U.S. Department of Transportation
National Highway Traffic Safety Administration

NHTSA

DOT HS 813 057

June 2022

Tribal Crash Reporting Toolkit: Quality Control Tool

DISCLAIMER

This publication is distributed by the U.S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the authors and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade or manufacturers' names are mentioned, it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

The contents of this document do not have the force and effect of law and are not meant to bind the public in any way. This document is intended only to provide clarity to the public regarding existing requirements under the law or agency policies.

Suggested APA Format Citation:

DeFisher, J., Stevens, G., Kristiansen, D., Brown, R., Benac, J., & Scopatz, R. (2022, June). *Tribal crash reporting toolkit: Quality control tool* (Report No. DOT HS 813 057). National Highway Traffic Safety Administration.

Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
DOT HS 813 057		

4. Title and Subtitle	5. Report Date
Tribal Crash Reporting Toolkit: Quality Control Tool	June 2022
	6. Performing Organization Code

7. Authors	8. Performing Organization Report No.
DeFisher, J., Stevens, G., Kristiansen, D., Brown, R., Benac, J., and Scopatz, R.	

9. Performing Organization Name and Address	10. Work Unit No. (TRAIS)
VHB Venture I 940 Main Campus Drive, Suite 500 Raleigh, NC 27606	11. Contract or Grant No. Contract DTNH22-14-D-00342L Task Order 693JJ919F000087

12. Sponsoring Agency Name and Address	13. Type of Report and Period Covered
National Highway Traffic Safety Administration 1200 New Jersey Avenue SE Washington, DC 20590	Final Report
	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

This document is the Quality Control Tool as part of the Tribal Crash Reporting Toolkit. The purpose of the Quality Control Tool is to help Tribal governments manage crash data quality in ways that meet the description from the advisory. A motor vehicle crash report describes characteristics of the crash, the vehicles, and people (drivers, occupants, and nonmotorists) involved. Quality data are necessary for developing countermeasures to decrease motor vehicle injuries and fatalities. Decision-makers use the data to perform problem identification, establish goals and performance measures, allocate resources, and support the development and evaluation of highway and traffic safety countermeasures.

17. Key Words	18. Distribution Statement
Toolkit, officer's instruction tool	Document is available to the public from the DOT, BTS, National Transportation Library, Repository & Open Science Access Portal, rosap.ntl.bts.gov.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	53	

Form DOT F 1700.7 (8-72) Reproduction of completed page authorized

Table of Contents

List of Figures

List of Tables

Abbreviations

CDIP	Crash Data Improvement Program
EMS	emergency medical services
MMUCC	Model Minimum Uniform Crash Criteria
MOU	memorandum of understanding
PDO	property damage only
VIN	Vehicle Identification Number

Introduction

The National Highway Traffic Safety Administration's *Traffic Records Program Assessment Advisory* (National Highway Traffic Safety Administration, 2018), pages 13-16, defines a formal, comprehensive data quality management program for crash data. The components of that program are:

- Automated edit checks and validation rules;
- Limited State (or Tribal)-level correction authority;
- Processes for returning rejected crash reports;
- Performance measures;
- Numeric goals;
- Performance reporting;
- High-frequency error tracking;
- Quality control reviews;
- Independent sample-based audits; and
- Periodic comparative and trend analyses.

This document is the Quality Control Tool as part of the Tribal Crash Reporting Toolkit. The purpose of the Quality Control Tool is to help Tribal governments manage crash data quality in ways that meet the description from the advisory. This tool's components have been grouped into two main categories:

1. **Quality Control Analyses.** These analyses come from expert crash data managers and reflect the noteworthy practices built up over many years to identify potential problems in the data and suggest ways to correct those problems. The analyses described here include periodic comparative and trend analyses. They are useful in calculating data quality performance measures, setting numeric goals, and reporting performance.
2. **Edit Checks.** These are the data editing and validation rules that apply to each data element and attribute collected using the Crash Reporting Tool (the fillable PDF). Every data element is defined in the Officer's Instruction Tool, the form itself, and the Database Tool. This Quality Control Tool describes how automated tools check the data for accuracy and logical consistency. They also describe how an officer and their supervisor can check to make sure the data coded on the form matches the definitions for each data element. Edit checks are a way to automate the process of returning a report to the officer or law enforcement agency for correction. Tribes can also track frequent errors to determine when a new edit check or additional training may be needed. Edit checks are also a good starting point for designing the review criteria for a sample-based audit of crash data.

Data quality management is a shared responsibility. The officer who creates the report should provide the most accurate data possible. The supervisor reinforces data quality guided by their own experience and departmental policy. The data managers examine every report before including it in the crash database. Finally, even with all the validation steps at law enforcement

agencies and data management, users may still identify errors. Users can contribute to data quality management by reporting those errors and explaining what they believe the correct information should be. Users are an important part of all crash data improvement discussions as they can communicate what data elements they need, why they need them, and how important it is for them to have high-quality data on which to base decisions.

Commitment to a comprehensive crash data quality management process includes a well-defined quality assurance process, quality control steps, and measurements of data quality. This Quality Control Tool is designed to help agencies and individuals understand and contribute to data quality management.

This tool is intended for use by Tribal crash data managers, database administrators, and analysts. Others may find useful information here, especially as the tool documents how the data are checked at the point of collection by law enforcement and as it is accepted into the database. Data users may need some of this information to tell them what each attribute means in relation to other data elements' attributes in the database.

This Tribal crash data quality tool is designed to help Tribal governments develop a more formal, comprehensive data quality management process for crash data. The first part of this data quality tool presents a series of data quality analyses and data quality measurements for use in evaluating the data in a crash system. The second part of this data quality tool provides the edit checks and validation rules for the data elements recommended in the Tribal crash data collection tool and database tool. These are the edit checks implemented in the fillable PDF crash data collection tool and they are also built into the Tribal crash database as a series of validations that run during the data ingestion process. Taken together, the document describes the parts of a data quality tool for crash data.

Crash Data Quality Control

This section describes the quality control actions for crash reporting. Every crash report completed by a law enforcement officer has three quality control steps:

1. **Officers:** The officer, who knows the crash reporting process and data element definitions, completes a crash report and verifies that the report is complete and accurate. The officer may be assisted in this quality control step by software routines that help to check for correct data in each data element and compare the values in related data elements to verify that the report information is logically consistent. These edit checks at the reporting stage may cause a warning to appear on the screen alerting the officer to any possible errors or omissions in the report. The officer can use the list of issues to either correct the data or verify that the report conveys the information about the crash in the way the officer intended.
2. **Supervisors:** Law enforcement agency supervisors are the second step in the crash data quality control process. Some agencies do not implement this step. For those agencies that do include a supervisory review as part of their quality assurance procedures, the supervisors serve to verify that officers' reports are complete, accurate, and follow the department's rules for reporting information. The supervisors may run the same edit checks as included in the crash reporting software; however, the supervisory review may go beyond the edit checks to assess reports based on a set of rules established through the supervisor's experience and departmental policy. Those rules may include things like safeguarding sensitive information and providing a clear and accurate record of the crash event. For example, a supervisor might compare the narrative and diagram to the coded portions of the form to verify that the information is logically consistent. The supervisor might also check that the narrative and diagram do not include any information (names or sensitive locations) that department policy says should be excluded from the crash report. Supervisory review may result in the crash report being returned to the officer for correction or the supervisor may send the report on for inclusion in the crash database.
3. **Data Intake:** When a crash report is submitted for inclusion in the crash database, the data managers may run it through edit and error checking routines before accepting the report into the system. If a report fails any of the edit checks, the data managers have a choice of (a) accepting the report without correction; (b) rejecting the report—i.e., sending it back to the officer without entering it into the system; or (c) correcting the report themselves and adding it to the system. The data intake process may use the same or a larger set of edit checks than the ones that are included in the crash reporting software that the officer or their supervisors use when validating a report before submission. If the data intake edit check list is larger than the one included in the officers' and supervisors' review, there is the chance that a report that succeeded in the first two quality control steps may be rejected. If the edit checks are the same in all steps, the time to manually review a crash report may be unacceptable to officers. The system managers and law enforcement personnel can strike a balance between these two possibilities by including the most important and critical edit checks in the officers' and supervisors' review and then letting the system intake process identify anything that could be fixed by data management staff or referred back to the officer only if necessary.

Quality Control Analyses

This section presents a series of analyses that a Tribal government could use in checking the quality of crash data in the Tribal Crash Database. These analyses are best run at the database level, not individual crashes. The purpose of the analyses is to identify unexpected results in the data. The analyses fall into two broad categories:

1. **Comparisons to baseline.** These usually take the form of results tables showing the percentages for each attribute of a data element for one or more prior years (baseline) compared to the current year's data. The baseline year establishes the expected percentages for each attribute (e.g., each value of Weather Conditions). The analyses compare the current year's percentages to the baseline and make it obvious if something has changed unexpectedly (e.g., there were twice as many crashes in snowy conditions than in the baseline).
2. **Data quality measurements.** These are measures of four of the six NHTSA-recommended data quality attributes: timeliness, accuracy, completeness, and uniformity. The other two attributes—integration and accessibility—are not easily measured using repeatable analyses using the multi-year database of crashes. The analyses presented here are drawn from the *Crash Data Improvement Program Guide* (Scopatz et al., 2017). Suggestions on how to measure and manage crash data quality may also be found in the NHTSA *Traffic Records Program Assessment Advisory, 2018 Edition* (National Highway Traffic Safety Administration, 2018). Some data quality measures are based on a mapping of State data to the *Model Minimum Uniform Crash Criteria (MMUCC) 5th Edition* (NHTSA, 2017).

Comparisons to Baseline

These data-quality analyses require two things: (1) one or more years of prior data to establish the baseline, and (2) current year data (year-to-date or the full year). The examples that follow assume that the Tribal government has 5 years of prior data, but even one previous year's data would work for these types of comparisons. Over time, a Tribal government can build up a multi-year crash database if it does not have one already. The analyses described in this section can become part of a monthly, quarterly, or annual review of data. One good practice is to store the queries that are used to generate the analyses so that they can be reused in the future. It should be easy to repeat these analyses with only a small number of changes each time to change the date ranges to apply for the baseline historical data and the current year-to-date.

Weather Condition Example

Table 1 shows an example comparison for data for a crash data element: **C11. Weather Condition**. This example supposes that there are 5 prior years of usable data and a partial year of current data. Because similar periods are not being compared in this example, it is best to use percentages as shown. This makes it so the comparisons are less affected by the different numbers of crashes in each year.

Table 1. Example Comparison Against Baseline Data

C11. Weather Condition*	Baseline Years (percentage)						Current	Difference (item #)
	1	2	3	4	5	Average	Year-to-Date	
01: Blowing Sand, Soil, Dirt	10	12	11	13	10	**12.4**	**16**	**3.6 (4)**
02: Blowing Snow	1	1	2	0	1	**1.2**	**1**	**-0.2 (3)**
03: Clear	50	47	52	52	55	**51.8**	**55**	**3.2 (5)**
04: Cloudy	10	11	10	11	10	**10.7**	**11**	**0.3 (3)**
05: Fog, Smog, Smoke	0	0	0	0	0	**0**	**0**	**0.0 (3)**
06: Freezing Rain or Freezing Drizzle	2	3	2	3	3	**2.8**	**3**	**0.2 (3)**
07: Rain	12	11	12	15	12	**12**	**7**	**-5.0 (5)**
08: Severe Crosswinds	7	10	5	2	2	**5.4**	**0**	**-5.4 (4)**
09: Sleet or Hail	1	1	1	1	1	**1**	**1**	**0.0 (3)**
10: Snow	6	4	5	3	5	**5.2**	**6**	**0.8 (3)**
98: Other	1	0	0	0	1	**0.2**	**0**	**-0.2 (2)**
99: Unknown	0	0	0	0	0	**0**	**0**	**0.0 (2)**
…: <missing data>	0	0	0	0	0	**0**	**0**	**0.0 (1)**

*NOTE: There are up to two responses per crash. One response is required.

In the table the Year-to-Date column has current year data (e.g., 1 month, 6 months, or whatever portion of the year's data are available in the Tribal crash database). That column is compared to the data in the column labeled "Average"—the average of the preceding 5 years of data. Behind this data table is a database capable of holding at least six years of crash data (5 prior years plus the current year). The numbers in the table are percentages and they represent the percentage of cases in each of the years that each of the attributes was coded on a crash report form. Recall that Weather Condition can be coded once or twice on each form (the data element can take up to two responses). Using percentages allows for valid comparisons across the years and between the current (partial) year and the average of the 5 preceding years.

Table 1 shows some useful comparisons for examining data quality. There are several valid ways to use this table to verify data quality and identify potential problems.
Item numbers shown in parentheses in the Difference column of the table correspond to the discussion that follows:

1. **There is zero percent missing data.** This should be true because this field is required (i.e., it cannot be left blank). If the percentage of missing data was above zero in any year, that might indicate some data quality problems including blank records, errors in data transfer, or some other issue that an analyst should examine in the database. Since it is zero percent in all years, the analysis did not find a problem.
2. **Very low or zero percent Other and Unknown.** These are both valid codes for Weather Condition, but they should only be used rarely, if at all. The fact that the percent coded Other is below one, and the percent coded Unknown is zero indicates that officers are using the Weather Condition data element as expected—they are choosing one of the 10

valid weather types and neither leaving the field blank or using one of these two non-preferred codes.

3. **Most of the attribute comparisons are close to the baseline.** The comparisons of current year to baseline percentages for attribute values 02, 03, 05, 06, 09, and 10 are all within 1 percentage point. That indicates that the data are stable across the years and that there are no surprising results in those six attributes. As a general rule of thumb, data that varies by more than 5 percent is worth examining and a difference of more than 10 percent should trigger a review to identify the causes. The concern with large variations is that something went wrong in the data and that would mean that a quality problem exists and should be corrected if possible. Even a large variation might be acceptable and the data could be correct; however, the quality control process should include a review just in case the variation does, in fact, point to a data problem.
4. **The severe crosswinds attribute indicates a problem.** In the current year, this attribute was not coded at all, while in the baseline it is coded, on average, on over 5 percent of crashes. Looking closely, there may have been a shift in how officers interpret the severe crosswinds attribute and that change may have happened in year 4 or year 5 of the baseline; however, it is quite clear that something has changed in the current year. Looking at the other wind-related attributes, 01: Blowing Sand Soil Dirt may have become the officers' preferred code as it is showing a large increase over the baseline. This example illustrates another rule of thumb for comparison analyses. Any time a frequency count or percentage drops to zero, the possibility of a data collection problem should be considered. In this example, the data would likely have been checked anyway because the change in percentages was large; however, data managers should look for any items that drop to zero unexpectedly.
5. **The use of attributes for Rain and Clear weather should be examined.** For 07: Rain, the code is used 5 percentage points less often than in the baseline. However, there could be a logical reason for this. First, since the current year's data are partial, it is possible that the rainy season is some months in the future and the percentage of crashes involving rain will increase later. Second, it is also possible that there is a drought or some other natural change in the weather that would account for the decrease. Use of the 03: Clear attribute has increased in the current year versus the baseline. This may fit with the explanation offered for the lower percentage of crashes involving rain. An analyst might check to see if there has been a change in weather patterns that would account for the data or, conversely, if there is any reason to suspect that officers might be misunderstanding the attributes of Weather Condition. This example illustrates why the rule of thumb is not absolute. Some of the elements on a crash report measure things that vary a lot from year to year. Analysts can learn through experience when to expect larger year-to-year changes and spend less time reviewing the changes in those data elements.

Based on the five items for Weather Condition, a Tribal crash data manager could take several actions. First, the consistency of several of the attributes is encouraging news. The perceived reliability of the data is increased by these findings. Second, it would be worth some effort to research why the attribute 08: Severe Crosswinds is not being coded as frequently as it was in the past, and if there was a change in years 4 and 5 of the baseline. Discussions with law enforcement officers and supervisors would help uncover any problems or changes in how officers are interpreting that attribute. Similarly, if no logical reason can be found for the

changed use of the 07: Rain and 03: Clear attributes the crash data manager could include them in the discussions with law enforcement.

If law enforcement officers *have* changed how they are interpreting some of the attributes for Weather Condition, it is up to the crash data manager and the data collectors to decide if anything should be done about it. It is possible that officers are getting it right and their choices in prior years were incorrect. It is also possible that they are not coding those attributes properly now. If so, the concerns can be addressed through training, improved instructions, and changes in supervisory review procedures.

Cargo Body Type Example

This example is here because it is the subject of one of the classic stories in crash data management and shows why it is a good idea to run a comparison of newer and older data for every data element in a crash report database. In this example, a data element attribute list changed to match the definitions in MMUCC, and, in the following year, the data managers ran their usual quality control checks of each data element and attribute of the crash report form. This example shows a year-to-year comparison to simplify the discussion and show the value of such comparisons even when limited data are available.

Table 2. Example Year-to-Year Comparison

LV9. Cargo Body Type	**Percentage**		
	Baseline	Current	Difference
00: No Cargo Body	**4**	**1**	**-3.0**
01: Bus	**5**	**6**	**1.0**
02: Auto Transporter	**3**	**3**	**0.0**
03: Cargo Tank	**6**	**5**	**-1.0**
04: Concrete Mixer	**4**	**12**	**8.0**
05: Dump	**6**	**7**	**1.0**
06: Flatbed	**8**	**9**	**1.0**
07: Garbage/Refuse	**3**	**2**	**-1.0**
08: Grain/Chips/Gravel	**5**	**4**	**-1.0**
09: Intermodal Container Chassis	**4**	**3**	**-1.0**
10: Log	**8**	**10**	**2.0**
11: Pole-Trailer	**7**	**7**	**0.0**
12: Van/Enclosed Box	**12**	**4**	**-8.0**
13: Vehicle Towing Another Vehicle	**8**	**9**	**1.0**
97: Not Applicable	**15**	**14**	**-1.0**
98: Other	**1**	**1**	**0.0**
99: Unknown	**1**	**1**	**0.0**
…: <missing data>	**0**	**0**	**0.0**

Table 2 shows example data for a year-to-year comparison between the current year and one prior year's data for **LV9. Cargo Body Type**. The example shows very few differences between the current and baseline year. Most of the differences are zero or 1 percentage point. However, two differences are worth exploring further. The values for 04: Concrete Mixer and 12: Enclosed Box have an 8-percentage-point difference between the baseline year and the current year. Additionally, the percentages for those two attributes appear to be flipped from one year to the next. When the State examined the data further, it found a potential explanation. In their old form, the numbering sequence of the two cargo body type attributes had changed. Specifically, the sequence number assigned to Van/Enclosed Box changed from 04 to 12—and Concrete Mixer changed from 12 to 04. The crash data managers spoke with law enforcement officers and found that no one had noticed the change—those who had used the old form for years *knew* the code to use for the most frequently encountered type of truck body. It was number 04 on the list. When the State implemented the new form, the officers didn't notice the change and just used the code they were used to.

Fortunately, the data analysts were able to examine the data in a quality control analysis like the one shown in the example before they published their annual crash summary for the year. They were able to correct the records. Rather than show a worrying increase in crashes involving concrete mixers, they revised the data to correctly reflect the truck cargo body types actually in the crashes. The inconsistency from one year to the next was enough to initiate a conversation, and the cause of the inconsistency was discovered. Besides correcting the data, the crash data managers sent information to officers alerting them to the coding change.

Examples Without a Baseline Comparison

Sometimes when a data element is collected for the first time or a Tribal government has no access to prior data, a baseline comparison is impossible. Crash data managers can still complete quality control analyses even as they plan for future years by creating a baseline now.

Two analyses are useful in this situation.

1. **Monthly and quarterly trends.** The crash data managers can compare monthly and quarterly totals for a current period to the preceding periods in the same year. This can be useful when, for example, the crash contributing factors and crash types are not expected to change seasonally. For other crash factors, some seasonality is expected and analysts can look at the data to see if the expected pattern is there. Analysts can examine the monthly and quarterly data to find unexpected changes in the percentages for each attribute in any data element.
2. **Logical, explainable, and expected results.** All the analyses described in this section rely on the crash data managers' and analysts' knowledge of what to expect in the Tribal crash data. Looking for any unexpected result—like a very high percentage of cement mixer-involved crashes—can help identify potential data collection issues that are worth further examination and discussion.

Data Quality Performance Measures

The NHTSA *Traffic Records Program Assessment Advisory, 2018 Edition* (NHTSA, 2018) provides examples of data quality control measurements for crash systems. These are adopted and adapted from the *Model Performance Measures for State Traffic Records Systems* (NHTSA, 2011). The *CDIP Guide* (Scoptaz et al., 2017) expands on the list of data quality performance measures to provide examples from noteworthy practices in crash data management. This section

does not repeat the information in these three documents. Instead, some detailed examples are provided showing how a Tribal crash data manager could use the data quality measurements to examine and report data quality, set targets for data quality improvements, and support constructive discussions with data collectors on how to improve the data. We encourage data managers and analysts to review the prior documents to see the full list of data quality performance measures and decide for themselves which ones would be most useful. NHTSA encourages Tribal governments to develop at least one data quality performance measure in each of the six data quality attributes of timeliness, accuracy, completeness, uniformity, integration, and accessibility. Of these, the first four are the most important to start with as they are critical for making the crash data reliable for decision making, preparing the data for integration with other datasets, and for sharing with others who may also need the data.

Table 3 shows the list of data quality performance measures described in the *CDIP Guide* (Scoptaz et al., 2017). This set includes the example measurements from the advisory. It also includes additional examples used in the CDIP program based on the work of crash data managers throughout the United States.

Tribes can adapt these example measurements to meet their needs. The remainder of this section provides tables and graphs with explanations of how a Tribal crash data manager could use the measurements.

Table 3. Crash Data Quality Performance Measures

Crash Data System Data Quality Performance Measures	
Timeliness	The number of days from the crash date to entry into the database. The percentage of crash reports entered within 30, 60, or 90 days. Timeliness of crash report submissions by law enforcement agencies. Timeliness of crash location coding. Timeliness of error correction by law enforcement agencies. Timeliness of annual release of the crash data for analytic users.
Accuracy	The percentage of crash records with no errors in critical data elements. The percentage VINs matched to the registration file. The average number of errors per crash report. The percentage of VINs decoded.
Completeness	The percentage or number of missing data elements in the database. The percentage of crash records with no missing data elements. The percentage of unknowns or blanks in critical data elements. Ratio measure of under-reporting.
Uniformity	The percentage of data elements mapable to MMUCC. Ratio measure of uniformity.
Integration	The percentage of appropriate records in the crash database that are linked to another system or file. The number of data owner agencies with signed memorandums of understanding (MOUs) or data sharing agreements allowing data linkage.
Accessibility	Satisfaction survey of data users. Web analytics of online access to crash data.

Source: Adapted from *CDIP Guide* (Scoptaz et al., 2017).

Timeliness

This data quality measurement relies on knowing two dates: the date of the crash event and the date that the data was entered into the crash database. The steps to calculate this measure are:

1. Calculate timeliness for each crash report record. For each crash event, record the difference, in days, between the crash date and date of entry into the crash database. The crash date is the actual date on which the event took place. The date of entry into the statewide crash database is the date when the record is first created in that database—this need not necessarily correspond to the date when the record is made available to users for analysis.
2. Calculate the median (or mean) number of days for a specified reporting period (e.g., monthly, quarterly, annually). For all crash records with a crash date within the specified period, calculate the mean or median number of days.

Table 4. Example of Average Timeliness

Record	Crash Date	Entry Date	Timeliness (Days)
1	4/1/2020	4/5/2020	5
2	4/2/2020	4/5/2020	3
3	4/3/2020	4/3/2020	0
4	4/3/2020	4/15/2020	12
5	4/8/2020	4/15/2020	7
6	4/9/2020	4/12/2020	3
7	4/10/2020	4/18/2020	8
8	4/11/2020	4/22/2020	11
9	4/19/2020	4/24/2020	5
10	4/24/2020	5/7/2020	12
Mean **Median**	**6.5 days** **6 days**		

Source: Updated from the *CDIP Guide* (Scoptaz et al., 2017).

Table 4 shows the data for ten crash reports in April 2020. Timeliness for each report is the difference between the date of the crash and the date the data was entered into the crash database. The mean is the sum of all the timeliness values divided by ten (the number of values). The median is found by listing all of the timeliness values from smallest to largest and finding the value in the middle of the range. Since there are ten records, the median value is halfway between the fifth and sixth largest timeliness numbers.

Table 5. Example Timeliness Data for Calculating Median and Mean

Rank	Timeliness (Days)
1	0
2	3
3	3
4	4
5	5
6	7
7	8
8	11
9	12
10	12
TOTAL	**65**

Source: Updated from the *CDIP Guide* (Scoptaz et al., 2017).

Table 5 shows the 10 values listed in increasing order. The median is the number in the middle of the distribution—so halfway between the fifth and sixth values. The fifth-largest value is 5. The sixth-largest is 7. Halfway between the two is 6 days. The table also shows the total of the 10 timeliness measures for the crash reports: 65 days. The mean is 65 divided by the number of reports (10), which is 6.5 days.

A trend line is a useful way to examine changes over time. It can show if timeliness (or any other measurement) is improving, getting worse, or staying the same. Figure 1 shows two ways to look at a trend—a bar chart of individual years, and a trend line showing combined data—in this case, a 3-year average.

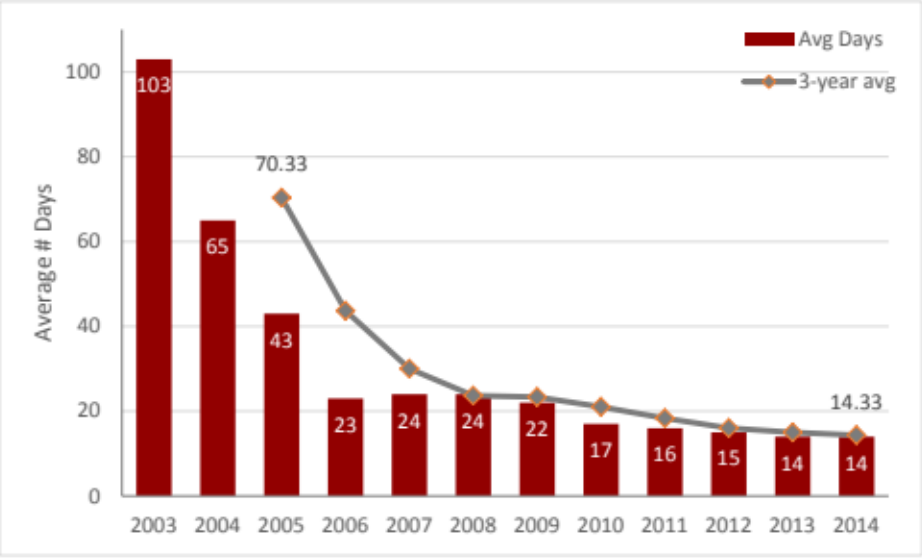

Figure 1. Example Trend Graphic of Timeliness

Source: *CDIP Guide* (Scoptaz et al., 2017).

Tribal crash data managers may want to measure each step in the process from the crash event through to final entry into the database. It is sometimes important to measure the steps in processing to pinpoint the possible causes of delay. For example, Tribal governments may want to look at timeliness of crash report submissions by law enforcement agencies to see if there are delays in turning in reports and, if so, which agencies are responsible for the delays. Similarly, the Tribal government could measure how long it takes a law enforcement agency to correct any reports that have been rejected after submission. Other delays may come from data management processes such as assigning location codes or performing quality control steps before final acceptance of a record into the database.

Accuracy

The Tribal government may consider which data elements are most important—the critical data elements—for decision making. These critical data elements could be examined for the percentage of records where there are no errors. To calculate this measure, the data analyst would review edit check results and sort reports into two types: those with no errors and those with at least one error. The percentage of reports with no errors is a good measure of overall accuracy in the database. The *CDIP Guide* (Scoptaz et al., 2017) presents an example of how to calculate this measurement. It also shows how to examine the trend over the years to see if accuracy is improving.

With the growing use of electronic crash reporting tools that include edit checks like those shown in the first part of this report, the likelihood of an error in a crash database record is decreasing. If the law enforcement agencies that submit crash reports to the Tribal government all have electronic field data collection software, the crash data manager may want to select a different accuracy measurement—one that is relevant given the data management practices that still allow for some possibility of error. The *CDIP Guide* (Scoptaz et al., 2017) shows an example related to location coding. It shows data from several law enforcement agencies and reports the percentage of crash locations that were mapped (in an agency's geographic information system or to a specific location in a linear referencing system) using either automated or manual processes. This measurement can be very useful if the data managers and analysts are trying to link crash and roadway data to assess crash factors related to roadway attributes or calculate crash rates based on traffic volume.

Completeness

The list of critical data elements is useful for measuring completeness. The crash data manager may consider a critical data element complete if the officer has used one of the allowed values, but not if the data element was left blank. The crash manager may also want to look at the percentage of cases where officers have used general-purpose codes such as "unknown" or "other" when determining if reports are complete. The *CDIP Guide* (Scoptaz et al., 2017) shows examples of completeness measurements based on missing data and the use of "unknown" as a response.

Under-reporting is another concern for data completeness. Under-reporting is when officers do not complete and submit a report for a crash when they should have—that is, the crash meets the reporting criteria, but no report was sent for inclusion in the Tribal crash database. The *CDIP Guide* (Scoptaz et al., 2017) shows an example of a ratio measurement of completeness—the measure can also be used to measure uniformity. The example is highlighted here as a useful

way of determining if reports are missing and (for uniformity) if law enforcement agencies are applying the crash reporting criteria consistently by turning in a report of every eligible crash.

This measure is calculated as the ratio of serious crashes (fatal + injury crashes) to total crashes reported. It can be calculated for the entire crash database or for individual law enforcement agencies (if more than one agency is reporting crashes). The use of this measurement requires the crash data manager to develop a reasonable expected value of the ratio. If there is no baseline, several States report a value of about 25 percent: that is, about one-quarter of all crashes involve at least one injury or fatality—the other 75 percent involve property damage only. When this measurement gets higher than 25 percent, that indicates law enforcement is under-reporting PDO crashes. Comparing among several law enforcement agencies (if relevant) is a good way to see if they are all following the crash reporting guidance for what is a "reportable" crash. Any agencies with a ratio that is either too high or too low could be contacted for a discussion about the decision to complete a crash report.

Table 6. Ratio Measure of Completeness and Uniformity

Agency	Injury Crashes	Fatal Crashes	Fatal + Injury Crashes	Total Crashes	Ratio of Fatal + Injury/Total
A	1,520	380	1,900	10,000	0.19
B	320	80	400	4,000	0.10
C	576	144	720	2,000	0.36
…					
Y	1,560	390	1,950	3,000	0.65
Z	36	9	45	900	0.05
Total	**40,000**	**6,000**	**46,000**	**200,000**	**0.23**

Source: Adapted from the *CDIP Guide* (Scoptaz et al., 2017).

Table 6 shows data for several years from an example database of crashes where several law enforcement agencies contribute to crash reports. The ratio measure shows the proportion of serious crashes over total crashes reported. The overall ratio is 0.23—which is close to the 25 percent number suggested as a reasonable expected value based on experience in the United States. The values for various example agencies are shown as instructive for examining under-reporting and inconsistent use of the crash reporting criteria. The extreme values in this table are Agency Z with a low ratio of 0.05—meaning only 5 percent of crashes involved an injury or fatality—and Agency Y with a high of 0.65. The 0.65 value is a reasonable indicator of under-reporting. It means that the law enforcement agency is experiencing serious crashes 65 percent of the time, or they are not reporting the PDO crashes as frequently as they should. The extremely low value of 0.05 may be an indication that that agency requests assistance when reporting serious crashes. This can happen when an agency asks for help from either the State Police or Patrol or if they have some other arrangement for completing crash reports when there is a need for experience with serious injuries or fatalities. In both extreme cases, however, the crash data manager may want to contact the law enforcement agency to discuss what the issues are and determine if there is an under-reporting or uniformity problem.

Uniformity

The preceding section described a ratio analysis that can be used to measure both completeness and uniform application of the crash reporting criteria. NHTSA requests all crash reporting management agencies to consider adoption of the MMUCC Guideline for data definitions. To help in this decision, NHTSA provides a MMUCC mapping that shows how well the crash report and crash database match to the data element definitions in MMUCC. If an agency is using the Tribal Crash Reporting Tool that is part of this toolkit, they are assured of mapping to the *MMUCC 5th Edition* on all of the data elements included on the form. If an agency is using some other crash reporting form or database, its data are likely to have a lower mapping score. This information can be requested through the NHTSA regional office.

Integration

Tribal crash data managers may already link crash data with other important sources of safety data including roadway, driver, vehicle, citation and adjudication, and emergency medical services (EMS)/injury surveillance data. The *CDIP Guide* includes suggested data integration measurements that a Tribal government could use to track successful data integration. One method is to take stock of how many MOUs or data-sharing agreements are in place that specifically support integrating crash data with any of the other databases. Another measurement is to look at the actual results of data integration efforts. This could include measurement of the number of crashes linked to roadway attributes and traffic volumes; the number of crash-involved drivers whose driver history records are linked to the crash data; and the number of injured crash participants (people involved in crashes) with a linked record from the EMS, emergency department, or hospital discharge records. These measures of integration are useful in showing how well the integration efforts are working. Low success levels can be examined as part of an effort to improve the linkage through better timeliness, accuracy, completeness, and uniformity or through changes in the data-sharing agreements.

Accessibility

Tribal governments may want to strictly control who can access crash data—especially the sensitive portions of the records such as personal identifiers or sensitive locations. Given that, it may seem less important to measure accessibility for Tribal crash data than it is to measure the other data quality attributes. However, if the Tribe does share its crash data with other agencies, measuring accessibility is a good way to identify needed improvements and track how the data are being used. The *CDIP Guide* includes two accessibility measures: one is survey-based and asks users of the data if they are satisfied; the other is a more automated measure of how many users have accessed the data online. Other measures are possible—for example, the Tribal crash data managers and analysts could track how many requests for data they have received and how many they have fulfilled.

Crash Data Edit Checks

This section of the Quality Control Tool presents the edit checks that apply to the data elements included in the Crash Reporting Tool. The data elements and edit checks are from the *MMUCC 5th Edition*—with some updates noted in a post-publication review. NHTSA believes this to be the most complete and accurate set of edit checks. Data elements are listed using their numbers in MMUCC. Subfields are indicated with the letter "S." Edit checks, if any, are presented in a box for each element.

An edit check may reference a data element or attribute that is *not* present in the Crash Reporting Tool. To make those edit checks more visible, they have been highlighted in yellow. Red highlighting indicates the portion of the edit check that references a specific data element or attribute that is not present in the Crash Reporting Tool.

Crash Section

C1. Crash Identifier

Edit Checks
E(C)01.01 Minimum Length: x (Tribe should set to its own minimum).
E(C)01.02 Maximum Length: n (Tribe should set to its own maximum).

C2. Crash Classification

S1. Ownership

S2. Characteristics

S3. Secondary Crash?

Edit Checks
E(C)02.01 If "C2. Crash Classification" Subfield 2, Characteristics = 01 (Trafficway, On Road) or 02 (Trafficway, Not on Road), then "V14. Trafficway Description" is a required field for each vehicle involved in the crash.
E(C)02.02 If "C2. Crash Classification" Subfield 2, Characteristics = 01 (Trafficway, On Road) or 02 (Trafficway, Not on Road), then "V15. Total Lanes in Roadway" is a required field for each vehicle involved in the crash.
E(C)02.03 If "C2. Crash Classification" Subfield 2, Characteristics = 01 (Trafficway, On Road) or 02 (Trafficway, Not on Road), then "V16. Roadway Alignment and Grade" is a required field for each vehicle involved in the crash.

C3. Crash Date and Time

S1. Crash Date and Time (YYYYMMDDHHMM)

S2. Time of Roadway Clearance (HHMM)

Edit Checks
E(C)03.01 Crash date cannot be greater than the current date.
E(C)03.02 Time fields must be in the range 0000 to 2359.
E(C)03.03 DD should not exceed the number of days in MM.
E(C)03.04 In a leap year, DD may be 1-29 if MM=02.

C4. Crash County

Edit Checks
E(C)04.01 The value of "C5. Crash City/Place (Political Jurisdiction)" must be within the boundary of the value of "C4. Crash County".
E(C)04.02 The value of "C6. Crash Location" must be within the boundary of the value of "C4. Crash County".

C5. Crash City/Place (Political Jurisdiction)

Edit Checks
E(C)05.01The value of "C5. Crash City/Place Name (Political Jurisdiction)" must be within the boundary of the value of "C4. Crash County."
E(C)05.02 The value of "C6. Crash Location" must be within the boundary of the value of "C5. Crash City/Place (Political Jurisdiction)."

C6. Crash Location

Edit Checks
E(C)06.01 Tribes should set up the minimum and maximum value for latitude and longitude based on the Tribes' boundaries.

C7. First Harmful Event

Edit Checks
E(C)07.01 If "C7. First Harmful Event" = 17 (Pedestrian) then at least one involved person must have "P4. Person Type" = 06 (Pedestrian).
E(C)07.02 If "C7. First Harmful Event" = 16 (Pedalcycle) then at least one involved person must have "P4. Person Type" = 04 (Bicyclist) or "P4. Person Type" = 05 (Other Cyclist).
E(C)07.03 If "C7. First Harmful Event" = 14 (Other Nonmotorist) then at least one involved person must have "P4. Nonmotorist Person Type" = 07 (Other Pedestrian (wheelchair, person in a building, skater, personal conveyance, etc.)), 08 (Occupant of a Nonmotor Vehicle Transportation Device), or 09 (Unknown type of Nonmotorist).
E(C)07.04 If "C7. First Harmful Event" = 12 (Motor Vehicle in Transport) or 15 (Parked Motor Vehicle) then "C9. Manner of Crash/Collision Impact" cannot be blank.
E(C)07.05 If "C7. First Harmful Event" = 15 (Parked Motor Vehicle) then "V18. Motor Vehicle Maneuver/Action" for the struck vehicle must = 09 (Parked).
E(C)07.06 If "C7. First Harmful Event" = 17 (Pedestrian), 16 (Pedalcycle), or 14 (Other Nonmotorist) then the "NM4. Nonmotorist Location at Time of Crash" cannot be blank.
E(C)07.07 If "C7. First Harmful Event" does not = 12 (Motor Vehicle in Transport) or 15 (Parked Motor Vehicle) then "C9. Manner of Crash/Collision Impact" must = 00 (Not a Collision Between Two Motor Vehicles).
E(C)07.08 If "C7. First Harmful Event" = 12 (Motor Vehicle in Transport), 15 (Parked Motor Vehicle), 19 (Strikes Object at Rest from MV in Transport) or 20 (Struck by Falling, Shifting Cargo or Anything Set in Motion by Motor Vehicle), then "C20. Number of Motor Vehicles Involved" should include a minimum of two vehicles.

C8. Location of First Harmful Event Relative to the Trafficway

Edit Checks
E(C)08.01 If "C7. First Harmful Event" = 24 (Cable Barrier), 25 (Concrete Traffic Barrier), 27 (Curb), 28 (Ditch), 29 (Embankment), 31 (Guardrail End Terminal), 32 (Guardrail Face), 38 (Traffic Sign Support), 39 (Traffic Signal Support), 41 (Utility Pole/Light Support) then "C8. Location of First Harmful Event Relative to the Trafficway" should = 01 (Gore), 03 (Median), 09 (Roadside), or 10 (Separator/Traffic Island).

C9. Manner of Crash/Collision Impact

Edit Checks
E(C)09.01 If "C7. First Harmful Event" does not = 12 (Motor Vehicle in Transport) or 15 (Parked Motor Vehicle) then "C9. Manner of Crash/Collision Impact" must =00 (Not a Collision Between Two Motor Vehicles).
E(C)09.02 If "C7. First Harmful Event" = 12 (Motor Vehicle in Transport) or 15 (Parked Motor Vehicle) then "C9. Manner of Impact" must contain values and must not = 00 (Not a Collision Between Two Motor Vehicles).
E(C)09.03 If "C7. First Harmful Event" = 99 (Unknown) then "C9. Manner of Crash/Collision Impact" must = 99 (Unknown).
E(C)09.04 If "C20. Number of Motor Vehicles Involved"= 01 then "C9. Manner of Crash/Collision Impact" must = 00 (Not a Collision Between Two Motor Vehicles).
E(C)09.05 If "V13. Direction of Travel Before Crash" contains values showing vehicles traveling the same direction, "C9. Manner of Crash/Collision Impact" cannot be any of the following: 02 (Front to Front), 06 (Sideswipe, Opposite Direction), 05 (Rear to Side), or 04 (Rear to Rear).
E(C)09.06 If "V13. Direction of Travel Before Crash" contains values showing vehicles traveling in opposing directions, "C9. Manner of Crash/Collision Impact" cannot = 03 (Front to Rear), 07 (Sideswipe, Same Direction), or 05 (Rear to Side).
E(C)09.07 If "V13. Direction of Travel Before Crash" contains values showing vehicles traveling in perpendicular directions, "C9. Manner of Crash/Collision Impact" must = 02 (Front to Front), 01 (Angle), 05 (Rear to Side), 98 (Other) or 99 (Unknown).

C10. Source of Information

S1. Source of Information

S2. Law Enforcement Agency

Edit Checks
E(C)10.01 If only law enforcement agencies are allowed to complete the form and enter data into the Tribe database, the value cannot = 02 (Civilian).

C11. Weather Conditions

(choose up to 2)

Edit Checks
E(C)11.01 If the value of "C11. Weather Conditions" = 06 (Freezing Rain or Freezing Drizzle), 07 (Rain), 09 (Sleet or Hail), or 10 (Snow), then "C13. Roadway Surface Condition" cannot = 01 (Dry).
E(C)11.02 If 03 (Clear) is selected, a second occurrence of this element should not be selected.

C12. Light Condition

NOTE: These are examples of edit checks that Tribes may want to use as a warning.

Edit Checks
E(C)12.01 If the crash occurred between 1800 and 0700 (Tribes should adjust the time period to fit their situations) and months x to y, "C12. Light Condition" should not = 01 (Daylight).
E(C)12.02 If the crash occurred between 0700 and 1500, (Tribes should adjust the time period to fit their situations) and months x to y, "C12. Light Condition" should not = any of the following: 02 (Dawn/Dusk), 03 (Dark – Lighted), 04 (Dark – Not Lighted), 05 (Dark – Unknown Lighting).

C13. Roadway Surface Condition

NOTE: These are examples of edit checks that Tribes may want to use as a warning.

Edit Checks
E(C)13.01 If the value of "C11. Weather Conditions" = 06 (Freezing Rain or Freezing Drizzle), 07 (Rain), 09 (Sleet or Hail), or 10 (Snow), then "C13. Roadway Surface Condition" cannot = 01 (Dry).

NOTE: There may be unusual circumstances, like a tunnel that remains dry even when the weather conditions differ. Tribes may want to include this edit check as a warning.

Edit Checks
E(C)13.02 If the crash occurred during May to September, the value of "C13. Roadway Surface Condition" should not = any of the following (Tribes should adjust the months to fit their situations): 02 (Ice/Frost), 06 (Slush), or 07 (Snow).

C14. Contributing Circumstances – Roadway Environment

(choose up to 2)

Edit Checks
E(C)14.01 If "C14. Contributing Circumstances – Roadway Environment" = 18 (Weather Conditions), then the value of "C11. Weather Conditions" cannot = 03 (Clear).
E(C)14.02 If "C14. Contributing Circumstances – Roadway Environment" = 00 (None), no other attributes can be selected.
E(C)14.03 If "C14. Contributing Circumstances – Roadway Environment" = 15 (Traffic Control Device), then "V17. Traffic Control Device Type" must not = 00 (No Controls).
E(C)14.04 If "C14. Contributing Circumstances – Roadway Environment" = 19 (Work Zone (construction/maintenance/utility)), then "C18. Work Zone-Related (Construction/ Maintenance/Utility)" Subfield 1 must = 02 (Yes); and Subfields 2, 3, 4, and 5 must not be blank or = 98 (Not Applicable/Not Within or Related to a Work Zone).

C15. Relation to Junction

S1. Within Interchange Area?

S2. Specific Location

Edit Checks
E(C)15.01 If "C8. Location of First Harmful Event Relative to the Trafficway" = 02 (In Parking Lane or Zone) then Subfield 1, Within Interchange Area? cannot = 02 (Yes).
E(C)15.02 If "C16. Type of Intersection" Subfield 1, Number of Approaches = 01 (Not an Intersection) then "C15. Relation to Junction" Subfield 2, Specific Location must not = 05 (Intersection or Related).
E(C)15.03 If "C16. Type of Intersection" Subfield 1, Number of Approaches does not = 01 (Not an Intersection), then "C15. Relation to Junction" Subfield 2, Specific Location must = 05 (Intersection or Related).
E(C)15.04 If "C15. Relation to Junction" Subfield 1, Within Interchange Area? = 02 (Yes), Subfield 2, Specific Location cannot = 06 (Non-Junction).
E(C)15.05 If "C15. Relation to Junction" Subfield 1, Within Interchange Area? = 01 (No), Subfield 2, Specific Location cannot = 10 (Other Location Not Listed Above Within an Interchange Area (median, shoulder and roadside)).

C16. Type of Intersection

S1. Number of Approaches

S2. Overall Intersection Geometry

S3. Overall Traffic Control Device

Edit Checks
E(C)16.01 If "C14. Contributing Circumstances – Roadway Environment" = 15 (Traffic Control Device) then "C16. Type of Intersection" Subfield 3, Overall Traffic Control Device must not = 05 (No Controls).
E(C)16.02 If "C7. First Harmful Event" = 39 (Traffic Signal Support) then "C16. Type of Intersection" Subfield 3, Overall Traffic Control Device must not = 05 (No Controls).
E(C)16.03 If any "C16. Type of Intersection" Subfield = Not Applicable/Not an Intersection then all must = Not Applicable/Not an Intersection.
E(C)16.04 If "C15. Relation to Junction" Subfield 2, Specific Location = 05 (Intersection or Related) then no "C16. Type of Intersection" Subfield can = Not Applicable/Not an Intersection.

C19. Crash Severity

Edit Checks
E(C)19.01 If attribute 01 ((K) Fatal Injury) is selected, elements "F1. Attempted Avoidance Maneuver," "F2. Alcohol Test Type and Results," and "F3. Drug Test Type and Results" must not be blank.

C20. Number of Motor Vehicles Involved

Edit Checks
E(C)20.01 If "C7. First Harmful Event" = 10 (Construction Equipment (backhoe, bulldozer, etc.), 11 (Farm Equipment (tractor, combine harvester, etc.), 12 (Motor Vehicle in Transport), 15 (Parked Motor Vehicle), 19 (Strikes Object at Rest from MV in Transport), or 20 (Struck by Falling, Shifting Cargo or Anything Set in Motion by Motor Vehicle) then "C20. Number of Motor Vehicles Involved" must = 2 or more.

C21. Number of Motorists

Edit Checks
E(C)21.01 "C21. Number of Motorists" should be greater than or = to "C20. Number of Motor Vehicles" unless "C7. First Harmful Event" = 15 (Parked Motor Vehicle) or V19 Subfield 1, Initial Point of Contact = 00 (Non-collision) or V19 Subfields 2 or 3 = 16/04 (Vehicle Not at Scene).

C22. Number of Nonmotorists

Edit Checks
There are no edit checks required for this field.

C23. Number of Non-Fatally Injured Persons

Edit Checks
E(C)23.01 "C23. Number of Non-Fatally Injured Persons" must not be greater than the sum of "C21. Number of Motorists" and the number of persons coded as Nonmotorist (04-09) in "P4. Person Type."

C24. Number of Fatalities

Edit Checks
E(C)24.01 "C24. Number of Fatalities" must not be greater than the sum of "C21. Number of Motorists" and the number of persons coded as Nonmotorist (04-09) in "P4. Person Type." E(C)24.02 If Number of Fatalities > 0, elements "F1. Attempted Avoidance Maneuver," "F2. Alcohol Test Type and Results," and "F3. Drug Test Type and Results" must not be blank.

C25. Alcohol Involvement

Edit Checks
There are no edit checks required for this field.

C26. Drug Involvement

Edit Checks
There are no edit checks required for this field.

C27. Day of Week

Edit Checks
There are no edit checks required for this field.

Crash Description (text field):

Edit Checks
There are no edit checks required for this field.

Crash Diagram (graphic):

Edit Checks
There are no edit checks required for this field.

Vehicle Section

V2. Motor Vehicle Unit Type and Number

S1. Type

S2. Number

Edit Checks
E(V)02.01 If "C7. First Harmful Event" = 12 (Motor Vehicle in Transport) then at least one involved vehicle must = "V2. Motor Vehicle Unit Type and Number" Subfield 1, Type = 01 (Motor Vehicle in Transport).
E(V)02.02 If "C7. First Harmful Event" = 15 (Parked Motor Vehicle) then at least one involved vehicle must = "V2. Motor Vehicle Unit Type and Number" Subfield 1, Type = 02 (Parked Motor Vehicle) and another vehicle in the crash must = "V2. Motor Vehicle Unit Type and Number" Subfield 1, Type = 01 (Motor Vehicle in Transport).
E(V)02.03 If "C7. First Harmful Event" = 10 (Construction Equipment (backhoe, bulldozer, etc.)) then at least one involved vehicle must have "V2. Motor Vehicle Unit Type and Number" Subfield 1, Type = 03 (Working Vehicle/Equipment) and another vehicle in the crash must have "V2. Motor Vehicle Unit Type and Number" Subfield 1, Type = 01 (Motor Vehicle in Transport).
E(V)02.04 If "V2. Motor Vehicle Unit Type and Number" Subfield 1, Type = 01 (Motor Vehicle in Transport), then "V18. Motor Vehicle Maneuver/Action" must not = 09 (Parked) for the same vehicle.
E(V)02.05 If "V2. Motor Vehicle Unit Type and Number" Subfield 1, Type = 02 (Parked Motor Vehicle), then "V18. Motor Vehicle Maneuver/Action" must = 09 (Parked) for the same vehicle.

V3. Motor Vehicle Registration State and Year

S1. Identifier

S2. Motor Vehicle Registration

Edit Checks
E(V)03.01 Motor Vehicle Registration year cannot be greater than current year.

V5. Motor Vehicle Make

Edit Checks
There are no edit checks required for this field.

V6. Motor Vehicle Model Year (YYYY)

Edit Checks
E(V)06.01 The value of "V6. Motor Vehicle Model Year" cannot exceed current year.

Note: Tribes may want to use this as a warning edit since the model year could exceed current year in some cases.

Edit Checks
E(V)06.02 If YYYY (Model Year) is not derived from VIN, compare YYYY to decoded value from "V1. Vehicle Identification Number (VIN)" position 10.

V7. Motor Vehicle Model

Edit Checks
There are no edit checks required for this field.

V8. Motor Vehicle Body Type Category

S1. Body Type Category

S2. Number of Trailing Units

S3. Vehicle Size

S4. Did this motor vehicle display a hazardous materials (HM) placard?

Edit Checks
E(V)08.01 If any value in "V8. Motor Vehicle Body Type Category" Subfield 1, 3, or 4 is one of the marked large vehicle codes (indicated by **), ["V23. Towed Due to Disabling Damage" = 02 (Towed Due to Disabling Damage) and/or (the sum of "C23. Number of Non-Fatally Injured Persons" and "C24. Number of Fatalities" is greater than 0)], then the Large Vehicle/Hazardous Materials Section must be completed. E(V)08.02 If "V8. Motor Vehicle Body Type Category" Subfield 2, Number of Trailing Units is not = 97 (Not Applicable (vehicle with no trailing units)), and the Large Vehicle Hazardous Materials section is required (see E(V)08.01), then trailing unit information in "LV2. Trailer License Plate Number", "LV3. Trailer VIN", "LV4. Trailer Make", "LV5. Trailer Model", and "LV6. Trailer Model Year". is required and must have the same number of Subfields completed (maximum of 4) as the number shown in "V8. Motor Vehicle Body Type Category" Subfield 2, Number of Trailing Units.

V9. Total Occupants in Motor Vehicle

Edit Checks
E(V)09.01 Value of "V9. Total Occupants in Motor Vehicle" must = the total number of Person Records for this vehicle number.

V18. Motor Vehicle Maneuver/Action

Edit Checks
E(V)18.01 If "V18. Motor Vehicle Maneuver/Action" = 09 (Parked), then "V2. Motor Vehicle Unit Type and Number" Subfield 1, Type must not = 01 (Motor Vehicle in Transport).

V20. Sequence of Events

(choose up to 4)

Edit Checks
E(V)20.01 If value of "V20. Sequence of Events" = 48 (Traffic Signal Support), then "V17. TCD Type" Subfield 1, TCD Type must not = 00 (No Controls). E(V)20.02 If value of "V20. Sequence of Events" = 24 (Pedalcycle), at least one "P4. Person Type" Subfield 1, Person Type in the crash must = 04 (Bicyclist) or 05 (Other Cyclist). E(V)20.03 If value of "V20. Sequence of Events" = 25 (Pedestrian), then at least one "P4. Person Type" Subfield 1, Person Type in the crash must = 06 (Pedestrian) or 07 (Other Pedestrian (wheelchair, person in a building, skater, personal conveyance, etc.)). E(V)20.04 If value of "V20. Sequence of Events" = 20 (Motor Vehicle In Transport), 23 (Parked Motor Vehicle), 28 (Struck by Falling, Shifting Cargo or Anything Set in Motion by Motor Vehicle), or 29 (Work Zone/Maintenance Equipment), then "C20. Number of Motor Vehicles Involved" must = 2 or more. E(V)20.05 If "V2. Motor Vehicle Unit Type and Number" Subfield 1, Type = 01 (Motor Vehicle in Transport) for this vehicle and any Subfield of "V20. Sequence of Events" = 20 (Motor Vehicle In Transport), then there must be another vehicle record with "V2. Motor Vehicle Unit Type and Number" Subfield 1, Type = 01 (Motor Vehicle in Transport). E(V)20.06 If "V2. Motor Vehicle Unit Type and Number" Subfield 1, Type = 01 (Motor Vehicle in Transport) for this vehicle and any Subfield of "V20. Sequence of Events" = 23 (Parked Motor Vehicle), then there must be another vehicle record with "V2. Motor Vehicle Unit Type and Number" Subfield 1, Type = 02 (Parked Motor Vehicle). E(V)20.07 If "V2. Motor Vehicle Unit Type and Number" Subfield 1, Type = 01 (Motor Vehicle in Transport) for this vehicle and any Subfield of "V20. Sequence of Events" = 29 (Work Zone/Maintenance Equipment), then there must be another vehicle record with "V2. Motor Vehicle Unit Type and Number" Subfield 1, Type = 03 (Working Vehicle/Equipment). E(V)20.08 If "V20. Sequence of Events" includes only one value in the range from 11-51 (a harmful event), then "V21. Most Harmful Event for this Motor Vehicle" must be the same as "V20. Sequence of Events".

Edit Checks
E(V)20.09 If value of "V20. Sequence of Events" = 01 (Cross Centerline), then "V14. Trafficway Description" Subfield 1, Travel Directions should = 02 (Two-Way) for this vehicle.
E(V)20.10 If value of "V20. Sequence of Events" = 02 (Cross Median), then "V14. Trafficway Description" Subfield 1, Travel Directions should = 02 (Two-Way) and Subfield 2, Divided? should = 02 (Divided, Flush Median (greater than 4ft wide)), 03 (Divided, Raised Median (curbed)), or 04 (Divided, Depressed Median).

V21. Most Harmful Event for This Motor Vehicle

Edit Checks
E(V)21.01 If "V21. Most Harmful Event for this Vehicle" = 14 (Pedalcycle), at least one "P4. Person Type" Subfield 1, Person Type in the crash must = 04 (Bicyclist) or 05 (Other Cyclist) and at least one Subfield of "V20. Sequence of Events" must = 24 (Pedalcycle).
E(V)21.02 If "V21. Most Harmful Event for this Vehicle" = 15 (Pedestrian), then at least one "P4. Person Type" Subfield 1, Person Type in the crash must = 06 (Pedestrian) or 07 (Other Pedestrian (wheelchair, person in a building, skater, personal conveyance, etc.)) and at least one Subfield of "V20. Sequence of Events" must = 25 (Pedestrian).
E(V)21.03 "V21.Most Harmful Event for this Vehicle" must = one of the subfields of "V20. Sequence of Events."

V22. Hit-and-Run

Edit Checks
E(V)22.01 "V22. Hit-and-Run" should not = 02 (Yes, Driver or Car and Driver Left Scene) for more than one vehicle record.

V23. Towed Due to Disabling Damage

Edit Checks
E(V)23.01 If any value in "V8. Motor Vehicle Body Type Category" Subfield 1, 3, or 4 is one of the marked large vehicle codes (indicated by **), and ["V23. Towed due to Disabling Damage" = 02 (Towed Due to Disabling Damage) and/or (the sum of "C23. Number of Non-Fatally Injured Persons" and "C24. Number of Fatalities" is greater than 0)], then the Large Vehicle/Hazardous Materials Section must be completed.

V24. Contributing Circumstances, Motor Vehicle

Edit Checks
There are no edit checks required for this field.

Person Section

P1. Name of Person Involved

Edit Checks
E(P)01.01 Compare to current record in the Driver License File.

P2. Date of Birth

S1. Date of Birth (YYYY/MM/DD)

S2. Age

Edit Checks
E(P)02.01 If "P4. Person Type" Subfield 1, Person Type = 01 (Driver), compare to Date of Birth in the Driver License File.

P3. Sex

Edit Checks
E(P)03.01 If "P4. Person Type" Subfield 1, Person Type = 01 (Driver), compare to current value in the Driver License File.

P4. Person Type

S1. Person Type

S2. Incident Responder?

Edit Checks
E(P)04.01 If "P4. Person Type" Subfield 1, Person Type = 04 - 09, then Nonmotorist Crash Section must be completed. E(P)04.02 If "P4. Person Type" Subfield 1, Person Type = 01 (Driver) or 02 (Passenger), then "V2. Motor Vehicle Unit Type and Number" Subfield 1, Type must = 01 (Motor Vehicle in Transport) for the vehicle number identified in "P6. Occupant's Motor Vehicle Unit Number". E(P)04.03 If "P4. Person Type" Subfield 1, Person Type = 03 (Occupant of Motor Vehicle Not in Transport), then "V2. Motor Vehicle Unit Type and Number" Subfield 1, Type must = 02 (Parked Motor Vehicle) or 03 (Working Vehicle/Equipment) for the vehicle number identified in "P6. Occupant's Motor Vehicle Unit Number".

P5. Injury Status

Edit Checks
E(P)05.01 If "P5. Injury Status" = 01 ((K) Fatal Injury), the Fatal Crash Section must be completed.

P6. Occupant's Motor Vehicle Unit Number

Edit Checks
There are no edit checks required for this field.

P11. Driver License Jurisdiction

S1. Type

S2. Name of Jurisdiction (ANSI Code)

Edit Checks
There are no edit checks required for this field.

P12. Driver License Number, Class, CDL, and Endorsements

S1. License Number

S2. Class

S3. Commercial Driver License

S4. Endorsements

Edit Checks
There are no edit checks required for this field.

P13. Speeding-Related

Edit Checks
E(P)13.01 If "P13. Speeding-Related" = 02 (Exceeded Speed Limit) then "V12. Motor Vehicle Posted/Statutory Speed Limit" must not = 97 (Not Applicable) or 99 (Unknown).

P14. Driver Actions at Time of Crash

(choose up to 4)

Edit Checks
E(P)14.01 If "P14. Driver Actions at Time of Crash" = 13 (Ran Red Light) or 14 (Ran Stop Sign) then "V17. Traffic Control Device Type" Subfield 1, TCD Type must not = 00 (No Controls).

P16. Driver License Restrictions

S1. Driver License Restrictions (choose up to 3)

S2. Alcohol Interlock Present?

Edit Checks
E(C)16.01 If "P4. Person Type" Subfield 1, Person Type = 01 (Driver), "P16. Driver License Restrictions" Subfield 1, Driver License Restrictions = 01 (Alcohol Interlock Device) and Subfield 2, Alcohol Interlock Present? = 01 (No), then "P15. Violation Codes" should not = 00 (No Violation) or 99 (Unknown).

P17. Driver License Status

S1. Type Applicable for This Person

S2. Status

Edit Checks
E(P)17.01 If "P4. Person Type" Subfield 1, Person Type = 01 (Driver) and "P17. Driver License Status" Subfield 2, Status does not = 06 (Valid License) then "P15. Violation Codes" should not = 00 (No Violation) or 99 (Unknown). E(P)17.02 If "P4. Person Type" Subfield 1, Person Type = 01 (Driver), "V8. Motor Vehicle Body Type Category" Subfield 1, Body Type Category = any of the marked commercial vehicle types (marked with **), and "P17. Driver License Status" Subfield 1, Type of Applicable for This Person does not = 03 (Commercial Driver License (CDL)) then "P15. Violation Codes" should not = 00 (No Violation) or 99 (Unknown).

P18. Distracted By

S1. Action

S2. Source

Edit Checks
E(P)18.01 If "P18. Distracted By" Subfield 1, Action = 02 (Manually Operating (texting, dialing, playing game, etc.)), then Subfield 2, Source should not = 05 (Passenger/Other Nonmotorist), 06 (External (to vehicle/nonmotorist area)) or 07 (Other Distraction (animal, food, grooming)). E(P)18.02 If "P18. Distracted By" Subfield 1, Action = 00 (Not Distracted), then Subfield 2, Source must = 97 (Not Applicable (Not Distracted)).

P19. Condition at Time of the Crash

(choose up to 2)

Edit Checks
E(P)19.01 "P19. Condition at Time of Crash" should not = 00 (Apparently Normal) as the second occurrence of this element. E(P)19.02 If first occurrence of "P19. Condition at Time of Crash" = 00 (Apparently Normal), no other attributes can be selected.

P20. Law Enforcement Suspects Alcohol Use

Note: Tribes may want to use this as a warning edit if their practices allow officers to indicate suspicion without testing the BAC.

Edit Checks
E(P)20.01 If "P20. Law Enforcement Suspects Alcohol Use" = 02 (Yes), then "P21. Alcohol Test" Subfield 1, Test Status should not = 00 (Test Not Given) or 99 (Unknown if Tested), and Subfield 2, Type of Test and Subfield 3, BAC Test Result should not = 97 (Not Applicable (Test Not Given)) or blank.

P21. Alcohol Test

S1. Test Status

S2. Type of Test

S3. BAC Test Result

Edit Checks
E(P)21.01 If "P21. Alcohol Test" Subfield 3, BAC Test Result reports a BAC test value, then "P21. Alcohol Test" Subfield 1, Test Status should not = 00 (Test not given), 02 (Test Refused), or 99 (Unknown if Tested) and "P21. Alcohol Test" Subfield 2, Type of Test must not = 97 (Not Applicable (Test Not Given)) or blank.

P22. Law Enforcement Suspects Drug Use

Edit Checks
E(P)22.01 If "P22. Law Enforcement Suspects Drug Use" = 02 (Yes), "P23. Drug Test" Subfield 1, Test Status should not = 00 (Test not given) or 99 (Unknown if Tested) and Subfield 2, Type of Test should not = 97 (Not Applicable (Test Not Given)) or blank, and Subfield 3, Drug Test Result should not = 97 (Not Applicable (Test Not Given)) or blank.

P23. Drug Test

S1. Test Status

S2. Type of Test

S3. Drug Test Result (choose up to 4)

Positive Test Results

Edit Checks
E(P)23.01 If "P23. Drug Test" Subfield 3, Drug Test Result = 01 (Negative) or 02-08, then Subfield 1, Test Status should not = 00 (Test Not Given), 02 (Test Refused), or 99 (Unknown if Tested) and Subfield 2, Type of Test should not = 97 (Not Applicable (Test Not Given)) or blank.

P24. Transported to First Medical Facility By

S1. Source of Transport to First Medical Facility

S2. Emergency Medical Services Response Agency Identifier

S3. EMS Response Run Number

S4. Medical Facility Receiving Patient

Edit Checks
E(P)24.01 If "P24. Transported to First Medical Facility By" Subfield 1, Source of Transport to First Medical Facility = 00, then "P24. Transported to First Medical Facility By" Subfields 2, 3, and 4 must be blank. E(P)24.02 If "P24. Transported to First Medical Facility By" Subfield 1 = 01-03, then "P24. Transported to First Medical Facility By" Subfields 2, 3, and 4 must include valid values.

P27. Injury Severity

Edit Checks
E(P)27.01 If "P27. Injury Severity" = 01-04, then "P25. Injury Area" should not be blank.

Roadway Section

R1. Bridge/Structure Identification Number

Edit Checks
E(R)01.01 If "C7. First Harmful Event" = 21 (Bridge Overhead Structure), 22 (Bridge Pier or Support), or 23 (Bridge Rail), "R1. Bridge/Structure Identification Number" should not be blank.

R2. Roadway Curvature

(specify up to 3)

R3. Grade

S1. Direction of Slope

S2. Percent of Slope

Edit Checks
There are no edit checks required for this field.

R4. Part of National Highway System

Edit Checks
There are no edit checks required for this field.

R5. Roadway Functional Class

Edit Checks
There are no edit checks required for this field.

R6. Annual Average Daily Traffic

S1. AADT (Year)

S2. AADT

S3. Truck (over 10,000 lbs.) Count or Percentage

S4. Motorcycle Count or Percentage

Edit Checks
There are no edit checks required for this field.

R7. Widths of Lane and Shoulder

S1. Lane Width (Width in feet)

S2. Left Shoulder Width (width in feet)

S3. Right Shoulder Width (width in feet)

Edit Checks
There are no edit checks required for this field.

R8. Width of Median

Edit Checks
E(R)8.01 If "C8. Location of First Harmful Event Relative to Trafficway" = 03 (Median), then "R8. Width of Median" should not be blank.

R9. Access Control

Edit Checks
There are no edit checks required for this field.

R10. Railway Crossing ID

Edit Checks
E(R)10.01 If "R10. Railway Crossing ID" must = 0000000, nnnnnnA, or 9999999; where n is a number and A is a capital letter. E(R)10.02 If "C15. Relation to Junction" Subfield 2, Specific Location = 07 (Railway Grade Crossing) then "R10. Railway Crossing ID" should not be blank or 0000000.

R11. Roadway Lighting

Edit Checks
E(R)11.01 If "C12. Lighting Condition" = 03 (Dark-Lighted) then "R11. Roadway Lighting" must not = 03 (No Lighting).

R12. Pavement Markings, Longitudinal

S1. Edgeline Presence/Type

S2. Centerline Presence/Type

S3. Lane Line Markings

Edit Checks
There are no edit checks required for this field.

R13. Presence/Type of Bicycle Facility

S1. Facility

S2. Signed Bicycle Route

Edit Checks
There are no edit checks required for this field.

R14. Mainline Number of Lanes at Intersection

Edit Checks
There are no edit checks required for this field.

R15. Cross-Street Number of Lanes at Intersection

Edit Checks
There are no edit checks required for this field.

R16. Total Volume of Entering Vehicles

S1. AADT (Year)

S2. AADT

Edit Checks
E(R)16.01 If "C15. Relation to Junction" Subfield 2, Specific Location = 00 (Not an Interchange Area) then "R16. Total Volume of Entering Vehicles" Subfield 2, Specific Location should be blank.

Fatal Section

F1. Attempted Avoidance Maneuver

Edit Checks
E(F)01.01 If "P14. Driver Actions at Time of Crash" does not = 99 (Unknown), then "F1. Attempted Avoidance Maneuver" must not = 00 (No Driver Present/Unknown if Driver Present).
E(F)01.02 If "V18. Motor Vehicle Maneuver/Action" is not blank or 99 (Unknown), "F1. Attempted Avoidance Maneuver" must not = 00 (No Driver Present/Unknown if Driver Present).
E(F)01.03 If "V9. Total Occupants in Motor Vehicle" = 0, then "F1. Attempted Avoidance Maneuver" must = 00 (No Driver Present/Unknown if Driver Present).

F2. Alcohol Test Type and Results

S1. Test Type

S2. Test Result

Edit Checks
E(F)02.01 If "F2. Alcohol Test Type and Results" Subfield 1, Test Type does not = 00 (Test Not Given), then Subfield 2, Test Result should not be blank.
E(F)02.02 If "F2. Alcohol Test Type and Results" Subfield 1, Test Type does not = 00 (Test Not Given), then Subfield 2, Test Result must not = 996 (Test Not Given).
E(F)02.03 If "F2. Alcohol Test Type and Results" Subfield 1, Test Type = 00 (Test Not Given), then Subfield 2, Test Result must = 00 (Test Not Given).

F3. Drug Test Type and Results

S1. Test Type

S2. Test Result

Edit Checks
E(F)03.01 If "F3. Drug Test Type and Results" Subfield 1, Test Type does not = 00 (Test Not Given), then Subfield 2, Test Result should not be blank.
E(F)03.02 If "F3. Drug Test Type and Results" Subfield 1, Test Type does not = 00 (Test Not Given), then Subfield 2, Test Result must not = 000 (Test Not Given)
E(F)03.03 If "F3. Drug Test Type and Results" Subfield 1, Test Type = 00 (Test Not Given), then Subfield 2, Test Result must = 000 (Test Not Given).
E(F)03.04 If "F3. Drug Test Type and Results" Subfield 1, Test Type = 99 (Unknown if Tested), then Subfield 2, Test Result must = 999 (Unknown if Tested).

Large Vehicle and Hazardous Material Section

LV1. Commercial Motor Vehicle License Status and Compliance With CDL Endorsements

CMV License Status

Compliance with CDL Endorsement

Edit Checks
E(LV)01.01 If "LV1. CMV License Status and Compliance with CDL Endorsements" Subfield 1, CMV License Status = 07 (Valid) then "P12. Driver License Number, Class, CDL and Endorsements" Subfield 3, Commercial Driver License (CDL) must = 02 (Yes) and "P17. Driver License Status" Subfield 1, Type Applicable for This Person must = 03 (Commercial Driver License (CDL)). E(LV)01.02 If "LV1. CMV License Status and Compliance with CDL Endorsements" Subfield 2, Compliance with CDL Endorsement = 00 (No Endorsement Required for the Vehicle), then "LV8. Vehicle Configuration" Subfield 1, Vehicle Configuration must not = 03 (Bus (seats more than 15 occupants, including driver), 09 (Truck Tractor/Double), or 10 (Truck Tractor/Triple), "LV9. Cargo Body Type" must not = 03 (Cargo Tank), "LV10. Hazardous Materials (HM) (Cargo Only)" Subfield 1, Hazardous Materials ID must = 0000 (No HM Placard Displayed), and "V8. Motor Vehicle Body Type Category" Subfield 1, Body Type Category of this vehicle must not = 24 (School Bus).

LV7. Motor Carrier Identification

S1. Identification Type

S2. Country/State Code

S3. Identification Number

S4. Name

S5. Motor Carrier Address

S6. Type of Carrier

Edit Checks
There are no edit checks required for this field.

LV8. Vehicle Configuration

S1. Vehicle Configuration

S2. Special Sizing (choose up to 4)

S3. Permitted?

Edit Checks
E(LV)08.01 If trailer information is provided in LV2-LV6 and LV11, then "LV8. Vehicle Configuration" Subfield 1, Vehicle Configuration must = 06 (Truck Pulling Trailer), 08 (Truck Tractor/Semi-Trailer), 09 (Truck Tractor/Double), or 10 (Truck Tractor/Triple).
E(LV)08.02 If "LV8. Vehicle Configuration" Subfield 1, Vehicle Configuration = 02 (Bus/Large Van (seats for 9-15 occupants, including driver)) or 03 (Bus (seats more than 15 occupants, including driver)), then "LV9. Cargo Body Type" must = 01 (Bus) and "V8. Motor Vehicle Body Type Category" Subfield 1, Body Type Category of this vehicle must = 20-27 (bus attributes).

LV9. Cargo Body Type

Edit Checks
E(LV)09.01 If trailer information is provided in LV2-LV6 and LV11, then "LV9. Cargo Body Type" must not = 00 (No Cargo Body (bobtail, light MV with hazardous materials [HM] placard, etc.)).

LV10. Hazardous Materials (Cargo Only)

S1. Hazardous Materials ID

S2. Hazardous Materials Class

S3. Release of hazardous materials from a cargo compartment (e.g., trailer), cargo container (e.g., tank) or from a package?

Edit Checks
E(LV)10.01 If "LV10. Hazardous Materials (Cargo Only)" Subfield 1, Hazardous Material ID = 0000 (No HM Placard Displayed), then Subfield 2, Hazardous Material Class must = 00 (No HM Placard Displayed).
E(LV)10.02 If "LV10. Hazardous Materials (Cargo Only)" Subfield 1, Hazardous Material ID does not = 0000 (No HM Placard Displayed), then "LV7. Motor Carrier Identification" Subfield 1, Identification Type should = 01 (US DOT Number).

Nonmotorist Section

NM1. Unit Number of Motor Vehicle Striking Nonmotorist

Edit Checks
There are no edit checks required for this field.

NM2. Nonmotorist Action/Circumstance Prior to Crash

S1. Action/Circumstance

S2. Origin/Destination

Edit Checks
There are no edit checks required for this field.

NM3. Nonmotorist Contributing Action/Circumstance

(choose up to 2)

Edit Checks
E(NM)03.01 If "NM3. Nonmotorist Contributing Action/Circumstances" = 01 (Dart/Dash), then "NM2. Nonmotorist Action/Circumstance Prior to Crash" should = 02 (Crossing Roadway). E(NM)03.02 If "NM3. Nonmotorist Contributing Action/Circumstances" = 06 (Improper Passing) or 07 (Improper Turn/Merge), then "P4. Person Type" Subfield 1, Person Type must = 04 (Bicyclist) or 05 (Other Cyclist).

NM4. Nonmotorist Location at Time of Crash

Edit Checks
E(NM)04.01 If "NM4. Nonmotorist Location at Time of Crash" = 01 (Intersection – Marked Crosswalk), 02 (Intersection – Unmarked Crosswalk) or 03 (Intersection – Other) and "C7. First Harmful Event" = 14 (Other Nonmotorist), 16 (Pedalcycle), 17 (Pedestrian), then "C16. Type of Intersection" Subfields 1, 2, and 3 should not = 01 (Not an Intersection) and "C15. Relation to Junction" Subfield 2, Specific Location = Intersection or Related. Subfield 1, Facility must not = 00 (None) or 99 (Unknown). E(NM)04.02 If "NM4. Nonmotorist Location at Time of Crash" = 08-13 "R13. Presence/Type of Bicycle Facility "Subfield 1, Facility must not = 00 (None) or 99 (Unknown). E(NM)04.03 If "NM4. Nonmotorist Location at Time of Crash" = 01 (Intersection – Marked Crosswalk), 02 (Intersection – Unmarked Crosswalk) or 03 (Intersection – Other), then "R14. Mainline Number of Lanes at Intersection" and "R15. Cross-Street Number of Lanes at Intersection" must not be blank or 00 (Not an Intersection or Interchange).

NM5. Nonmotorist Safety Equipment

(choose up to 5)

Edit Checks
E(NM)05.01 If any "NM5. Nonmotorist Safety Equipment" = 00 (None) or 99 (Unknown) then only that one value may be selected and the other 4 fields must be blank.

Summary

This tool is intended for use by Tribal crash data managers, database administrators, and analysts. Others may find useful information here, especially as the tool documents how the data are checked at the point of collection by law enforcement and as it is accepted into the database. Data users may need some of this information to tell them what each attribute means in relation to other data elements' attributes in the database.

This Tribal crash data quality tool is designed to help Tribal governments develop a more formal, comprehensive data quality management process for crash data. The first part of this data quality tool presents a series of data quality analyses and data quality measurements drawn from the *CDIP Guide*. These can be part of a formal, comprehensive data quality management process. Tribes can calculate the values of the data quality measurements they select and, as part of that formal process, they can set targets for what levels of quality they would like to achieve. Those targets take the form of target values for each of the quality measurements. Tribes can also create their own data quality measurements to supplement or replace the ones described here.

The second part of this data quality tool provides the edit checks and validation rules from the *MMUCC 5th Edition* for the data elements recommended in the Tribal crash data collection tool and database tool. These are the edit checks implemented in the fillable PDF crash data collection tool and they are also built into the Tribal crash database as a series of validations that run during the data ingestion process. Tribes that are not using those tools may still benefit from the application of edit checks like those presented in the first section. If the submitting law enforcement agencies do not have data collection software with built-in edit checking, it is even more important that the database validations are programmed to review each crash as it is accepted into the system. When crash reports fail an edit check, it will be up to the crash data manager and the law enforcement agencies to negotiate a report rejection and correction process. As noted in the second part of this tool, it may also be important to track the timeliness of those corrections.

If a Tribal government is starting from a position of not yet having data (i.e., there is no baseline database) and does not yet measure the quality of their crash data, the following are considerations on how to proceed:

1. **Analyze the data in all data elements.** The section on comparisons to baseline assumes there is at least one prior year of data. However, Tribes can start with just the current year's data and run an analysis of every data element in the database to see what values are being recorded and judge if the pattern of data makes sense. Later, with more years of data available, the comparisons to a baseline will become possible and the Tribe can examine changes over time to see if there is anything unexpected as each new year's data are submitted.
2. **Formal data quality management starts with data quality measurement.** The crash data manager and other stakeholders can decide which are the most useful data quality measurements and which data elements are critical. Adapting a small set of important data quality measurements is a good way to get started and provides the Tribe with a foundation to build on in the future.
3. **Repeated measurements are more useful than one-time efforts.** As the Tribal crash data manager and analyst work out which data quality measurements to adopt, one

important consideration is how best to sustain the effort. Starting with a small set of the most important measurements will help make the effort easier to keep going. A willingness to revise measurements and drop those that are not useful is also important. Finally, making sure to document the analyses and save the analysis definitions (the queries) will help to make the process more routine and more efficient in the future. Investing in user-friendly analytic tools should help make this easier as well.

Tribal governments can adapt this tool to their own use. If the Tribe collects additional data elements, changes some of the validation rules, or creates new data quality procedures and measurements, they can create their own version of this tool as part of their crash system documentation. The information can also be valuable when developing training or updating the instructions for officers on how to complete a crash report.

References

National Center for Statistics and Analysis. (n.d.) *National Center for Statistics and Analysis (NCSA) Motor Vehicle Traffic Crash Data Resource Page* (Web portal). https://crashstats.nhtsa.dot.gov/#/

National Highway Traffic Safety Administration. (2011, February). *Model performance measures for state traffic records systems* (Report No. DOT HS 811 441). https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/811441

National Highway Traffic Safety Administration. (2017, July). *MMUCC guideline: Model minimum uniform crash criteria*, fifth edition, 2017 (Report No. DOT HS 812 433). https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812433

National Highway Traffic Safety Administration (2018, August). *Traffic records program assessment advisory*, 2018 edition (Report No. DOT HS 812 601). https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812601

Scopatz, R., Brown, R., Zhou, Y., Benac, J., Peach, K., Bryson, M., & Lefler, N. (2017, December). *Crash data improvement program guide* (Report No. DOT HS 812 419). National Highway Traffic Safety Administration. https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812419

DOT HS 813 057
June 2022

U.S. Department
of Transportation

**National Highway
Traffic Safety
Administration**

15059-061622-v4