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Immunization Information Systems for a New Era

National Set of Error Codes

Background

Release 1.5 of the National HL7 Implementation Guide (IG) documents how to return errors generated while receiving and processing VXU or QBP messages. The ERR segment is used to exchange error related data and contains several relevant fields:

- ERR-2 (Error Location) indicates the location of the error in the incoming message. The location of the error is specified to the appropriate level of granularity, including down to the subcomponent level (see definition of the ERL data type for additional details).
- ERR-3 (HL7 Error Code) indicates the nature of the HL7 (communication) error. Typically, these errors relate to issues with the format and technical content of the message rather than the clinical data in the message.
- ERR-4 (Severity) indicates if the error code being returned is informational, a warning or an error. The severity specifies the nature of the expected action in response to the error.
- ERR-5 (Application Error Code) indicates the nature of the error that occurred. Typically, these errors relate to issues with the clinical or administrative content of the message. Often, these errors are the result of applying local business rules to the data in the message.
- ERR-8 (User Message) transmits a text to further explain the nature of the error.

The IG defines six application error codes belonging to HL7 Table 0533 for use in ERR-5. However, community implementation and enhancement of acknowledgement and response messages has revealed the need for additional application error codes. Several jurisdictions have begun to expand the error value set, however, in the absence national level coordination; the same error code has been defined multiple ways in different jurisdictions. This creates implementation hurdles for vendors and organizations operating in multiple jurisdictions.

Scope of Guidance

In Scope

This document is a companion document to the spreadsheet that catalogs additional application error codes. It outlines the creation, management and use of national level error codes. The definition and use of additional national application level error codes will ensure that vendors and organizations operating across jurisdictional lines will receive consistent error content from trading partners, opening the door to more automated routing and handling of error conditions.

Out of Scope

ERR-3 is used to message HL7 (communication) error codes. This field uses the values in HL7 Table 0357. Because this table is “HL7 Defined” (as opposed to “User Defined” as Table 0533 is), we do not have the

ability to extend the error codes used in ERR-3 in the IG or this document. Fortunately, the existing error codes are more comprehensive and better fulfill the needs of immunization error messaging. If the need for additional ERR-3 codes is uncovered during implementations, we will work with HL7 to extend Table 0357 in the base standard.

The list of national application error codes does not include a “generic” error to be used when a specific error code has not been defined. This is because the Usage of ERR-5 in Release 1.5 is “RE” (required but may be empty) and thus population of ERR-5 is not required. No benefit was seen to using a generic error code relative to simply leaving ERR-5 empty. See below for the expectations of a system when a suitable error code is not available.

Derivation of Nationally Defined Application Error Codes

Release 1.5 of the National HL7 Implementation Guide (IG) includes a list of six application error codes in Table 0533:

- 1 – Illogical Date Error
- 2 – Invalid Date
- 3 – Illogical Value Error
- 4 – Invalid Value
- 5 – Table Value Not Found
- 6 – Required Observation Missing

As well, an example message includes a seventh error code:

- 7 – Required Data Missing

This set of seven error codes is insufficient to convey the variety of errors that may be encountered when processing VXU and QBP messages. To identify additional common error scenarios, we reviewed the list of application errors provided by several IIS vendors and IIS implementations. From these lists, we identified common error scenarios and documented them in the accompanying error spreadsheet. In the spreadsheet, each error scenario is assigned an error code and is classified into one of a number of general classes:

- Existing (error codes documented in Release 1.5)
- Conflicting Data (data within a single message is internally inconsistent)
- Inappropriate Date
- Invalid Data
- Lookup (an expected record cannot be found based on data in the message)
- Message Construction (structural issues based on local business rules)
- Missing Data
- Processing Error
- Data Sharing

The spreadsheet also provides guidance on the parts of the message an error applies to, a typical actor and action for resolving the error and where appropriate, a pointer to a specific requirement of the Release 1.5 IG underlying the error.

Expectations for Error Generating Systems

Systems that generate ERR segment containing ACK and RSP messages (i.e. IIS) should incorporate the nationally defined error code into ERR-5 and not create their own local codes when the relevant error scenario is encountered. However, systems are not be expected to be able identify all listed error scenarios. In other words, an IIS will not be expected to perform all of the checks and validations required to identify every error scenarios, however, if local business logic identifies an error scenario for which a national error code is defined, the IIS should use the national error code in ERR-5 in place of a locally defined code. Implementation of the use of the national error codes should happen as soon as time permits as systems:

- Upgrade their ACK/RSP messaging capabilities
- Implement new data quality checks and validations (i.e. recognize new error conditions)
- Implement expanded error reporting

If a system that generates errors is capable of identifying an error scenario that is not part of the national error code list, it is expected that the owners of the system will contact AIRA to work with them to define a suitable national error code. AIRA will work quickly with all interested parties to document new error codes to ensure that specific error reporting can be implemented promptly. In order to avoid overlapping with errors in other jurisdictions, systems should not generate locally defined error codes.

Expectations for Error Receiving Systems

Systems that receive ERR segments in ACK and/or RSP messages (i.e. IIS submitters such as EHRs and pharmacies) should gracefully accept any error code in ERR-5. Note that “gracefully” handling an unexpected error code may simply consist of populating a generic work queue for manual error investigation and resolution. Similarly, if ERR-5 is not populated with an error code, the receiving system should be prepared to accept the message.

Before taking more advanced error resolution actions based on the ERR-5 error code, the owners of a system must be confident that the trading partner generating error contain messages is adhering to the use of the nationally defined error codes. If the trading partner is redefining any nationally defined error codes, inappropriate action may be taken, potentially resulting in negative data quality and patient care consequences.

Summary

The definition and implementation of an expanded set of nationally defined application error codes for use in ERR-5 has the potential to automate error response handling and resolution in clinical systems. All systems are highly encouraged to adopt the expanded set of error codes and curtail the use of locally defined codes.