3
Total	2,983	36.7	1,887	100.0

6.5 County of occurrence

Other available fields were also searched for factors that varied by reporting rates. The enforcement agency type is often important, but the crash data did not include information about the type of enforcement agency (state or local police, for example) that covered the crash. However, there were interesting geographical differences by the county in which the crash occurred. Table 10 shows reporting rates by the top nine counties in terms of the number of reportable records. The top five are all either on Long Island or counties in the New York City

metropolitan area. The rates in these areas are all significantly lower than the statewide average. Westchester County is immediately north of the city and is indeed part of the contiguous urbanized area around New York City; the rate there is actually a bit higher than the state average, at 40.0 percent compared with 36.7 percent, which is not meaningfully different.

Table 10 Reporting Rate by Crash County, New York 2009

County	Reportable cases	Reporting rate	Unreported cases	% of total unreported cases
Suffolk	384	20.1	307	16.3
Nassau	298	21.5	234	12.4
Queens	212	9.4	192	10.2
Kings	200	10.0	180	9.5
New York	178	7.3	165	8.7
Westchester	155	40.0	93	4.9
Erie	134	63.4	49	2.6
Bronx	125	12.8	109	5.8
Monroe	114	41.2	67	3.6
Top 9 counties	1,800	22.4	1,396	74.0
All Counties	2,983	36.7	1,887	100.0

Erie County, in western New York, has the highest reporting rate among the top nine, at 63.4 percent. This may be related to the fact that I-90 goes through the area, so it is on a major east-west interstate route. Moreover, a crossing point to Canada is immediately north, so again, there is a greater likelihood of out-of-state trucks in the area, which has already been shown to increase the probability of reporting. It may also be the case that in less urbanized areas, the focus and priorities of enforcement agencies is different.

6.6 Fire Occurrence

FMCSA has a special interest in ensuring that reportable crash involvements in which a vehicle fire occurred are accurately reported. With respect to the occurrence of fire in reportable crash involvements, there was only one such case, and it was reported. The case involved a bus, which experienced a fire. It is somewhat surprising that there was only one recorded fire among the 2,983 reportable cases, but there is no evidence in the crash data of any others.

7. Data Quality and Reporting Latency of Reported Cases

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

In this section of the evaluation, all cases reported to the MCMIS crash file from New York for 2009 are used, since the purpose of the analysis is to examine the quality of the data as reported.

7.1 Missing data

Table 11 shows missing data rates for selected, important variables in the MCMIS Crash file. Missing data rates are generally low, with a handful of exceptions. On most fundamental, structural variables, such as date, time, number of fatalities and number of injuries, missing data rates are either zero or extremely low.

The only variable with a significantly high rate of missing data is roadway access, where the information is not present for 16.5 percent of the cases. This information is collected on the Truck and Bus Supplemental Police Accident Report, and officers may be unfamiliar with how to classify roadway access. Rates for some of the sequence of events variables may appear to be high, but probably just reflect that crashes frequently include only one harmful event, the collision itself. The missing data rate for DOT number is calculated only for carriers coded as "Interstate," which therefore must have a DOT number, and is only 0.1 percent. Overall, the rates of missing data are exceptionally low, reflecting very complete data collection on these variables.

Table 11 Missing Data Rates for Selected MCMIS Crash File Variables, New York 2009

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	3.5
Accident minute	0.0	Event two	80.4
County	0.0	Event three	94.3
Body type	0.1	Event four	98.0
Configuration	0.0	Number of vehicles	0.0
GVWR class	0.0	Road access	16.5
DOT number *	0.8	Road surface	0.0
Carrier state	0.0	Road trafficway	1.8
Citation issued	0.0	Towaway	0.0
Driver date of birth	2.5	Truck or bus	0.0
Driver license number	2.8	Vehicle license number	0.4
Driver license state	2.7	Vehicle license state	0.0
Driver license class	2.9	VIN	1.0
Driver license valid	0.0	Weather	0.0

* Based on cases where the carrier is coded interstate.

Hazardous materials variable	Percent unrecorded
Hazardous materials placard	24.8
Percentages of hazmat placarded vehicles only:	
Hazardous cargo release	0.0
Hazardous materials class (1-digit)	9.8
Hazardous materials class (4-digit)	17.1
Hazardous materials name	8.9

The second section of the table shows missing data rates for the hazardous materials (hazmat) variables. Whether the vehicle displayed a Hazmat Placard was unrecorded in 24.8 percent of cases. The other missing data rates shown are limited to the 123 New York MCMIS records where the vehicle displayed a hazmat placard, indicating it was carrying hazmat. Cargo release was recorded for all records. About 10 percent of the hazmat records were missing the hazmat class 1-digit code, and 17.1 percent were missing the 4-digit code. About nine percent were missing the hazmat name.

7.2 Inconsistent codes

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

Overall, the coded values were very consistent between the two files, on the variables compared, with the exception of variables describing vehicle type. The variables for light condition, road condition and weather condition were virtually identical, with only three discrepancies for light condition and one for road condition. With respect to hazmat placard, there were a relative handful of records with different values. There were three records coded as displaying a hazmat placard in the State crash data, but as not displaying such a placard in the MCMIS data. There were also three records that were coded with a hazmat placard, but left blank in the MCMIS data. There were also 94 records where hazmat placard was left blank in the State crash data, but the matching MCMIS record indicated that the vehicle had a hazmat placard. These differences may reflect a process of reviewing and correcting fields in the data prior to submitting the records to the MCMIS file, but the corrections may not always be applied to the State crash data file.

There was a more significant inconsistency between vehicle type as coded in the State crash data and vehicle configuration in the MCMIS crash file. There was a handful of records with minor differences, e.g., a record where the vehicle type was coded as a two-door sedan in the State crash data and as a bus with more than 15 passenger seats in the MCMIS data. Overall, about 3.2 percent of the State record vehicle configurations were inconsistent with the configuration in the MCMIS file. "Inconsistent" here is strongly defined as clearly indicating a different vehicle type. These differences are relatively few and scattered, and seem to be simple, essentially random errors.

However, 508 records were coded as a "tractor" in the State data but was a truck and trailer in the MCMIS crash file. The large number of differences suggest that there may be a systematic misunderstanding of what the "tractor" and "truck and trailer" configurations mean. A tractor is a truck with a fifth wheel, designed to pull semitrailers. The truck and trailer configuration consists of a straight truck, with a cargo body, pulling a trailer—either a full trailer or another trailer attached by a ball hitch or something similar. This is a not-infrequent error, which is easily remedied but which will require some specific training and care in preparing the data.

Overall, there does not appear to be any pattern to the inconsistencies, so they are not likely to be computer programming errors.

7.3 Reporting latency

Reporting latency also reflects data quality. All reportable crash involvements for a calendar year are required to be transmitted to the MCMIS Crash file within 90 days of the date of the crash. The 2009 MCMIS Crash file as of May 31, 2010, 151 days after the end of 2009, was used to identify records submitted from New York, so all 2009 cases should have been reported by that date. Figure 4 shows the cumulative percent of cases submitted by latency in days, i.e. the number of days between the crash date and the date the case was uploaded to the MCMIS Crash file. Crash reports are required to be submitted to the MCMIS Crash file within 90 days of the crash. Almost 91 percent of the records that were ultimately reported were submitted within 90 days of the crash, and almost 95 percent were submitted within 150 days of the crash. The median time between crash occurrence and record upload was just ten days, but for a significant number of records the delay was much greater. Over 100 records were submitted more than 150 days after the crash, with the greatest delay 478 days.

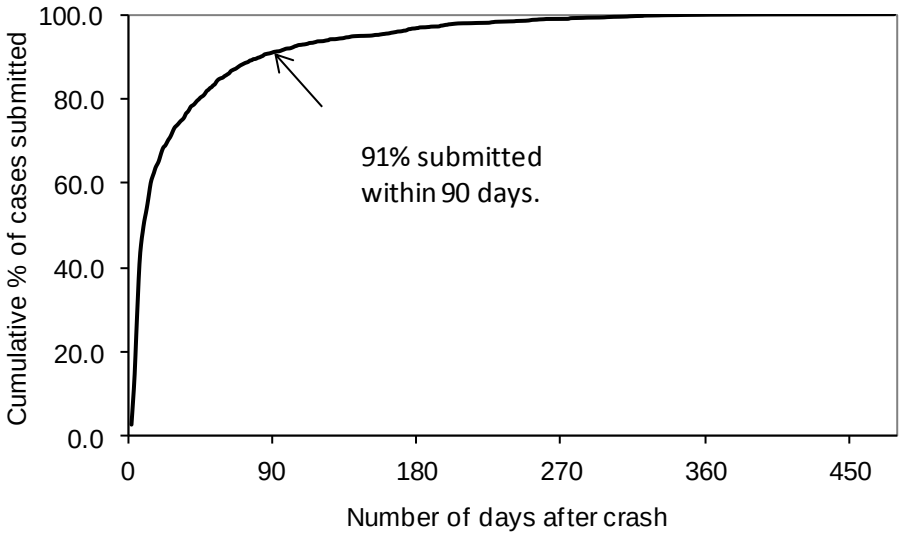

Figure 4 Cumulative Percent of Cases Submitted to MCMIS Crash File by Number of Days After Crash, New York, 2009

The first date on which crash records from 2009 were uploaded was January 7, 2009 when two records were uploaded. On average, uploads occurred every 2.0 days between then and May 7, 2010, when the last upload occurred. An average of 13.1 records were submitted per upload. About 50 percent of the uploads contained nine or fewer records, though the largest single upload was of 103 records.

8. Summary and Discussion

Evaluating crash reporting from New York to the MCMIS crash file presented several challenges. The State crash data included only a few variables that could be used to match records with the MCMIS crash file. As a result, it was necessary to resort to manual review for several hundred records, and in the end, only about 91 percent of the records in the MCMIS crash file could be matched to a record in the New York crash data. In addition, it was not possible to apply all levels of the crash severity reporting rules. Accordingly, for the evaluation

to proceed, it was necessary to identify a subpopulation of crashes that met some levels of the reporting requirements and evaluate how well those crashes were reported.

Reportable vehicles were identified using a combination of variables, including determining the vehicle's GVWR and likely power unit type from the VIN. The primary information used was the vehicle body style field, as corroborated by the VIN, though for some situations—such as a vehicle identified by VIN as a light vehicle, but classified as a bus on the police report—the officer's coding was preferred to the VIN. In addition, manual review of vehicle make and body type was used to verify the information decoded from the VIN. In the case of class 3 pickup trucks, only those with positive evidence of commercial operations were included as reportable vehicles. In identifying reportable vehicles, we attempted to maximize the use of available information, and to take into account all the information that was available.

Because the crash data supplied by New York did not include information about whether vehicles were damaged or towed, it was not possible to identify crashes in which at least one vehicle was towed. Accordingly, reporting rates could only be calculated for crashes that included a fatality or an injured person transported for medical attention. A total of 2,983 records in the New York data were determined to be part of this subset of reportable records; 1,096 of these were located in the MCMIS crash file, for an overall reporting rate of 36.7 percent. New York submitted 3,138 records to the MCMIS crash file for 2009, but, because towed/disabled crashes could not be identified, it could not be determined whether all those records were correctly reported. They may have been, but it is not possible to tell at this point. However, it was determined that 101 of the records likely should not have been reported because they were for light vehicles, and there was no evidence that they were transporting hazmat.

The crash data were analyzed to identify factors that were associated with lower rates of reporting. Understanding the types of crashes that were reported at a lower rate may be helpful in identifying weak points in the reporting process which can be strengthened.

Fatal crash involvements were reported at a higher rate than injury/transported involvements. About 82 percent of the fatal crashes were reported, but only 34.6 percent of injured/transported crashes. Fatal crashes almost certainly receive more thorough investigation and so are more likely to be recognized as meeting the MCMIS reporting criteria. Analyzing reporting rates by crash severity confirmed this relationship. A linear relationship was demonstrated between crash severity and the reporting rate.

With respect to vehicle types, large trucks are more likely to be reported than smaller ones and trucks as a whole are more likely to be reported than buses. About 40.1 percent of reportable truck crashes are reported, while about 25.3 percent of reportable bus crashes are. Among truck types, smaller trucks tend to be reported at a lower rate than large trucks. The reporting rate for SUTs with a GVWR between 10,001 and 19,500 lbs. was 12.0 percent, compared with a 40.8 percent for SUTs with a GVWR over 26,000 lbs. and 80.5 percent rate for truck tractors. Straight trucks in general are reported at a lower rate than truck tractors, even the largest straights. It is clear that big trucks, and tractor-semitrailers in particular, are more readily recognized as meeting the reporting requirements than smaller trucks.

From the data analysis, even without being able to identify all levels of reportable crashes, it seems fairly clear that a basic issue is effectively identifying vehicles and crashes that should be

submitted to the MCMIS crash file. New York uses a supplemental form to collect many of the special variables required for the MCMIS file. Although the instructions in the *Police Accident Report Manual* are clear and accurate, it seems likely that the officers are not recognizing consistently when the supplemental form should be completed. Data from that form were not supplied for this evaluation, so it could not be determined conclusively whether the supplemental form is completed often enough, but the nature of the reporting deficiencies suggests that they are not. It was noted that there is no reminder on the main PAR form to complete the supplemental form for the appropriate vehicles and crashes. Such a reminder could help to improve reporting.

In terms of the data reported, the timeliness of uploading cases was good. Over 90 percent of the cases met the 90 day post-crash reporting requirement. Clearly there is room for improvement.

With respect to the reported data itself, missing data rates for most fields reported to the MCMIS Crash file are quite low. The rates were somewhat high for roadway access, but overall the data are quite complete. There were some inconsistencies between code values in the State crash data and the corresponding record in the MCMIS crash file. For the most part, these inconsistencies did not appear to be reflective of a systematic problem, e.g., a computer programming problem in reformatting the data to submit to SafetyNet. They appear to be inadvertent entry errors. The only significant problem was a large number of trucks that were coded as a tractor in the State data and a truck trailer in the MCMIS data. This inconsistency suggests some confusion about the definition of each configuration. It should be noted that it is impossible to know which record is correct.

The New York crash report includes information about vehicle damage and whether the vehicle was towed. If this information was captured in the computerized record, and the data about injury transportation were accurately and consistently completed, it should be possible to use computer algorithms to extract the records that are required for the MCMIS crash file. At a minimum, use of automated case selection could improve the reporting rate.

Because of its size and the amount of truck and bus traffic, New York is a critical state. Accurate and complete data are essential to monitoring and improving the safety of motor carrier operations. It is certainly the goal of this report to contribute to that result, by identifying weaknesses and areas for improvement in the current process.

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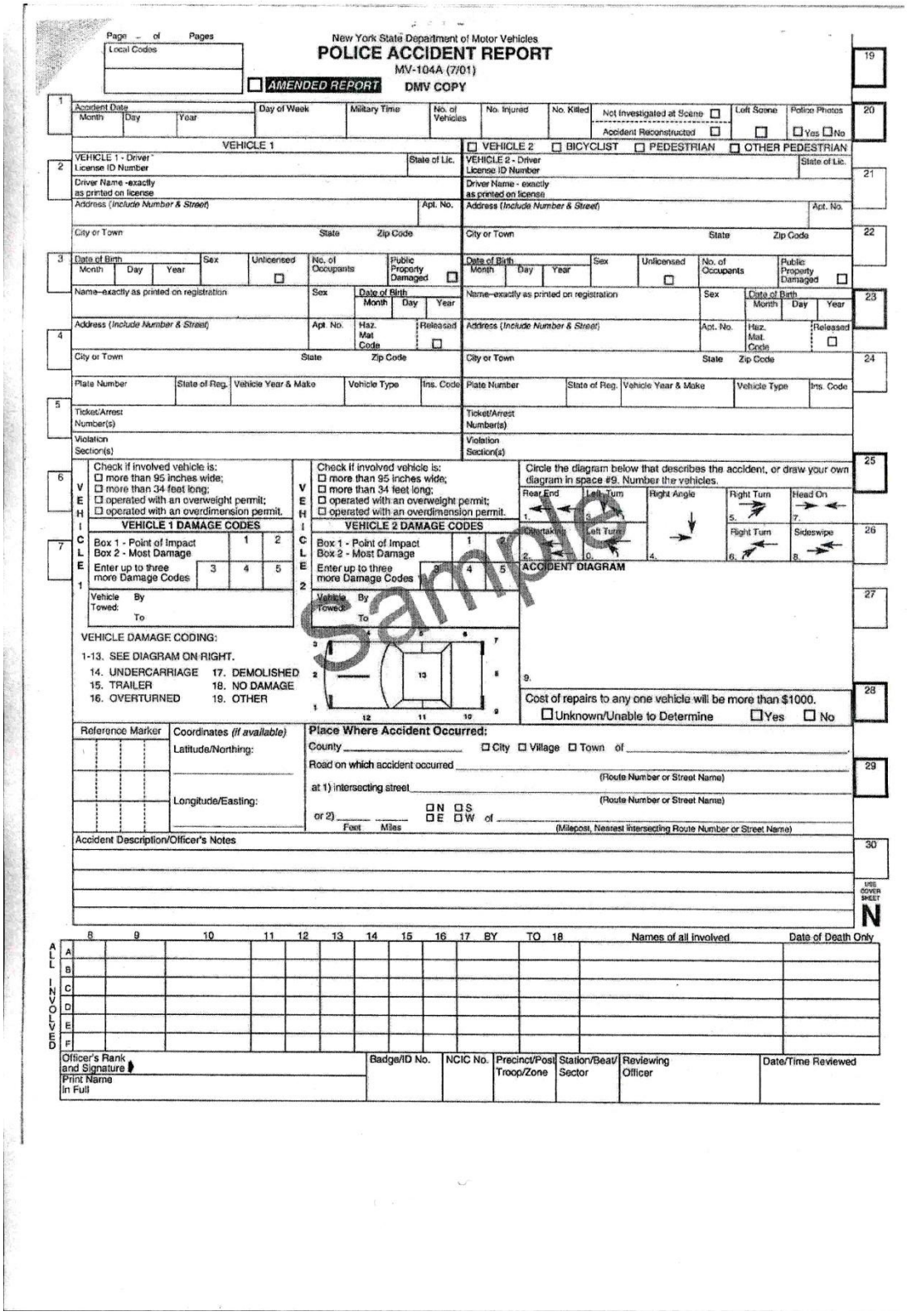
Appendix A New York Police Accident Reports



Page _ of Pages

Local Codes

New York State Department of Motor Vehicles

POLICE ACCIDENT REPORT

MV-104A (7/01)

☐ AMENDED REPORT DMV COPY

Accident Date: Month | Day | Year; Day of Week; Military Time; No. of Vehicles; No. Injured; No. Killed; Not Investigated at Scene ☐; Accident Reconstructed ☐; Left Scene ☐; Police Photos ☐ Yes ☐ No

VEHICLE 1

VEHICLE 1 - Driver License ID Number; State of Lic.

Driver Name - exactly as printed on license

Address (Include Number & Street); Apt. No.

City or Town; State; Zip Code

Date of Birth: Month | Day | Year; Sex; Unlicensed ☐; No. of Occupants; Public Property Damaged ☐

Name–exactly as printed on registration; Sex; Date of Birth: Month | Day | Year

Address (Include Number & Street); Apt. No.; Haz. Mat Code; Released ☐

City or Town; State; Zip Code

Plate Number; State of Reg.; Vehicle Year & Make; Vehicle Type; Ins. Code

Ticket/Arrest Number(s)

Violation Section(s)

☐ VEHICLE 2 ☐ BICYCLIST ☐ PEDESTRIAN ☐ OTHER PEDESTRIAN

VEHICLE 2 - Driver License ID Number; State of Lic.

Driver Name - exactly as printed on license

Address (Include Number & Street); Apt. No.

City or Town; State; Zip Code

Date of Birth: Month | Day | Year; Sex; Unlicensed ☐; No. of Occupants; Public Property Damaged ☐

Name–exactly as printed on registration; Sex; Date of Birth: Month | Day | Year

Address (Include Number & Street); Apt. No.; Haz. Mat Code; Released ☐

City or Town; State; Zip Code

Plate Number; State of Reg.; Vehicle Year & Make; Vehicle Type; Ins. Code

Ticket/Arrest Number(s)

Violation Section(s)

VEHICLE 1

Check if involved vehicle is:
☐ more than 95 inches wide;
☐ more than 34 feet long;
☐ operated with an overweight permit;
☐ operated with an overdimension permit.

VEHICLE 1 DAMAGE CODES

Box 1 - Point of Impact; Box 2 - Most Damage: 1 2

Enter up to three more Damage Codes: 3 4 5

Vehicle Towed: By / To

VEHICLE 2

Check if involved vehicle is:
☐ more than 95 inches wide;
☐ more than 34 feet long;
☐ operated with an overweight permit;
☐ operated with an overdimension permit.

VEHICLE 2 DAMAGE CODES

Box 1 - Point of Impact; Box 2 - Most Damage: 1 2

Enter up to three more Damage Codes: 3 4 5

Vehicle Towed: By / To

VEHICLE DAMAGE CODING:

1-13. SEE DIAGRAM ON RIGHT.
14. UNDERCARRIAGE
15. TRAILER
16. OVERTURNED
17. DEMOLISHED
18. NO DAMAGE
19. OTHER

Circle the diagram below that describes the accident, or draw your own diagram in space #9. Number the vehicles.

ACCIDENT DIAGRAM

9.

Cost of repairs to any one vehicle will be more than $1000.
☐ Unknown/Unable to Determine ☐ Yes ☐ No

Reference Marker; Coordinates (if available) Latitude/Northing: Longitude/Easting:

Place Where Accident Occurred:

County ☐ City ☐ Village ☐ Town of

Road on which accident occurred (Route Number or Street Name)

at 1) intersecting street (Route Number or Street Name)

or 2) ____ Feet ____ Miles ☐N ☐S ☐E ☐W of (Milepost, Nearest Intersecting Route Number or Street Name)

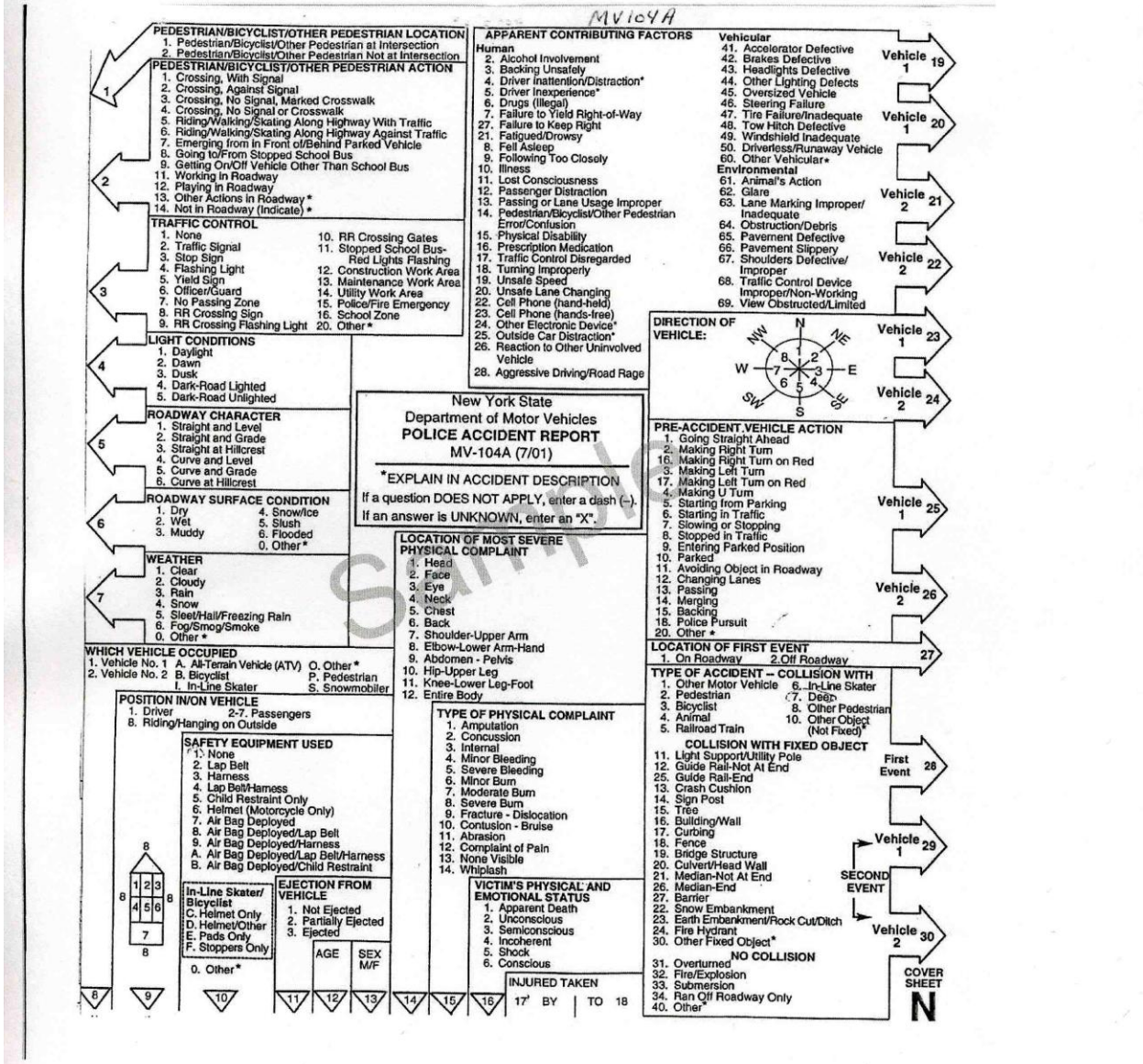
Accident Description/Officer's Notes

USE COVER SHEET **N**

ALL INVOLVED

	8	9	10	11	12	13	14	15	16	17 BY	TO 18	Names of all involved	Date of Death Only
A													
B													
C													
D													
E													
F													

Officer's Rank and Signature; Print Name In Full; Badge/ID No.; NCIC No.; Precinct/Post Troop/Zone; Station/Beat/ Sector; Reviewing Officer; Date/Time Reviewed


MV104A
PEDESTRIAN/BICYCLIST/OTHER PEDESTRIAN LOCATION
1. Pedestrian/Bicyclist/Other Pedestrian at Intersection
2. Pedestrian/Bicyclist/Other Pedestrian Not at Intersection
PEDESTRIAN/BICYCLIST/OTHER PEDESTRIAN ACTION
1. Crossing, With Signal
2. Crossing, Against Signal
3. Crossing, No Signal, Marked Crosswalk
4. Crossing, No Signal or Crosswalk
5. Riding/Walking/Skating Along Highway With Traffic
6. Riding/Walking/Skating Along Highway Against Traffic
7. Emerging from In Front of/Behind Parked Vehicle
8. Going to/From Stopped School Bus
9. Getting On/Off Vehicle Other Than School Bus
11. Working In Roadway
12. Playing In Roadway
13. Other Actions in Roadway *
14. Not in Roadway (Indicate) *
TRAFFIC CONTROL
1. None
2. Traffic Signal
3. Stop Sign
4. Flashing Light
5. Yield Sign
6. Officer/Guard
7. No Passing Zone
8. RR Crossing Sign
9. RR Crossing Flashing Light
10. RR Crossing Gates
11. Stopped School Bus-Red Lights Flashing
12. Construction Work Area
13. Maintenance Work Area
14. Utility Work Area
15. Police/Fire Emergency
16. School Zone
20. Other *
LIGHT CONDITIONS
1. Daylight
2. Dawn
3. Dusk
4. Dark-Road Lighted
5. Dark-Road Unlighted
ROADWAY CHARACTER
1. Straight and Level
2. Straight and Grade
3. Straight at Hillcrest
4. Curve and Level
5. Curve and Grade
6. Curve at Hillcrest
ROADWAY SURFACE CONDITION
1. Dry
2. Wet
3. Muddy
4. Snow/Ice
5. Slush
6. Flooded
0. Other *
WEATHER
1. Clear
2. Cloudy
3. Rain
4. Snow
5. Sleet/Hail/Freezing Rain
6. Fog/Smog/Smoke
0. Other *
WHICH VEHICLE OCCUPIED
1. Vehicle No. 1
2. Vehicle No. 2
A. All-Terrain Vehicle (ATV)
B. Bicyclist
I. In-Line Skater
O. Other *
P. Pedestrian
S. Snowmobiler
POSITION IN/ON VEHICLE
1. Driver
2-7. Passengers
8. Riding/Hanging on Outside
SAFETY EQUIPMENT USED
1. None
2. Lap Belt
3. Harness
4. Lap Belt/Harness
5. Child Restraint Only
6. Helmet (Motorcycle Only)
7. Air Bag Deployed
8. Air Bag Deployed/Lap Belt
9. Air Bag Deployed/Harness
A. Air Bag Deployed/Lap Belt/Harness
B. Air Bag Deployed/Child Restraint
In-Line Skater/Bicyclist
C. Helmet Only
D. Helmet/Other
E. Pads Only
F. Stoppers Only
0. Other *
EJECTION FROM VEHICLE
1. Not Ejected
2. Partially Ejected
3. Ejected
AGE
SEX M/F
APPARENT CONTRIBUTING FACTORS
Human
2. Alcohol Involvement
3. Backing Unsafely
4. Driver Inattention/Distraction*
5. Driver Inexperience*
6. Drugs (Illegal)
7. Failure to Yield Right-of-Way
27. Failure to Keep Right
21. Fatigued/Drowsy
8. Fell Asleep
9. Following Too Closely
10. Illness
11. Lost Consciousness
12. Passenger Distraction
13. Passing or Lane Usage Improper
14. Pedestrian/Bicyclist/Other Pedestrian Error/Confusion
15. Physical Disability
16. Prescription Medication
17. Traffic Control Disregarded
18. Turning Improperly
19. Unsafe Speed
20. Unsafe Lane Changing
22. Cell Phone (hand-held)
23. Cell Phone (hands-free)
24. Other Electronic Device*
25. Outside Car Distraction*
26. Reaction to Other Uninvolved Vehicle
28. Aggressive Driving/Road Rage
Vehicular
41. Accelerator Defective
42. Brakes Defective
43. Headlights Defective
44. Other Lighting Defects
45. Oversized Vehicle
46. Steering Failure
47. Tire Failure/Inadequate
48. Tow Hitch Defective
49. Windshield Inadequate
50. Driverless/Runaway Vehicle
60. Other Vehicular*
Environmental
61. Animal's Action
62. Glare
63. Lane Marking Improper/Inadequate
64. Obstruction/Debris
65. Pavement Defective
66. Pavement Slippery
67. Shoulders Defective/Improper
68. Traffic Control Device Improper/Non-Working
69. View Obstructed/Limited
New York State
Department of Motor Vehicles
POLICE ACCIDENT REPORT
MV-104A (7/01)
*EXPLAIN IN ACCIDENT DESCRIPTION
If a question DOES NOT APPLY, enter a dash (–).
If an answer is UNKNOWN, enter an "X".
Sample
LOCATION OF MOST SEVERE PHYSICAL COMPLAINT
1. Head
2. Face
3. Eye
4. Neck
5. Chest
6. Back
7. Shoulder-Upper Arm
8. Elbow-Lower Arm-Hand
9. Abdomen - Pelvis
10. Hip-Upper Leg
11. Knee-Lower Leg-Foot
12. Entire Body
TYPE OF PHYSICAL COMPLAINT
1. Amputation
2. Concussion
3. Internal
4. Minor Bleeding
5. Severe Bleeding
6. Minor Burn
7. Moderate Burn
8. Severe Burn
9. Fracture - Dislocation
10. Contusion - Bruise
11. Abrasion
12. Complaint of Pain
13. None Visible
14. Whiplash
VICTIM'S PHYSICAL AND EMOTIONAL STATUS
1. Apparent Death
2. Unconscious
3. Semiconscious
4. Incoherent
5. Shock
6. Conscious
INJURED TAKEN
17 BY | TO 18
DIRECTION OF VEHICLE:
N NE E SE S SW W NW
Vehicle 1 19
Vehicle 1 20
Vehicle 2 21
Vehicle 2 22
Vehicle 1 23
Vehicle 2 24
PRE-ACCIDENT VEHICLE ACTION
1. Going Straight Ahead
2. Making Right Turn
16. Making Right Turn on Red
3. Making Left Turn
17. Making Left Turn on Red
4. Making U Turn
5. Starting from Parking
6. Starting in Traffic
7. Slowing or Stopping
8. Stopped in Traffic
9. Entering Parked Position
10. Parked
11. Avoiding Object in Roadway
12. Changing Lanes
13. Passing
14. Merging
15. Backing
18. Police Pursuit
20. Other *
Vehicle 1 25
Vehicle 2 26
LOCATION OF FIRST EVENT
1. On Roadway
2. Off Roadway
27
TYPE OF ACCIDENT – COLLISION WITH
1. Other Motor Vehicle
2. Pedestrian
3. Bicyclist
4. Animal
5. Railroad Train
6. In-Line Skater
7. Deer
8. Other Pedestrian
10. Other Object (Not Fixed)*
COLLISION WITH FIXED OBJECT
11. Light Support/Utility Pole
12. Guide Rail-Not At End
25. Guide Rail-End
13. Crash Cushion
14. Sign Post
15. Tree
16. Building/Wall
17. Curbing
18. Fence
19. Bridge Structure
20. Culvert/Head Wall
21. Median-Not At End
26. Median-End
27. Barrier
22. Snow Embankment
23. Earth Embankment/Rock Cut/Ditch
24. Fire Hydrant
30. Other Fixed Object*
NO COLLISION
31. Overturned
32. Fire/Explosion
33. Submersion
34. Ran Off Roadway Only
40. Other*
First Event 28
Vehicle 1 29
SECOND EVENT
Vehicle 2 30
COVER SHEET
N
8
9
10
11
12
13
14
15
16

MV-104A (7/01)

There are only 3 valid entries for injury code boxes 14, 15 and 16:

1. three dashes (-) meaning "does not apply" because no injury occurred.
2. three X's meaning that an injury did occur but its complete nature is "unknown".
3. three numeric injury codes which individually reflect the LOCATION OF MOST SEVERE PHYSICAL COMPLAINT, the TYPE OF PHYSICAL COMPLAINT and the VICTIM'S PHYSICAL AND EMOTIONAL STATUS.

The injury codes in column 14, the LOCATION OF MOST SEVERE PHYSICAL COMPLAINT, are self-explanatory. Definitions of the injury codes for columns 15 and 16 are as follows:

COLUMN 15 - TYPE OF PHYSICAL COMPLAINT: This column is used to describe the type of physical injury sustained. The following are definitions of the Types of Physical Complaints for Column 15.

1. Amputation — Severed parts.
2. Concussion —Dazed condition as the result of a blow to the head.
3. Internal — No visible injury, but signs of anxiety, internal pain and thirst.
4. Minor Bleeding — Slight discharge of blood.
5. Severe Bleeding — Steady flow of blood that is not controlled.
6. Minor Burn — Reddening of the skin.
7. Moderate Burn — Reddening, blistering of skin over large area.
8. Severe Burn — Reddening, blistering or charring of the skin over a large portion of the body.
9. Fracture — Dislocation, evidence of displacement of bones.
10. Contusion/Bruise — Discoloration.
11. Abrasion — Top layer of skin is scraped.
12. Complaint of pain — No visible injury noted, but victim complains of pain.
13. None Visible — No visible injuries, but victim is other than normal.
14. Whiplash — Complaint of neck and head pain.

Column 16 — VICTIM'S PHYSICAL AND EMOTIONAL STATUS: Column 16 is used to describe the overall condition of the injured person. A victim's status is defined as follows:

1. Apparent Death.
2. Unconscious — Victim unaware of surroundings, and does not respond to verbal or physical stimuli.
3. Semi-conscious — Victim not fully aware of surroundings.
4. Incoherent — Lacking orderly continuity of thought.
5. Shock — Depressed condition of all body functions, resulting from serious injury or incident.
6. Conscious — Normal and aware of surroundings.

COLUMN 17 — INJURED TAKEN BY: The means by which an injured person is transported to a hospital is to be recorded in Column 17. If the vehicle is an ambulance with a New York ambulance license plate, enter the license plate number. For injured persons taken for emergency medical treatment in a vehicle other than an ambulance with a NY ambulance license plate, enter the following codes in column 17:

9992 Helicopter
9993 Unknown Ambulance
9994 Coroner's Van or Municipal Emergency Equip.
9995 Private Vehicle
9996 Invalid Coach (Funeral)
9997 Fire Vehicle
9998 Police Car
9999 Police Ambulance

COLUMN 18 — INJURED TAKEN TO: See the hospital codes on the bleed-through sheet.

For additional information on filling out this form, refer to the Police Accident Report Manual (Form P-33).

New York State Department of Motor Vehicles

TRUCK and BUS SUPPLEMENTAL POLICE ACCIDENT REPORT

MV-104S (10/05)

Mail To: NYS Dept. of Motor Vehicles, Accident Records Bureau, PO Box 2084, Albany NY 12220-0084

Page of Pages

Local Codes

☐ AMENDED REPORT

INSTRUCTIONS You must complete this form:

- if at least one of the vehicles involved is:
  - a truck having a GVWR or GCWR > 10,000 lbs.; or
  - a vehicle with a Haz Mat placard; or
  - a bus designed to carry 9 or more persons, including the driver;
- AND at least one of the following conditions is met:
  - at least one person sustained fatal injuries
  - at least one person was transported for IMMEDIATE medical treatment
  - at least one vehicle is disabled and was towed/transported from the scene.

Number of:

___ Trucks having a GVWR or GCWR > 10,000 lbs.

___ Vehicles with a Haz Mat placard

___ Buses designed to carry 9 or more persons

Number of Vehicles:

___ Towed/transported from scene due to damage

Number of Persons:

___ Sustaining fatal injuries

___ Transported for IMMEDIATE medical treatment

ACCIDENT DATE Mo. | Day | Year | MILITARY TIME | COUNTY | CITY/TOWN/VILLAGE

DRIVER

DRIVER LICENSE ID # | STATE OF LIC.

DRIVER NAME - exactly as printed on license (Last, First, M.I.)

1 LICENSE CLASS: 1 A, 2 B, 3 CDL C, 4 D, 5 DJ, 6 E, 7 M, 8 MJ, 9 OTHER, 10 DM | DATE OF BIRTH Mo. Day Year | SEX 1 Male 2 Female | 7

CARRIER

CARRIER NAME

STREET OR P.O. BOX | CITY | STATE | ZIP CODE | TOTAL AXLES (includes trailers) 8

PLATE NUMBER | STATE OF REG. | CARRIER'S IDENTIFICATION NUMBERS: US DOT | ICC MC

2 WEIGHT RATING OF TRUCK POWER UNIT: 1 Less than or equal to 10,000 lbs. 2 10,001 - 26,000 lbs. 3 More than 26,000 lbs.

VEHICLE IDENTIFICATION NUMBER

3 VEHICLE CONFIGURATION

1 Bus *(seats for more than 15 people, including driver)*
2 Single-unit Truck (2-axle, 6-tire)
3 Single-unit Truck (3 or more axles)
4 Truck/Trailer
5 Truck Tractor (bobtail)
6 Tractor/Semi-trailer
7 Tractor/Doubles
8 Tractor/Triples
9 Unknown Heavy Truck, cannot classify
10 Passenger Car - only record when vehicle displays a Hazardous Material placard
11 Light truck *(van, mini-van, panel, pickup, sport utility vehicle)* only record when vehicle displays an HM placard
12 Bus *(seats for 9 - 15 people, including driver)*

9 TRAFFIC WAY

1 Two-way, not divided
2 Two-way, divided, unprotected median
3 Two-way, divided, positive median barrier
4 One-way not divided
5 Not reported

4 CARGO BODY TYPE

1 Bus *(seats for more than 15 people, including driver)*
2 Van/Enclosed Box
3 Cargo Tank
4 Flatbed
5 Dump
6 Concrete Mixer
7 Auto Transporter
8 Garbage/Refuse
9 Other
10 Grain, Chips, Gravel
11 Pole
12 Bus *(seats for 9-15 people, including driver)*

10 ACCESS CONTROL

1 No Access Control
2 Full Access Control
4 Partial Access Control

5 HAZARDOUS MATERIALS INVOLVEMENT

Does vehicle have Haz Mat placard? 1 Yes 2 No

COPY FROM PLACARD:

4-digit identification number from diamond/orange panel | 1 or 2-digit number from bottom of diamond:

NAME OF HAZ MAT CLASS:

6 WAS HAZARDOUS CARGO RELEASED FROM VEHICLE (other than fuel from fuel tank)? 1 Yes 2 No

11 SEQUENCE OF EVENTS (FOR THIS VEHICLE)

1 Ran Off Road (noncollision)
2 Jackknife (noncollision)
3 Overturn/Rollover (noncollision)
4 Downhill Runaway (noncollision)
5 Cargo Loss or Shift (noncollision)
6 Explosion or Fire (noncollision)
7 Separation of Units (noncollision)
8 Involving Pedestrian (collision)
9 Involving Motor Vehicle in Transport (collision)
10 Involving Parked Motor Vehicle (collision)
11 Involving Train (collision)
12 Involving Pedalcycle (collision)
13 Involving Animal (collision)
14 Involving Fixed Object (collision)
18 Cross Median/Centerline (noncollision)
19 Equipment Failure (noncollision) (brake failure, blown tires, etc.)
20 Other (noncollision)
21 Unknown (noncollision)
22 With Work Zone Maintenance Equipment (collision)
23 With Other Movable Object (collision)
24 With Unknown Movable Object (collision)

12 | 13 | 14

OFFICER'S RANK AND SIGNATURE | BADGE/ID NO. | NCIC NO. | DATE OF REPORT

PRINT NAME IN FULL

Appendix B Reportable Vehicle Identification Algorithm

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Trkbush
      1=truck,2=bus,3=hazplac,8=other

Vehbody
      1=POLICE VEHICLE
      2=FIRE VEHICLE
      3=CONVERTIBLE
      4=SEDAN
      5=SUBURBAN
      6=4-DOOR SEDAN
      7=2-DOOR SEDAN
      8=HOUSE ON WHEELS
      9=ALL TERRAIN VEH
      10=MOTORCYCLE
      11=HEARSE-INVALID
      12=LOCOMOTIVE
      13=CUSTOM
      14=REPLICA
      15=UNKNOWN TRUCK
      16=UNKNOWN CAR
      17=UNKNOWN VEHICLE
      18=OTHER VEHICLE
      19=OFF ROAD VEHICLE
      20=CONSTRUCTION EQUIP
      21=FARM TRACTOR
      22=AMBULANCE
      23=POWER SHOVEL
      24=ROAD BLDG MACHINE
      25=ROAD ROLLER
      26=ROAD SWEEPER
      27=SAND OR AGRICUL
      28=SNOW PLOW
      29=SNOW TRAVELER
      30=SNOWMOBILE
      31=TRACTION ENGINE
      32=TRACTOR CRANE
      33=TRUCK CRANE
      34=TRK W/SMALL WHEELS
      35=WELL DRILLER
      36=WELL SERVIC RIG
      37=FEED PROCESS MACH
      38=MOBILE CAR CRUSHER
      39=EARTH MOVER
      40=TRACTOR
      41=DELIVERY TRUCK
      42=DUMP
      43=FLAT BED TRUCK
      44=PICKUP TRUCK
      45=STAKE TRUCK
      46=TANK TRUCK
      47=REFRIGERATOR TRK
      48=TOW TRUCK
      49=VAN TRUCK
      50=UTILITY
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      51=POLE TRAILER
      52=BOAT TRAILER
      53=HOUSE TRAILER
      55=SEMI-TRAILER
      57=TRAILER
      59=LIGHT TRAILER
      60=BUS (OMNIBUS)
      61=LIMOUSINE(OMNIBUS)
      62=HEARSE(AMBULANCE)
      63=TAXI
      64=DISABLED COMMERL
      65=CEMENT MIXER
      66=MOPED
      67=DLR/TRANSPORTER
      101=PEDESTRIAN
      102=OTH PEDESTRIAN
      103=BICYCLIST
      121=LOW SPEED VEHICLE
      141=LOW SPEED TRUCK
      -2=Not Applicable
      -3=Not Entered

VIN_vehtype
      1=UNKNOWN VIN
      2=GVWR GROUP1,<10K
      6=CAMPER/MOTOR HOME
      10=MED/HVY PICKUP
      11=STEP VAN
      15=TRANSIT/COMMU BUS
      16=SCHOOL BUS
      17=X-COUN/INTCITY BUS
      18=OTHER BUS TYPE
      19=MED/HVY MOTORHOME
      20=SUT (10-19.5K)
      21=SUT (19.5-26K)
      22=SUT (>26K)
      23=TRAC/W/WOUT TRLRS
      24=TRAILER
      25=VAN,TRUCK,OR BUS

Exclude these groups from eligible vehicles:
     If vehbody in (-2,1,2,3,4,8,9,10,11,12,13,14,16,17,18,19,20,21,22,25,
     30,39,52,53,59,61,62,63,64,66,101,102,103,121) then trkbush=8; /*Other*/

/** Trucks ***************************************************************/

Trucks, based on VIN decoding:
      else if vehbody in (5) and VIN_vehtype in (21,22) then
trkbush=1;/*Truck*/
      else if vehbody in (6) and VIN_vehtype in (21,23) then trkbush=1;
      else if vehbody in (7) and VIN_vehtype in (21,22,23) then trkbush=1;
      else if vehbody in (15) and VIN_vehtype in (21,22,23) then trkbush=1;
Power shovel:
     else if vehbody in (23) and VIN_vehtype in (22) then trkbush=1;
Road Bldg Machine:
     else if vehbody in (24) and VIN_vehtype in (22) then trkbush=1;
Road Sweeper:
     else if vehbody in (26) and VIN_vehtype in (21,22) then trkbush=1;
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Sand/Agricultural truck:
     else if vehbody in (27) and VIN_vehtype in (22) then trkbush=1;
Snow Plow:
     else if vehbody in (28) and VIN_vehtype in (22) then trkbush=1;
Traction engine:
     else if vehbody in (31) and VIN_vehtype in (22,23) then trkbush=1;
Tractor crane:
      else if vehbody in (32) and VIN_vehtype in (22,23) then trkbush=1;
Truck crane:
      else if vehbody in (33) and VIN_vehtype in (21,22,23) then trkbush=1;
Truck w/small wheels:
     else if vehbody in (34) and VIN_vehtype in (21,23) then trkbush=1;
Well driller:
     else if vehbody in (35) and VIN_vehtype in (21) then trkbush=1;
Well service rig:
      else if vehbody in (36) and VIN_vehtype in (21) then trkbush=1;
Tractor:
     else if vehbody in (40) then trkbush=1;
Delivery truck:
      else if vehbody in (41) and VIN_vehtype in (11,20,21,22,23) then
      trkbush=1;
Dump:
     else if vehbody in (42) and VIN_vehtype in (20,21,22,23) then trkbush=1;
Flat bed truck:
     else if vehbody in (43) then trkbush=1;
Med/heavy pickup trucks, only if registration type indicates Commercial:
     else if vehbody in (44) and VIN_vehtype in (10,20) and regtype in (76)
     then trkbush=1;
Stake truck:
     else if vehbody in (45) and VIN_vehtype in (10,20,21,22,23) then
     trkbush=1;
Tank truck:
     else if vehbody in (46) and VIN_vehtype in (20,21,22,23) then trkbush=1;
Refrigerator truck:
     else if vehbody in (47) then trkbush=1;
Tow truck:
      else if vehbody in (48) and VIN_vehtype in (10,20,21,22,23) then
      trkbush=1;
Van truck:
      else if vehbody in (49) and VIN_vehtype in (10,11,20,21,22,23,25) then
      trkbush=1;
Utility truck:
      else if vehbody in (50) and VIN_vehtype in (10,11,20,21,22,23,25) then
      trkbush=1;
Semi-trailer:
     else if vehbody in (55) and VIN_vehtype in (21,22,23,24) then trkbush=1;
Cement mixer:
     else if vehbody in (65) then trkbush=1;
DLR/transporter:
     else if vehbody in (67) and VIN_vehtype in (22,23) then trkbush=1;

Add over-reported Fatal truck as a reportable vehicle:
      else if vehbody in (42) and VIN_vehtype =1 and crashid=32932692 and
      vehid=7654307 then trkbush=1;

/** Buses
**********************************************************************/
     else if vehbody in (5) and VIN_vehtype in (16) then trkbush=2; /* Bus */
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     else if vehbody in (6) and VIN_vehtype in (16) then trkbush=2;
     else if vehbody in (7) and VIN_vehtype in (16) then trkbush=2;
     else if vehbody in (49) and VIN_vehtype in (16) then trkbush=2;
     else if vehbody in (50) and VIN_vehtype in (16) then trkbush=2;

Buses, including GVWR<10K:
     else if vehbody in (60) and VIN_vehtype in (2,15,16,17,18,25) then
     trkbush=2;
Bus-takes all reported buses in over-reported list; decision based on VIN-
decoded Make, Model and PAR Make variables:
     else if vehbody in (60) and case_typ=1 then trkbush=2;

Add over-reported Fatal bus as a reportable vehicle:
     else if vehbody in (49) and VIN_vehtype =2 and crashid=32898503 and
     vehid=7591028 then trkbush=2;

/** Other vehicles carrying Hazmat (based on PAR Hazardous Materials
variable) **/
     else if hazmat not blank then trkbush=3; /* non-truck carrying hazmat */

     else trkbush=8; /*Other*/
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