Data Quality Measures for ICD-10-CM Hospitalizations and ED Visits

The intended audience of this document is epidemiologists beginning to work with ICD-10-CM coded data. **This document is based on the 2016 release of the ICD-10-CM implemented on October 1, 2015 and may not apply to subsequent releases.**

Background materials on ICD-10-CM for injury surveillance can be found at:
- Proposed ICD–10–CM Surveillance Case Definitions for Injury Hospitalizations and Emergency Department Visits: https://www.cdc.gov/nchs/data/nhsr/nhsr100.pdf
- Safe States ISW9 - The Transition from ICD-9-CM to ICD-10-CM: Guidance for Analysis and Reporting of Injuries by Mechanism and Intent: http://c.ymcdn.com/sites/www.safestates.org/resource/resmgr/isw9/ISW9_FINAL_Report.pdf
- Proposed Framework for Presenting Injury Data using ICD-10-CM External Cause of Injury Codes: https://www.cdc.gov/injury/wisqars/pdf/icd-10-cm_external_cause_injury_codes-a.pdf
- Proposed Framework for Presenting Injury Data Using the International Classification of Diseases, Tenth Revision, Clinical Modification (ICD–10–CM) Diagnosis Codes https://www.cdc.gov/nchs/data/nhsr/nhsr089.pdf

The following measures are important for assessing data quality in ICD-10-CM hospitalizations and ED visits:

1. **Percent of injury records for which the principal diagnosis code is a truncated version of an ICD-10-CM injury diagnosis code** (i.e., the code does not match a Centers for Medicaid and Medicare Services (CMS) billable code; the code does not include all the characters found in the full injury diagnosis code)

   Issue/Impact: For reimbursement, hospitals should be using the full version of the ICD-10-CM code when submitting administrative files to CMS for reimbursement. However, for the first year of the transition, CMS accepted shortened versions of the code (see https://www.cms.gov/Medicare/Coding/ICD10/Clarifying-Questions-and-Answers-Related-to-the-July-6-2015-CMS-AMA-Joint-Announcement.pdf)[1]

   "Truncated" codes might not contain all the information typically available in the full code. The concept behind "truncation" is that the code does not include all the characters needed to fully describe the injury. For example, for the injury diagnosis of "a puncture wound with foreign

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[1] In July 2015, the Centers for Medicare & Medicaid Services and the American Medical Association announced a claims payment review leniency policy that would be operative during the 12-month period after the October 1, 2015, implementation of the ICD-10-CM/PCS coding system. This policy guarantees that no Medicare fee-for-service claims billed under the Part B physician fee schedule will be denied on the basis of the specificity of the ICD-10-CM/PCS diagnosis codes if the claim includes a valid ICD-10-CM/PCS code that falls within the correct three-character category. Although the leniency policy was designed to avoid interruptions in the receipt of payments during the transition to the new coding system, the implication of this policy on research involves the accuracy of ICD-10-CM/PCS codes for certain claims that fall between October 2015 and October 2016. The first three characters of the code, which represent clinically related conditions, must be valid. Therefore, researchers can be confident in the accuracy of the broader conditions (known as "family of codes") that these claims represent. However, some variation in the fourth through seventh characters could occur. Therefore, this policy might limit the level of specificity that can be reliably reported within this 1-year time frame.

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body of unspecified part of head", the correctly assigned CMS billable code would be "S01.94X", however, some hospitals might assign "S01.9" which is not a complete code. The S01.9 code is for the broad "family of codes" for "Open wound of unspecified part of head" but doesn't provide the full detail contained in the "S01.94X" code.

The suggested way to calculate the percentage of truncated codes is to check the codes against the list of CMS billable codes (a link to the complete set of codes is provided below) and determine whether there are codes that do not match. For the purpose of this data quality measure, codes that lack a 7th character indicating the type of encounter (i.e., initial, subsequent or sequelae as described in Measure 4 below) are not considered a truncated code. For the codes that do not match the CMS billable codes, check whether the initial characters (the first 3-4 characters, not including the decimal) look like a shortened version of a "full" ICD-10-CM code. If so, then the code is possibly a truncated code.

Knowing whether truncated codes are found in the principal diagnosis field informs the analyst about the level of detail available in the data. Additionally, if the full code is used for case selection, truncated codes might not be recognized when selecting cases, which could lead to an underestimate in the number of injury records identified.

As mentioned above, the issue of truncated codes should have been resolved by October 1, 2016, when the leniency period of CMS accepting shortened versions of the codes ended.

How to assess:
   a. Select any record with a principal diagnosis code found on Table 1.
   b. Compare the codes to those in the list of CMS billable codes (see https://www.cms.gov/Medicare/Coding/ICD10/2016-ICD-10-CM-and-GEMs.html and select the 2016 Code Descriptions in Tabular Order) (for records with a discharge date between Oct 1, 2015 through Sept 30, 2016). From the zip file, select the file "ICD10cm_codes_2016.txt" for the list of CMS billable codes.
   c. Identify and review the codes that do not match the CMS list. For the purpose of this data quality measure, codes that lack a 7th character indicating the type of encounter (i.e., initial, subsequent or sequelae) are not considered a truncated code. Do the codes that do not match a CMS billable code look like a truncated code?
   d. Determine the percent of records from step "a" that have truncated codes in the principal diagnosis field.
   e. Review trends by quarter or month. Does the percent decrease over time? (i.e., is this a temporary problem that occurred early in the transition or is this an on-going issue throughout the first year of the transition?).

2. **Percent of injury records for which the first listed external cause of injury code is a truncated version of an ICD-10-CM external cause of injury code.** (i.e., the code does not contain all of the characters in the full ICD-10-CM external cause of injury code)

   Issue/Impact: This concept is the same as that in measure 1 but with a focus on the external cause of injury codes. "Truncated" codes might not contain all the information typically available in the full code. Thus, knowing whether truncated codes are found in the first listed external cause of injury code informs the analyst about the level of detail available in the data. Also, assignment of records to the appropriate cell of the proposed ICD-10-CM external cause matrix

for reporting injuries by mechanism and intent of injury is based on the full ICD-10-CM code. For example, use of the NCHS SAS programs for applying the proposed ICD-10-CM external cause matrix requires the full code; truncated codes might not be recognized. This could lead to inaccurate assignment or failure to assign a record to a given cell of the external cause matrix, resulting in an underestimate in the number of records in a given mechanism/intent category.

How to assess:
   a. Select any record with a principal diagnosis code found on Table 1.
   b. Identify the first listed external cause of injury code for each record. External cause of injury codes for injury surveillance purposes are shown in Table 2.
   c. Compare the first listed external cause of injury codes to those in the list of CMS billable codes.
   d. Identify and review the codes that do not match the CMS billable codes. For the purpose of this data quality measure, codes that lack a 7th character indicating the type of encounter (i.e., initial, subsequent or sequelae) are not considered a truncated code. Do the codes that don't match a CMS billable code look like a truncated code?
   e. Determine the percent of records from step "a" that have an external cause of injury code (step "b"). Of the records that have an external cause of injury code, what percent have a truncated code?
   f. Review trends by quarter or month. Does the percent decrease over time? (i.e., is this a temporary problem that occurred early in the transition or is this an on-going issue throughout the first year of the transition?)

3. **Frequency distribution of the 7th character of the injury diagnosis code in the principal diagnosis field**

   Issue/impact: In ICD-10-CM, a 7th character in the injury diagnosis code is used to identify the type of encounter when the diagnosis was made. The type of encounter character specifies whether the injury diagnosis is related to the initial encounter (a 7th character of A, B, or C), a subsequent encounter (7th character of D through R), or sequelae of a previous injury (7th character of S). The 7th character is required for all S codes and all T codes except T07, T14 and T30-T32[2]. The ICD-10-CM injury surveillance case definitions for hospitalizations and ED visits focuses on records for which the 7th character indicates an initial encounter or for which the 7th character is missing. Prior to applying the proposed case definition, the analyst should determine the frequency distribution of the 7th character of the injury diagnosis code in the principal diagnosis field to have an understanding about which records might be excluded in the case selection process.

   How to assess:
   a. Select any record with a principal diagnosis code found on Table 1.
   b. Parse the 7th character from the injury diagnosis code.
   c. Determine the frequency distribution of the 7th characters. The 7th characters can be grouped by type of encounter (i.e., group the values A through C as initial encounters, D

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[2] Beginning with the 2018 release of ICD-10-CM implemented on Oct 1, 2017, all T codes other than T30-T32 are required to have a 7th character indicating the type of encounter.

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through R as subsequent encounters, S as sequelae, and values other than A through S as missing a 7th character).

d. Remember to consider that some diagnosis codes (T07, T14 and T30-32) are not required to have a 7th character for type of encounter. Records with these codes in the principal diagnosis field might be found in the category for "missing a 7th character" and should be excluded from the calculation of the percent of records for which the 7th character is missing.

e. Review trends by quarter or month. Does the percent of records for which the 7th character of the principal injury diagnosis code is missing decrease over time? (i.e., is this a temporary problem that occurred early in the transition or is this an on-going issue throughout the first year of the transition? Theoretically, the percent missing should decrease over time).

4. **Frequency distribution of the 7th character of the first listed external cause of injury code**

   Issue/impact: This concept is the same as in measure 3, with the focus on the external cause of injury codes. In ICD-10-CM, a 7th character in the external cause of injury code is used to identify the type of encounter (A for initial encounter, D for subsequent encounter and S for sequelae). External cause of injury codes with a 7th character of S for sequelae are excluded from the CDC proposed ICD-10-CM external cause matrix.

   How to assess:
   a. Select any record with a principal diagnosis code found in Table 1.
   b. Identify the first listed external cause of injury code for each record. External cause of injury codes for injury surveillance purposes are shown in Table 2.
   c. Parse the 7th character from the first listed external cause of injury code.
   d. Determine the frequency distribution of the 7th characters.
   e. Take into account that T14.91 is not required to have a 7th character for type of encounter.[3] Records with T14.91 as the first listed external cause of injury code might be found in the category for "missing a 7th character" and should be excluded from the calculation of the percent of records for which the 7th character is missing.
   f. Review trends by quarter or month. Does the percent of records for which the 7th character of the first listed external cause of injury code is missing decrease over time? (i.e., is this a temporary problem that occurred early in the transition or is this an on-going issue throughout the first year of the transition? Theoretically, the percent missing should decrease over time).

5. **Percent of injury records that have an external cause of injury code**

   Issue/impact: To understand the results from application of the proposed ICD-10-CM external cause matrix, it is important to know what percent of the injury records have an external cause of injury code. Injury cases that lack an external cause of injury code will not be assigned to a cell in the matrix.

   How to assess:
   a. Select any record with a principal diagnosis code found in Table 1.

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[3] Beginning with the 2018 release of ICD-10-CM implemented on Oct 1, 2017, T14.91 is required to have a 7th character indicating the type of encounter.

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b. Determine the percent of injury records that have a "valid" external cause of injury code (a code from Table 2 in any field).
c. Compare to historical trends seen with ICD-9-CM coded data. Is the percent of injury records that have an external cause of injury code similar to that seen historically with ICD-9-CM coded data?

6. **Percent of injury records for which the first listed external cause of injury code is in the "unspecified" mechanism category of the external cause matrix**

Issue/impact: In addition to determining whether an injury record has an external cause of injury code, it's also important to assess whether the codes that are present are useful for determining the mechanism of injury involved. Records assigned an "unspecified" external cause of injury code provide limited information. If the percent of injury records assigned an "unspecified" external cause of injury code is high, it may be difficult to use the data for injury surveillance and prevention purposes.

How to assess:
a. Select any record with a principal diagnosis code found in Table 1.
b. Determine the percent of injury records that have a "valid" external cause of injury code (a code from Table 2 in any field).
c. For all injury records (whether or not an external cause of injury code is found), determine the percent of records for which the first listed external cause of injury code is X58XXX, T14.91, Y09, Y38.80X, Y35.91X, Y35.92X, Y35.93X, or Y37.90X.
d. Of those records with a valid external cause of injury code, determine the percent of records for which the first listed external cause of injury code is X58XXX, T14.91, Y09, Y38.80X, Y35.91X, Y35.92X, Y35.93X, or Y37.90X.

Table 1: Diagnosis codes*

S00-S99	Anatomic injuries
T07-T34	Foreign bodies, burns, corrosions, frostbite
T36-T50 with a <u>6th character</u> of 1, 2, 3, or 4 Note: Include T36.9, T37.9, T39.9, T41.4, T42.7, T43.9, T45.9, T47.9, and T49.9 with a <u>5th character</u> of 1, 2, 3, or 4 (Intent information for these codes is included in the 5th character and not the 6th)	Poisoning by drugs, medicaments, and biological substances (Includes accidental, intentional self-harm, assault, and underdetermined intents; Excludes adverse effects and underdosing)
T51-T65	Toxic effects of substances nonmedicinal as to source
T66-T76	Other and unspecified effects of external causes
T79	Certain early complications of trauma, not elsewhere classified
O9A.2-O9A.5	Traumatic injuries and abuse complicating pregnancy, childbirth, and the puerperium
T84.04**	Periprosthetic fracture around internal prosthetic joint
M97**	Periprosthetic fracture around internal prosthetic joint

*7th character of A, B, C, or missing (reflects initial encounter, active treatment). T30-T32 do not have a 7th character.

** T84.04 was retired and replaced by M97 in the FY2017 version of ICD-10-CM which went into effect on Oct 1, 2016.

Table 2: Codes that contain external cause of injury information (The subset of T, V, W, X, and Y codes* found in the ICD-10-CM external cause matrix)

V00-V99	Transport accidents
W00-X58	Other external causes of accidental injury
X71-X83	Intentional self-harm
X92-Y09	Assault
Y21-Y33	Event of undetermined intent
Y35-Y38	Legal intervention, operations of war, military operations and terrorism
T14.91	Suicide attempt
T15-T19	Effects of foreign body entering through natural orifice
T36-T50 with a <u>6th character</u> of 1, 2, 3, or 4 Note: Include T36.9, T37.9, T39.9, T41.4, T42.7, T43.9, T45.9, T47.9, and T49.9 with a <u>5th character</u> of 1, 2, 3, or 4 (Intent information for these codes is included in the 5th character and not the 6th)	Poisoning by drugs, medicaments, and biological substances
T51-T65	Toxic effects of substances chiefly non-medicinal as to source
T71	Asphyxiation
T73	Effects of deprivation
T74, T76	Adult and child abuse, neglect, and other maltreatment, confirmed or suspected
T75.0, T75.1, T75.2, T75.3	Effects of lightning, unspecified effects of drowning, effects of vibration, motion sickness

*7th character of A or missing (reflects initial encounter, active treatment)

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