NJHIN HL7 Message Acknowledgement & Error Handling

About This Document

This document describes HL7 acknowledgement and error handling for messages flowing through New Jersey Health Information Network (NJHIN). Unless superseded by different information in the Use Case document(s), information in this document is to be treated as the default. As a hub of a network of networks, NJHIN will pass back all acknowledgements and error messages from destination systems. This document only describes the cases when NJHIN is the destination system, the final destination/receiver system is not accessible (i.e. the system is not responsive or is down), or a few other limited use cases. This document is a combination of NJHIN concepts and NJIIS Immunization Registry documentation found at NJIIS_intfc_specs_HL7_251. For additional information and details please refer to the NJIIS Website and the NJIIS_intfc_specs_HL7_251 document found on the Documents page.

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Intended Audience

This is a highly technical document that is intended to be used by HL7 technical or interface staff. It assumes extensive HL7 knowledge.

Version History

This document is updated from time to time. The current version is always posted at NJII.COM/NJHIN. Information for this work was copied from NJIIS public domain documents and is not intended as a personal work product. NJII is a State recognized entity and partner and has access and usage of their public domain information.

1.0   3/20/2017   Initial Draft

MSA – Message Acknowledgement Segment

SEQ	Element Name	Data Type	Value Set	CDC IG Cardinality	NJIIS IMS Cardinality	CDC IG Usage	NJIIS IMS Usage	Conditional Predicate
1	Acknowledgment Code	ID	0008	[1..1]	[1..1]	R	R	
2	Message Control ID	ST		[1..1]	[1..1]	R	R	
3	Text Message	ST		[0..0]	[0..0]	X	X	
4	Expected Sequence Number	NM		[0..1]	[0..0]	O	X	
5	Delayed Acknowledgment Type			[0..1]	[0..0]	O	X	
6	Error Condition	CE		[0..0]	[0..0]	X	X	

MSA Field Usage Notes

MSA-1 Acknowledgment Code (ID)
This field contains an acknowledgment code, see message processing rules. **This is a required field.** Refer to HL7-defined Table 0008 – Acknowledgement Code in Appendix A of this document for values supported by the NJIIS IMS. The NJIIS IMS will value this field with one of the NJIIS IMS supported values.

MSA-2 Message Control ID (ST)
This field contains the Message Control ID of the message sent by the sending system. **This is a required field.**

It allows the sending system to associate this response with the message for which it is intended. This field echoes the Message Control ID sent in MSH-10 by the initiating system. Therefore, the NJIIS IMS will value MSA-2 in the ACK message with what was provided in the MSH-10 of the corresponding VXU message.

Error Handling

If the VXU is processed successfully, the NJIIS IMS sends an ACK response. MSA-1 will be valued with "AA" indicating that the VXU was successful and did not contain any errors.

If there are only non-fatal errors in the VXU message, the NJIIS IMS sends an ACK response with a MSA-1 value of "AE". The ACK will contain an ERR segment (one for each non-fatal error) that provides information about the error, such as the error location and the type of error.

If a fatal error occurs during processing, the NJIIS IMS sends an ACK response with a MSA-1 value of "AR" indicating the VXU message was rejected due to fatal errors. The ACK will contain an ERR segment (one for each fatal error) that provides information about the error, such as the error location and the type of error.

The NJIIS IMS will transmit the patient's NJIIS Registry ID (if available) back to the HL7 Data Exchange Partner in an ACK response. The NJIIS Registry ID (if available) will be returned in Diagnostic Information (ERR-7) field, where the HL7 Error Code (ERR-3) is set to "0" (Message Accepted), Severity (ERR-4) is set to "I" (Information) and Application Error Parameter (ERR-6) is set to "NJIIS_REGISTRY_ID".

ERR – Error Segment

Error Segment in ACK

The ERR segment is used to add error comments to acknowledgment messages.

SEQ	Element Name	Data Type	Value Set	CDC IG Cardinality	NJIIS IMS Cardinality	CDC IG Usage	NJIIS IMS Usage	Conditional Predicate
1	Error Code and Location	ELD		[0..0]	[0..0]	X	X	
2	Error Location	ERL		[0..1]	[0..1]	RE	RE	
3	HL7 Error Code	CWE	0357	[1..1]	[1..1]	R	R	
4	Severity	ID	0516	[1..1]	[1..1]	R	R	
5	Application Error Code	CWE	0533	[0..1]	[0..1]	O	O	
6	Application Error Parameter	ST		[0..1]	[0..1]	O	O	
7	Diagnostic Information	TX		[0..1]	[0..1]	O	O	
8	User Message	TX		[0..1]	[0..1]	O	O	
9	Inform Person Indicator	IS		[0..1]	[0..0]	O	X	
10	Override Type	CWE		[0..1]	[0..0]	O	X	
11	Override Reason Code	CWE		[0..1]	[0..0]	O	X	
12	Help Desk Contact Point	XTN		[0..1]	[0..0]	O	X	

ERR Field Usage Notes

ERR-2 Error Location (ERL)
The NJIIS IMS will value this field with the location of the error within the VXU message. Each error will have an ERR, so no repeats are allowed on this field. This field will only be empty if location is not meaningful (e.g., unidentifiable).
ERR-2 will be formatted as follows:
• The 1st component contains the Segment ID
• The 2nd component contains the Segment Sequence
• The 3rd component contains the Field Position

• The 4th component contains the Field Repetition
• The 5th component contains the Component Number
Example for ERR-2 if PID-5 (Patient Name) was not valued:
ERR||PID^1^5^1|
If PID-3 was valued with |**12345^^^325^MR~202729^^^NJIIS^**|, then ERR-2 would be valued as
follows to indicate the error is in the 2nd repetition of PID-3.5 of the 1st (only) PID segment:
ERR||PID^1^3^2^5|

Code	Text	Description
100	Segment sequence error	The message segments were not in the proper order or required segments are missing.
101	Required field missing	A required field is missing from the segment.
102	Data type error	The field contained data of the wrong data type, e.g., a NM (number) field contained letters of the alphabet.
103	Table value not found	A field of data type ID or IS was compared against the corresponding table and no match was found.
200	Unsupported message	The message type is not supported.
203	Unsupported version ID	The Version ID is not supported.

Refer to HL7 Table 0357 – Message Error Condition Codes within the CDC IG for all valid values.

Example:
ERR||PID^1^7^1|102^data type error^HL70357|

ERR-4 Severity (ID)
The NJIIS IMS will value this field with one of the following HL7-defined Table 0516 – Error Severity
Code in appendix A of this document:
• "W" (Warning) if the error was non-fatal; non-fatal errors may result in loss of data.
• "E" (Error) if the error was fatal.
• "I" (Information) if any information needs to be conveyed.

ERR-5 Application Error Code (CWE)
If meaningful to help identify the specific error that occurred, the NJIIS IMS will value this field with
one of the application specific error codes from User-defined Table 0533 – Application Error Code in
Appendix A of this document.
Example:
ERR||PID^1^7^1|102^data type error^HL70357|E|BadDateTime^^HL70533|

Example for ERR-2 if PID-5 (Patient Name) was not valued:
ERR||PID^1^5^1|
If PID-3 was valued with |**12345^^^325^MR~202729^^^NJIIS^**|, then ERR-2 would be valued as follows to indicate the error is in the 2nd repetition of PID-3.5 of the 1st (only) PID segment:
ERR||PID^1^3^2^5|

Message Acknowledgement (ACK)

Overview

ACK in Response to a VXU Message
The NJIIS IMS will always respond with an ACK to an HL7 2.5.1 VXU message sent by an HL7 Data Exchange Partner, regardless of whether that VXU was sent to report, update, or delete an immunization.
If the VXU is processed successfully, the NJIIS IMS sends an ACK response. MSA-1 will be valued with "AA" indicating that the VXU was successful and did not contain any errors.
If there are only non-fatal errors in the VXU message, the NJIIS IMS sends an ACK response with a MSA-1 value of "AE". The ACK will contain an ERR segment (one for each non-fatal error) that provides information about the error, such as the error location and the type of error.
If a fatal error occurs during processing, the NJIIS IMS sends an ACK response with a MSA-1 value of "AR" indicating the VXU message was rejected due to fatal errors. The ACK will contain an ERR segment (one for each fatal error) that provides information about the error, such as the error location and the type of error.
The NJIIS IMS will transmit the patient's NJIIS Registry ID (if available) back to the HL7 Data Exchange Partner in an ACK response. The NJIIS Registry ID (if available) will be returned in Diagnostic Information (ERR-7) field, where the HL7 Error Code (ERR-3) is set to "0" (Message Accepted), Severity (ERR-4) is set to "I" (Information) and Application Error Parameter (ERR-6) is set to "NJIIS_REGISTRY_ID".

It is highly recommended that the HL7 Data Exchange Partner store the NJIIS Registry ID, returned by the NJIIS IMS, in their system with the patient record and include that NJIIS Registry ID in future VXU and QBP messages to decrease the time that it takes for the NJIIS IMS to process and respond to the messages, as well as increase the likelihood that a patient match will be found.
Under certain circumstances, a patient's NJIIS Registry ID may change. The NJIIS IMS will always send the surviving NJIIS Registry ID in the ACK response message; therefore, the NJIIS Registry ID returned by the NJIIS IMS within the ACK may be different from the NJIIS Registry ID that the HL7 Data Exchange Partner submitted in the VXU message. The HL7 Data Exchange Partner's system should replace its existing NJIIS Registry ID reference with the new NJIIS Registry ID that was communicated within the ACK message.

In the ACK message, ERR segment containing fatal errors will be returned first, followed by ERR segments containing non-fatal errors, then followed by ERR segment containing NJIIS registry ID.

Value	Description	Comment
AA	Application Accept	Successful Processing – No Errors
AE	Application Error	Non-Fatal Processing Error
AR	Application Reject	Fatal Processing Error

ACK Message Segments

MSH – Message Header Segment

Table 6-6-1 Message Header Segment (MSH)

SEQ	Element Name	Data Type	Value set	CDC IG Cardinality	NJIIS IMS Cardinality	CDC IG Usage	NJIIS IMS Usage	Conditional Predicate
1	Field Separator	ST		[1..1]	[1..1]	R	R	
2	Encoding Characters	ST		[1..1]	[1..1]	R	R	
3	Sending Application	HD	0361	[0..1]	[1..1]	RE	R	
4	Sending Facility	HD	0362	[0..1]	[1..1]	RE	R	
5	Receiving Application	HD	0361	[0..1]	[1..1]	RE	RE	
6	Receiving Facility	HD	0362	[0..1]	[0..1]	RE	RE	
7	Date/Time Of Message	TS		[1..1]	[1..1]	R	R	
8	Security	ST		[0..1]	[0..0]	O	X	
9	Message Type	MSG		[1..1]	[1..1]	R	R	
10	Message Control ID	ST		[1..1]	[1..1]	R	R	
11	Processing ID	PT		[1..1]	[1..1]	R	R	
12	Version ID	VID		[1..1]	[1..1]	R	R	
13	Sequence Number	NM		[0..1]	[0..0]	O	X	
14	Continuation Pointer	ST		[0..1]	[0..0]	O	X	
15	Accept Acknowledgement Type	ID	0155	[0..1]	[1..1]	RE	RE	
16	Application Acknowledgment Type	ID	0155	[0..1]	[1..1]	RE	RE	
17	Country Code	ID		[0..1]	[0..0]	O	X	
18	Character Set	ID		[0..1]	[0..0]	O	X	
19	Principal Language Of Message	CE		[0..1]	[0..0]	O	X	
20	Alternate Character Set Handling Scheme	ID		[0..1]	[0..0]	O	X	
21	Message Profile Identifier	EI		[0..*]	[0..*]	C(R/O)	I	

Non-supported segments (Optionality of "X") will be ignored by the NJIIS IMS. All other fields are described in the Field Usage Notes that follow.

A usage of "I" indicates that, while the field is "R", "RE", or "C(a/b)" per the CDC IG , the NJIIS IMS ignores the field in a VXU.

MSH Field Usage Notes

MSH-1 Field Separator (ST)
This field contains the separator between the segment ID and the first real field, Encoding Characters (MSH-2). As such it serves as the separator and defines the character to be used as a separator for the rest of the message. **This is a required field. The NJIIS IMS will value this field with the required value which is |** (ASCII 124).
Example:
MSH**|**
↑

> Special characters that are utilized within HL7 messages as separators (also referred to as delimiters) should not be included within those same HL7 messages as data because their presence would interfere with the parsing of the message. If an HL7 message does contain one of these special delimiter characters as part of the message content (e.g., an ampersand as part of an address: "Apt. A & B"), then the HL7 Data Exchange Partner must utilize a special escape sequence to indicate that the character is a text character and not a delimiter content (e.g., "Apt. A\T\B" to represent "Apt. A & B"); otherwise, the NJIIS IMS cannot distinguish between the delimiter character and a character that is part of the text.
>
> In order to include any one of these special characters as data within an HL7 message, those characters must be converted into a predefined sequence of characters that begin and end with the escape character "\". HL7 Data Exchange Partners should utilize the following table to convert special characters into escape sequences when creating messages *sent to* the NJIIS IMS and to convert escape sequences to special characters when parsing messages *coming from* the NJIIS IMS.

Special Character Description	Special Character	Escape Sequence
Escape character	\	\E\
Field separator	|	\F\
Repetition separator	~	\R\
Component separator	^	\S\
Subcomponent separator	&	\T\

MSH-3 Sending Application (HD)
This field uniquely identifies the sending application. This is not the product, but rather the name of the specific instance. **This is a required field.**
The NJIIS IMS will not maintain a list of IIS applications in the CDC IG's User-defined Table 0361 and, therefore, will not limit MSH-3.1 values to the CDC IG's User-defined Table 0361 value set. The NJIIS IMS will value MSH-3.1 with "NJIIS".
Example:

MSH|^~\&|**NJIIS**|

MSH-4 Sending Facility (HD)
This field identifies the organization responsible for the operations of the sending application. **This is a required field.**
The NJIIS IMS will not maintain a list of facilities/Provider IDs in the CDC IG's User-defined Table 0362 and, therefore, will not limit MSH-4.1 values to the CDC IG's User-defined Table 0362 value set. The NJIIS IMS will value MSH-4.1 with "NJDOH".
Example:
|**NJDOH**|

MSH-5 Receiving Application (HD)
This field uniquely identifies the receiving application. This is not the product, but rather the name of the specific instance.
The NJIIS IMS will not maintain a list of IIS applications in the CDC IG's User-defined Table 0361 and, therefore, will not limit MSH-5.1 values to the CDC IG's User-defined Table 0361 value set.
The NJIIS IMS will value MSH-5.1 in the ACK message with what was provided in MSH-3.1 of the corresponding VXU or QBP message.

MSH-6 Receiving Facility (HD)
This field identifies the organization responsible for the operations of the receiving application.
The NJIIS IMS will not maintain a list of facilities/Provider IDs in CDC IG's User-defined Table 0362 and, therefore, will not limit MSH-6.1 values to the CDC IG's User-defined Table 0362 value set.
The NJIIS IMS will value MSH-6.1 in the ACK message with what was provided in MSH-4.1 of the corresponding VXU or QBP message.

MSH-7 Date/Time Of Message (TS)
This field contains the date/time that the sending system created the message. **This is a required field.**
The degree of precision should be to the second. The time zone must be specified and will be used throughout the message as the default time zone. When the time zone is not included, it is presumed to be the time zone of the sender.

The expected format is YYYYMMDDHHMMSS.
Milliseconds and Time zone values are Optional.
For example formats including milliseconds and time zones are:
YYYYMMDDHHMMSS.SSSS or YYYYMMDDHHMMSS.SSSS+/-ZZZZ.
Example:
|**20120204030159**|
This represents February 4, 2012 at 3:01:59.
Additional precision as specified in the Date/Time (DTM) HL7 data type, if sent, will be accepted. If the Date/Time of Message is not sent or is invalid (i.e., not a valid date or not in the correct format), a fatal error will be reported.

MSH-9 Message Type (MSG)
This field contains the message type, trigger event, and the message structure ID for the message.
This is a required field. All three components are required.
When sending an ACK, **the NJIIS IMS will value MSH-9 with: |ACK^V04^ACK|**
The NJIIS IMS will value **the following required components**:

• **MSH-9.1** Message Type with **ACK**

• **MSH-9.2** Trigger Event with **V04**

• **MSH-9.3** Message Structure ID with **ACK**

MSH-10 Message Control ID (ST)

This field contains the identifier assigned by the sending application (MSH-3) that uniquely identifies a message instance. This identifier is unique within the scope of the sending facility (MSH-4), sending application (MSH-3), and the YYYYMMDD portion of message date (MSH-7). **This is a required field.**
The NJIIS IMS will value MSH-10 in the ACK message with what was provided in the MSH-10 of the corresponding VXU message.

MSH-11 Processing ID (PT)

This field is used to decide whether to process the message as defined in HL7 Application (level 7) Processing rules. **This is a required field.**
Refer to HL7-defined Table 0103 – Processing ID in Appendix A of this document for values supported by the NJIIS IMS.
The NJIIS IMS will value MSH-11 in the ACK message with what was provided in the MSH-11 of the corresponding VXU message.

MSH-12 Version ID (VID)

This field contains the identifier of the version of the HL7 messaging standard used in constructing, interpreting, and validating the message. **This is a required field.**
Only the first component needs to be populated. **When sending a 2.5.1 message, the NJIIS IMS will value MSH-12 with: |2.5.1|**

MSH-15 Accept Acknowledgment Type (ID)

This field identifies the conditions under which accept acknowledgments are required to be returned in response to this message. Required for enhanced acknowledgment mode. Refer to HL7-defined Table 0155 – Accept/Application Acknowledgment Conditions in Appendix A of this document for values supported by the NJIIS IMS.
Accept acknowledgement indicates if the message was safely received or not. It does not indicate successful processing. Application acknowledgement indicates the outcome of processing.
Since the NJIIS IMS does not expect nor require the HL7 Data Exchange Partner to send an acknowledgment in response to an ACK message, the NJIIS IMS will value **MSH-15 with: |NE|.**

MSH-16 Application Acknowledgment Type (ID)

This field contains the conditions under which application acknowledgments are required to be returned in response to this message. Required for enhanced acknowledgment mode. Refer to HL7-defined Table 0155 – Accept/Application Acknowledgment Conditions in Appendix A of this document for values supported by the NJIIS IMS. If MSH-15 (Accept Acknowledgment Type) and MSH-16 (Application Acknowledgment Type) are omitted (or are both empty), the original acknowledgment mode rules are used. This means that, unless otherwise specified, the receiving application will send acknowledgment when it has processed the message.

Since the NJIIS IMS does not expect nor require the HL7 Data Exchange Partner to send an acknowledgment in response to an ACK message, the NJIIS IMS will value **MSH-15 with:** |**NE**|.

NJHIN ERROR HANDLING- SUBMISSIONS

Queuing, Replaying and Alerts:

Queuing messages are used in a situation where a message is sent to a destination and no ACK is received back from destination system. Rhapsody will automatically queue the undelivered messages and will continue to retry sending the messages every 5 minutes for 24 hours. After 24 hours an alert is generated notifying stakeholders that the receiving system is unresponsive.

Replaying messages are used in a situation where it may be required to initiate a replay of messages based on a date range or other criteria. The current NJ Rhapsody message store is set to 30 days. The Rhapsody archive can be searched and messages replayed directly using the web management console.

Alerts are generated if an inbound connection is idle for more than one hour. The idle time can be adjusted as required. As soon as the receiving connection has been reestablished and messages are being received the alert state is cleared

Troubleshooting Submission of Messages

Production Support

	Severity Levels			
	1	*2*	*3*	*4*
Description	*Critical Impact/ System Down:* Business critical software is down or critical interface has failed. The issue is impacting all production systems, causing all participating organizations' or other organizations' ability to function to be unusable.	*Significant Business Impact:* Software component severely restricted. Entire organization is unable to continue business functions, causing all communications and transfer of messages to be halted.	**Partial Failure or Downtime:** Program is useable and less significant features unavailable. The service is online, though may not working as intended or may not currently working as intended or may not currently be accessible, though other systems are currently available.	**Minimal Business:** A non-critical software component is malfunctioning, causing minimal impact, or a test system is down.
Example	All messages to and from NJHIN are unable to be sent and received, let alone tracked	NJHIN cannot communication (send or receive) messages between single or multiple participating organizations, but can still successfully communicate with other organizations.	Messages are lost in transit, messages can be received but not transmitted.	Additional feature requested.
Primary Initiation Method	*Phone:* (TBD)	*Phone:* (TBD)	Web form at http://NJII.com/NJHIN	Web form at http://NJII.com/NJHIN
Secondary Initiation Method	Web form at http://NJII.com/NJHIN	Web form at http://NJII.com/NJHIN	Email to http://NJII.com/NJHIN	Email to http://NJII.com/NJHIN
Tertiary Initiation Method	Email to http://NJII.com/NJHIN	Email to http://NJII.com/NJHIN	N/A	N/A
Initial Response	Within 2 hours	Within 2 hours	1 business day	1 business day
Resolution Goal	24 hours	24 hours	3 business days	7 business days

If you are experiencing difficulties or have questions, please contact the NJHIN Help Desk:
- http://NJII.com/NJHIN
- Phone: TBD
- Monday – Friday TBD