South Carolina

Immunization Registry

HL7 Immunization Implemntation

GUIDE

Preface

This guide is intended for immunization providers and their vendors to assist in connecting to the South Carolina Immunization Registry (SCI Registry). The specifications documented here supports automated exchange of data between the SC Immunization Information Registry and outside systems, making client's immunization records available in both places while avoiding the need to enter data twice. It covers only a small subset of the very extensive HL7 standard. Files of messages constructed from the guidelines in this document will fall within the HL7 standard, but there are a wide variety of other possible HL7 messages that are outside the scope of this document. Electronic Health Record (EHR) systems that comply with Stage 1 Meaningful Use requirements must be able to submit immunization administration data to their state registry. This document explains the technical details of this interface. The recommendations here are in line with CDC and HL7 standards and should be compatible with EHR's who are following Meaningful Use guidelines.

Introduction

The South Carolina Immunization Registry (SCI Registry) has made available an interactive user interface (CARES-IS) for authorized users to enter, query, and update client immunization records. The Users interface makes SC Immunization Registry information and functions available on desktops around the state. However, some immunization providers already store and process similar data in their own information systems and may wish to keep using those systems while also participating in the statewide Immunization Registry. Others having billing needs and do not want to enter data into two diverse systems. The SC Immunization Information system (SCI-RegEx) allows immunization providers to use the HL7 Version 2.3.1, 2.4 and Version 2.5.1 to submit client immunization information to the South Carolina Immunization Registry. Query and other bidirectional interface options will be developed soon and will be documented in an updated version of this document.

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The Health Level Seven (HL7) Standard

The ANSI HL7 standard is widely used for data exchange in the health care industry. The full standard is quite lengthy, covering a variety of situations in patient care and health care finance and no single application is likely to use all of its content. The CDC has worked with HL7 developers to create a set of messages that permit exchange of immunization data. This document covers the subset of HL7 that will be used for client and immunization records exchanged between SC Immunization Registry and outside systems.

Message Structure

- The basic unit transmitted in an HL7 implementation is the **message**.
- Messages are made of multiple lines called **segments**. Each line/segment is separated by a carriage return.

  Note Windows systems separate lines by carriage returns + line feeds, so some Windows applications will not correctly display HL7 messages. Windows Notepad will display HL7 messages as one long continuous line. This is very hard to read. It is better to view an HL7 message in WordPad or some other text editor.
- Each segment starts with a three letter name that identifies the segment.
- Each segment is broken into **fields** that are normally separated by vertical bars |.
- Each field can also be broken into **sub-fields** by a caret ^.
- Separators are only sent if they separate values. Separators at the end of segments and fields are omitted if all the values there are empty.
- Some fields within a segment can also repeat. Repeating fields are separated by a tilde ~.

```
MSH|^~\&|TestIIS |5445^TEST CLINIC|SCIR|SC-DHEC|199705221605||VXU^V04|682299|P|2.3.1|||ER|
PID|||79928^^^^PI||TEST^MARY^T^^^^^|JOHNSON^^^^^^^|19951212|F
RXA|0|999|19970903|19970903|^^^90701^DTP^C4|999
RXA|0|999|19970907|19970907|01^ DTP^CVX|999
```

The details of how HL7 messages are put together, for SCI-Registry purposes, will be explained later in this document. The example above shows the essentials of what a message looks like. In this example, a message is being sent on behalf of TEST Clinic to SCI-Registry. The message consists of three segments.

- The Message Header segment (**MSH**) identifies the owner (**TEST CLINIC**) of the information being sent and the receiver (**SC-DHEC**). It also identifies the message as being of type **VXU.** The VXU is an Unsolicited Vaccination Record Update, which is one of the message types defined by HL7.
- The Patient Identification segment (**PID**) gives the client's name (MARY T TEST), birth date (19951212, in YYYYMMDD format), and other identifying fields.
- The Pharmacy Administration segment (**RXA**) tells that a DTP vaccine, with CPT code 90701, was administered on September 3, 1997 (formatted as 19970903).
- The Pharmacy Administration segment (**RXA**) tells that a DTP vaccine, with CVX code 01, was administered on September 7, 1997 (formatted as 19970907).
- Many fields are optional and this example may have more information included in it. Some segments can be repeated within a single message. In this example, the message includes a second RXA segment to record another immunization given.

Scope of this Document

The goal of this document is to define the flow of electronic messages and the subset of HL7 that will be used to exchange patient and immunization data between external systems and SC Immunization Registry.

This document assumes the sending system understands and will adhere to the base HL7 message formatting and encoding rules. It does not cover the methods used to transmit files between the SC Immunization Registry and outside systems. It covers only a small subset of the very extensive HL7 standard. Files of messages constructed from the guidelines in this document will fall within the HL7 standard, but there are a wide variety of other possible HL7 messages that are outside the scope of this document.

For more detailed information about this topic please reference

- The CDC Implementation Guide for Immunization Data Transactions available from the National Immunization Program within the Center for Disease Control (http://www.cdc.gov/nip)
- The full HL7 Specification (version 2.x) available from the Health Level 7 Organization (http://www.hl7.org)

Bi-Directional, Real-Time SCI Registry (SCI-RegEx) Interfacing

The data transmissions between systems will occur as the result of three activities:

(1) A query from one system for a patient's vaccination record that is held in another system (VXQ) [version: 2.31 only]
(2) A response to a query containing the vaccination record (VXR) [version: 2.31 only]
(3) An unsolicited update to a vaccination record (VXU) [version: 2.3.1, 2.4 & 2.5.1]

Trigger event type V01 will initiate the Query for Vaccination Record (VXQ) message. DHEC supports event type V03--Response to Query Returning Vaccination Record (VXR).

Trigger event type V04 will initiate the Unsolicited Update to Vaccination Record (VXU) message. Addition of new patients immunizations can be accomplished by using VXU (V04).

Version 2.3.1 of the HL7 Standard gives the following explanation in Section 2.2.4, Queries. "In all cases, the HL7 Standard consists of a simple exchange of messages between a pair of applications: the unsolicited update and its acknowledgment, or the query and its response. The underlying operational model is that of a client and a server. An application interfaces with another application using an event code that identifies the transaction. The other application responds with a message that includes data or an error indication. The initiating application may receive a reject status from the other application or from lower level software indicating that its message was not received correctly."

For standard immunization exchanges, the VXQ message (event V01) querying for a patient's immunization record and its standard response, VXR (event V03) reporting the specifically requested patient immunization history, are defined in Sections 4.12 through 4.14 of the HL7 Standard. In the event that a query was not received correctly, the response would be an ACK (see Sections 2.13, 2.13.1, and 2.18.1 of the *Guide*). In the event that a query was received and processed correctly, but no matching records were found, the response would be a QAK (see Sections 2.13, 2.13.1, and 2.18.1 of the *Guide*). In the case of an unsolicited update to a record, a VXU (event V04) message would be sent. The response to the VXU is an ACK, or Acknowledgment Message (see Sections 2.13, 2.13.1, and 2.18.1 of the *Guide*).

Note: Client and immunization data can also be entered, queried and modified using the CARES-IS interface. This provides an alternate way of identifying a client as having a relationship with a trading partner.

Participant Set-Up

1. Trading partner will complete a DHEC Data Exchange (HIE) Setup Form
2. Establish Business/Technical Contact information between DHEC and Trading partners (if applicable)
3. Trading partner submit a signed BOA/MOA. (if applicable)
4. DHEC will issues trading partners Provider Identification ID number [This number will be used in MSH (Sending Facility) segment]
5. Determine the proper transport protocol The trading partners will need to perform the following:
    a. Obtain or develop, install and configure a client interface capable of transmitting an HL7 formatted Message file per the determine transport protocol.
    b. It is the responsibility of the trading partner to obtain or develop, install and configure an client Message Sender for sending the HL7 2.3.1/2.5.1 formatted Message Requests and receiving the resulting HL7 2.3.1/2.5.1 formatted Message Response file generated by the SCI Registry Data Exchange (aka SCIRegEx)
6. The trading partner will submit a text file containing HL7 2.3.1 formatted VXQ^V01 and/or VXU^V04 Messages (up to 100 messages) for manually process and assessment.
7. DHEC will setup Trading partner in the SCI Registry Data Exchange Partner's Database.
8. Establish a trail-period
9. Approve the participant for "live operations" after the successful trials

SC DHEC SCI-Registry Data Exchange Principles/Business Rules

1. The SC Immunization Registry should receive all vaccines/globulins administered to SC citizens as pending DHEC Immunization Registry.
2. The sender (if applicable) will receive an acknowledgement for each electronic record update request (VXU) transmitted indicating whether or not the data was successfully submitted into the SC Immunization Registry.
3. When multiple patient matches are returned between the Registry and the outside (EHR/EMR) system, the acknowledgement to the sender will indicate the data was not submitted to the Registry due to multiple possible patient matches along with a request to retransmit the record with additional identifying information.

4. Demographic information received from outside (EHR/EMR) systems will update the Registry as defined in the HL-7 Patient ID Segment. No demographic information in the Registry will be used to update outside systems. No demographic information in outside (EHR/EMR) systems will be used to update existing Registry records (unless defined in this document).

5. Data received from outside (EHR/EMR) systems should include a provider identifier and associated patient chart number (if applicable), and this should be stored to facilitate future record matching and linking.

6. Immunization information in outside (EHR/EMR) systems will update the Registry and immunization information in the Registry will update outside (EHR/EMR) systems as defined in the HL-7 Pharmacy/Treatment Administration (RXA) Segment.

7. Data received from outside (EHR/EMR) systems shall report, at a minimum, the date of immunization; specific type of vaccine given; full name, gender, and date of birth of the person receiving the vaccine; and name (Provider ID number) of the registered immunization provider. SC DHEC may require reporting of other data, including but not limited to, race, ethnicity, mother's maiden name, and other data as specified by the SC DHEC.

8. Data received from outside (EHR/EMR) systems will be pre-certified before it is integrated into the Registry. The sender will receive an acknowledgement of any records that are not accepted for review and retransmission. The following criteria will be used for pre-certification:
    - Minimum data set is present
    - Immunization date > DOB except for Hep B
    - Immunization date < DOD
    - Immunization date > report submission date (future Date)
9. When all HL7 immunization information is equal (identical) to an existing immunization record in the Registry, the duplicate information will not be added to the Registry.

10. When all HL7 immunization information is equal to an existing immunization record in Registry, except one record contains the vaccine lot number, the record containing the lot number should be kept in the Registry. However, in no cases will vaccination information recorded by DHEC users be removed from the Registry.

11. When the HL7 vaccination name and/or shot date are not identical to an existing immunization record in Registry, the record will always be added to the Registry.

12. All HL7 immunization information sent to the Registry from non-DHEC immunization providers will be recorded as "historical" in the Registry.

13. When a VXU^V04 (Unsolicited Vaccination Record Update) message type is sent with no RXA segment, the messages will be rejected.
14. DHEC will not process any messages received between 10pm – 12am US EST.
15. For Batch processing:
    a. Files must include Batch Header & Trailer segments.
    b. Large Batch Files (a file which contain 700+ MSH segments) will process after 5pm US EST.
16. For Hospitals – We ask that you delay sending Newborn information (First Name/Last Name is Baby) until the baby is given a name. We recommend waiting 10 days after discharge to send data. This is to ensure "naming-reconciliation".

SC DHEC SCI-Registry Patient (Client) Match Rules

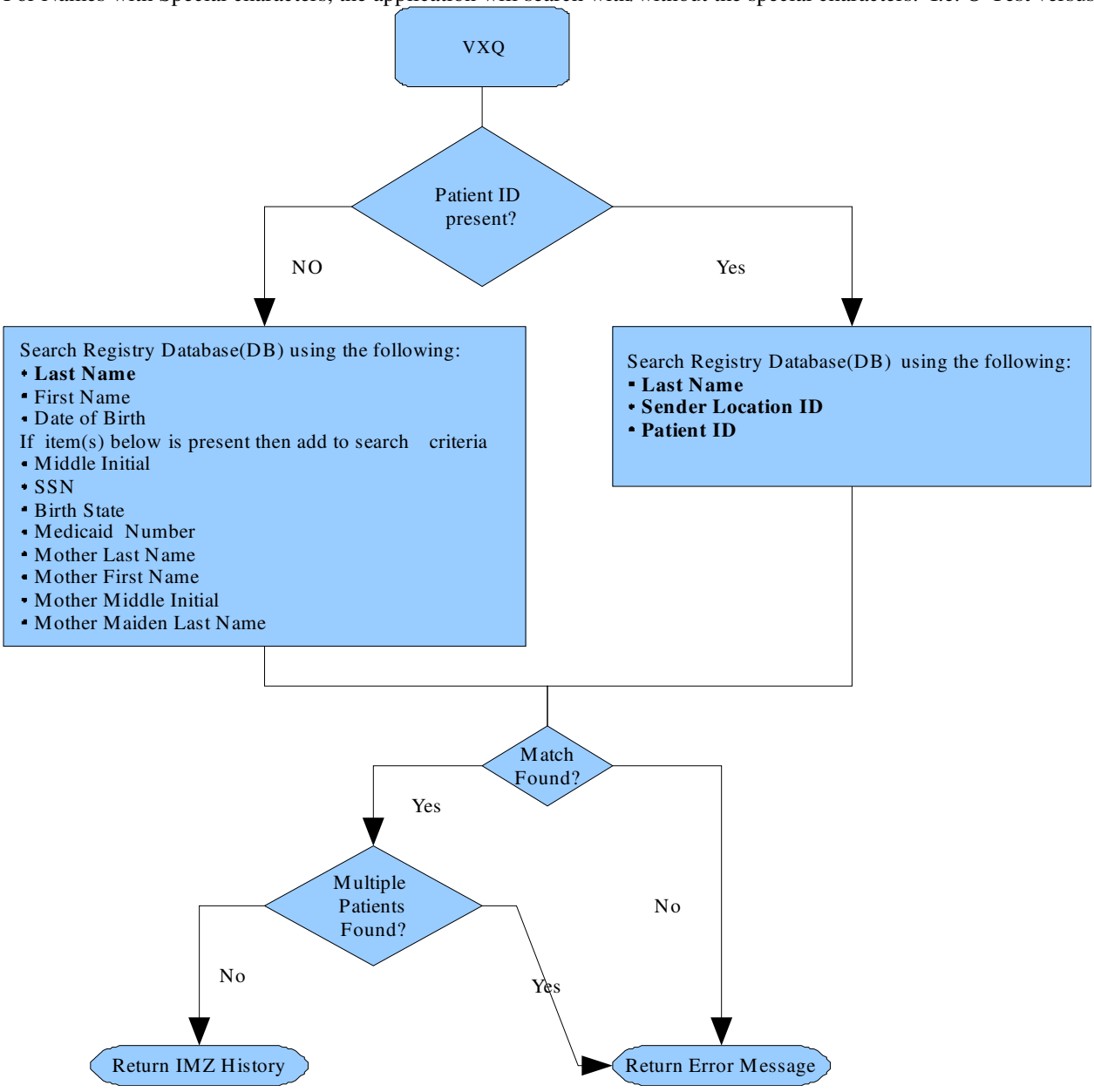
Query for Vaccination Record (VXQ) Message Match Flow

Minimum Search Fields: Last Name, First Name, Date of Birth

Optional Search Fields: Patient ID (Chart) Number, First Name, Middle Initial, SSN, Date of Birth, Birth State, Medicaid Number, Mother Last Name, Mother First Name, Mother Middle Initial, Mother Maiden Last Name

Note:

- The application will search all names (Primary, Alias, etc) in the Registry
- For Names with Special characters, the application will search with/without the special characters. I.e. O`Test versus O Test



Unsolicited Update to Vaccination Record (VXU) Message Match Flow

Minimum Search Fields: Last Name, First Name, Date of Birth

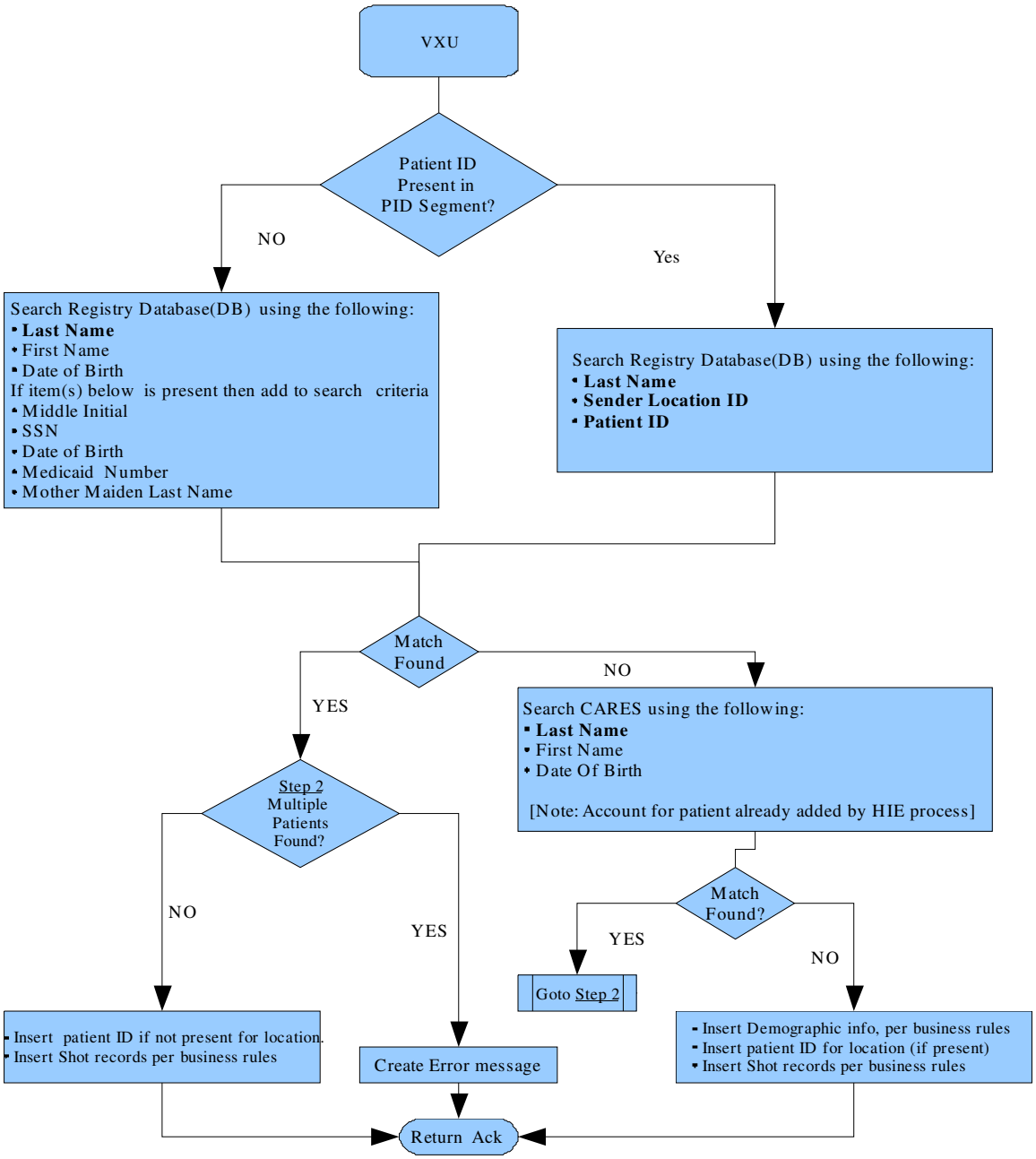
Optional Search Fields: Patient ID (Chart) Number, First Name, Middle Initial, SSN, Date of Birth, Medicaid Number, Mother Maiden Last Name

Minimum Demographic Fields: Last Name, First Name, Date of Birth, Sex

Minimum Vaccine Fields: Vaccine type, Date of administration, Provider identification

Note:

- The application will search all names (Primary, Alias, etc) in the Registry
- For Names with Special characters, the application will search with/without the special characters. I.e. O`Test versus O Test



HL7 Message Types Used in SCI-Registry Data Exchange Transmissions

SCI-RegEx (SCIIS) uses four message types: VXU, VXQ, VXR, and ACK/QAK. The VXQ is used for querying patient's immunization record. The VXU is used for sending immunization record. The ACK is used to acknowledge to the sender that a message has been received. Each segment is one line of text ending with the carriage return character. The carriage return is needed so that the HL7 messages are readable and printable. Square brackets [ ] enclose optional segments and curly braces {} enclose segments that can be repeated. In order to remain compliant with HL7, segments not use by IIS (i.e. NK1, INS1) will not result in an error, but the recipient can ignore the content of the message. The segments that are documented here are sufficient to support the principal SCI-Registry Data Exchange functions of storing data about patients and immunizations.

VXQ Query for Vaccination Record (Immunization Query)

When a health care provider participating in a SC Immunization Registry needs to obtain a complete patient immunization record, he/she will send a query (using a V01 trigger event) to the SCI-RegEx for the current patient immunization record within the Registry.

VXQ Format

MSH	Message Header Segment
QRD	Query Definition Segment
[QRF]	Query Filter Segment

HL7 VXR Vaccination Query Returning the Vaccination Record

The system will respond to a query request will return patient's Vaccination Record (VXR, a V03 trigger event) only if the system has uniquely identified (there is only one match to the query) the patient. The HL7 QAK is when the system unable to locate or uniquely identified a patient, the system will return acknowledgement message.

VXR Format

MSH	Message Header Segment
MSA	Message Acknowledgment Segment
QRD	Query Definition Segment
[QRF]	Query Filter Segment
PID	Patient Identification Segment
[{RXA	Pharmacy Administration
[RXR]	Pharmacy Route
}]	

HL7 VXU Unsolicited Vaccination Record Update

When a health care provider wishes to update or add the patient's immunization record in the SC Immunization Registry, he will transmit an unsolicited update of the record (a V04 trigger event). The VXU is based off a pharmacy message and can indicate a patient's demographics and zero or more vaccinations.

VXU Format

MSH	Message Header Segment
PID	Patient Identification Segment
[{	
RXA	Pharmacy Administration
[RXR]	Pharmacy Route
}]	

HL7 ACK / QAK Acknowledgement Messages

The system will send a message response

ACK/QAK Format

MSH	Message Header
MSA	Message Acknowledgment
[ERR]	Error
[QAK]	Query Acknowledgment Segment

Message Segments: Field Specifications and Usage

HL7 Segment Structure

Each segment consists of several fields that are separated by "|", which is the field separator character. The tables below define how each segment is structured and contain the following columns:

SEQ	The ordinal position of the field in the segment. Since SCI-RegEx does not use all possible fields in the HL7 standard, these are not always consecutive.
LEN	Maximum length of the field
DT	HL7 data type of the field.
R/M/C	R means required by HL7, M means mandatory for SCI Registry (SCI-RegEx) C means Conditional field. Blank indicates an optional field.
RP #	Y means the field may be repeated any number of times, an integer gives the maximum number of repetitions, and a blank means no repetition is permitted
TBL#	Number of the reference table giving valid values for the field.
ELEMENT NAME	HL7 name for the field.

- **HL7 data types.** Each field has an HL7 data type. For more information refer to Appendix 2 of the CDC Implementation Guide that lists and defines the HL7 data types mention in this document. The elemental data types Numeric (NM) and String (ST) consist of one value, while some data types, such as Extended Person Name (XPN) are composites.

- **Delimiter characters.** Field values of composite data types consist of several components separated by the **component separator**, "^". When components are further divided into sub-components, these are separated by the **sub-component separator**, "&". Some fields are defined to permit repetition separated by the **repetition character**, "~". When these special characters need to be included within text data, their special interpretations are prevented by preceding them with the **escape character**, "\".

  Example

  ```
  MSH|^~\&| …..
  XXX|field1|component1^component2^subcomponent3.1&subcomponent3.2^component4|  …..
  YYY|repetition1~repetition2| …..
  ZZZ|data includes escaped \|\~ special characters| …..
  ```

In the example above, the Message Header segment uses the field separator, "|", immediately after the "MSH" code that identifies the segment. This establishes what character serves as the field separator throughout the message. The next field, the four characters "^~\&", establishes, in order, the component separator character, the repetition character, the escape character, and the sub-component separator character that will apply throughout the message. The hypothetical "XXX" segment includes field1 with no internal structure, but the next field has several components separated by "^", and the third of these is made up of two sub-components separated by "&". The hypothetical "YYY" segment's first field permits repetition, in this example the two values "repetition1" and "repetition2". The hypothetical "ZZZ" segment's field has a text value that includes the characters "|~", and these are escaped to prevent their normal structural interpretation.

In SCI-RegEx, sub-components, repetition and text values requiring the escape character will be rare. Components within fields are common, since names and addresses are represented this way. HL7 permits the use of other delimiters besides the recommended ones and the delimiters used in each message are given in the Message Header segment. SCI-RegEx will always use the recommended delimiters when sending files and requires their use for files received.

Rules for Sending Systems

Sending systems to construct HL7 messages uses the following rules.

- Encode each segment in the order specified in the message format.
- Begin the segment with the 3-letter segment ID (for example RXA).
- Precede each field with the data field separator ("|").
- Use HL7 recommended encoding characters ("^~\&").
- Encode the data fields in the order given in the table defining segment structure.
- Encode the data field according to its HL7 data type format.
- Do not include any characters for fields not present in the segment. Since later fields in the segment are encoded by ordinal position, fields that are not present do not reduce the number of field separators in the segment. For example, when the second and third fields are not present, the field separators maintain the ordinal position of the fourth field: |field1|||field4
- Data fields that are present but explicitly null are represented by empty double quotes "".
- Trailing separators may optionally be omitted. For example, |field1|field2||||| is equivalent to |field1|field2, when field3 and subsequent fields are not present.
- End each segment with the segment terminator (always the carriage return character and Line Feed character; Windows ASCII Format).
- Name Fields that contain a name suffix, SCI-Registry recommends encoding characters ("^~\&") is present between Last (given) Name and Name suffix.
- Name fields which contains extended characters will be convert to ACSII
- For Street Address that contains an "In Care of", you must place "C/O" in front of information to indicate it's a Cares of Address.
    - Do not place the Care of information in the "Street address" segment; you must use the "Other designation" segment of the Address field.
    - If you have apartment number in main address and C/O information, then place the apartment information at the end of the street address in Street Segment and the C/O information in "Other designation" segment
      Example: |925 B NORTHEAST GREEN STREET WEST BLDG 12^C/O TEST DOE^San Francisco^CA^95123^USA
- For Street Address Field, do not place the main street address in "Other designation" segment.
- "Other designation" segment of the Address Field should be used to store apartment, unit, C/O information.

Receiving systems to process HL7 messages uses the following rules.

- Treat data segments that are expected but not present as if all data fields in the segment were not present.
- Require use of HL7 recommended Field Separator |, and Encoding characters ^~\& for encoding messages.
- Ignore any data segment that is included but not expected, rather than treating it as an error. The HL7 message types used by SCI-RegEx may include many segments besides the ones in this document, and SCI-RegEx ignores them. SCI-RegEx will not send messages with segments not documented in this specification, but reserves the right to specify more segments at a later date. The rule to ignore unexpected segments facilitates this kind of change.
- Ignore data fields found but not expected within a segment.

The message segments below are needed to construct message types that are used by SCI-RegEx and trading partners. Each segment is given a brief description excerpted from the HL7 standard. The tables define what fields make up each segment. Since SCI-RegEx does not use all the fields that HL7 defines, there are sometimes gaps in the ordinal sequence of fields. Following HL7 rules, the gaps do not diminish the number of field separators within the segment. For example, if the second and third fields in a segment are not present, their field separators remain in order to indicate that the next field present is the fourth: field1|||field4.

Message Header (MSH) Segment

The MSH segment defines the intent, source, destination and some specifics of the syntax of a message.

SEQ	LEN	DT	R/M/C	RP/#	TBL#	ELEMENT NAME
1	**1**	**ST**	**R**			**Field Separator**
2	**4**	**ST**	**R**			**Encoding Characters**
3	180	HD				Sending Application
4	**180**	**HD**	**M**			**Sending Facility**
5	180	HD				Receiving Application
6	180	HD				Receiving Facility
7	26	TS				Date/Time of Message
8	40	ST	C			Security
9	**7**	**CM**	**R**		**0076 0003**	**Message Type**
10	**20**	**ST**	**R**			**Message Control ID**
11	**3**	**PT**	**R**		**0103**	**Processing ID**
12	**60**	**VID**	**R**		**0104**	**Version ID**
14	180	ST				Continuation pointer
15	2	ID			0155	Accept Acknowledgement Type
16	2	ID				Application Acknowledgement Type

Total Sequence positions: 20 Skipped Sequence positions: 13-14, 17-20**Field Notes:**

MSH-1 Determines the field separator in effect for the rest of this message. SCI-RegEx requires the HL7 recommended field separator of "|".

MSH-2 Determines the component separator, repetition separator, escape character, and sub-component separator in effect for the rest of this message. IIS requires the HL7 recommended values of ^~\&.

MSH-3 Name of the sending application.
For SCHIEX Users Only: the value must be SCHIEX

MSH-4 Identifies whom the message is being sent from. Trading Partners will include their assigned Location ID numbers.

MSH-5 Identifies the message receiver. Trading partners will set this value equal to 'SIIS'

MSH-6 Identifies the message receiver. Trading partners will set this value equal to 'SC-DHEC'

MSH-7 Date and time the message was created. See the TS data type define in the Guide

MSH-8 Used by SC DHEC for trading partner to include additional security or identification (Bi-directional only)

MSH-9 This is a required field. Two components of this field give the HL7 message type (see Table 0076, HL7 Guide) and the HL7 triggering event (see Table 0003, HL7 Guide). Within HL7, the triggering event is considered to be the real-world circumstance causing the message to be sent. For SCI-RegEx purposes, this field should have the value VXQ^V01 for a message conveying immunization information or the value VXU^V04 for a message conveying client and immunization information. In acknowledgement messages the value ACK/QAK is sufficient and the second component may be omitted.

MSH-10 This is a required field. Message rejection will result if nothing is received in this field. The message control ID is a string (which may be a number) uniquely identifying the message among all those ever sent by the sending system. It is assigned by the sending system and echoed back in the ACK message sent in response

MSH-11 The processing ID to be used by SCI-RegEx to determine processing environment. **P** for production and **T** for Test. If this field is null, IIS will default to **T.**

MSH-12 This is a required field. For the parser, the version number that is read in the first MSH segment, of the file, will be the version assumed for the whole file. For example, use a value of "2.3.1" to indicate HL7 Version 2.3.1or "2.4" to indicate HL7 Version 2.4. If there is no version number found in the first MSH segment, a hard error will occur and the file will not be processed.

MSH-14 CARES IIS Use Only – for SFTP Users Only. This field will be used to store the name of Transmitted File.

MSH-15 This field controls whether an acknowledgement is generated for the message sent.

MSH-16 Identifies the conditions under which application acknowledgments are required to be returned in response to this message

Example

MSH|^~\&|TestIIS |123457689^TestLoc|SIIS|SC-DHEC|199705221605||VXQ^V01|1997052XXX40|T|2.3.1|||NE|<CR><LF>

Query Definition (QRD) Segment

The QRD segment is use to define your immunization query.

SEQ	LEN	DT	R/M/C	RP/#	TBL#	ELEMENT NAME
1	**26**	**TS**	**R**			**Query date/time**
2	**1**	**ID**	**R**		**0106**	**Query Format Code**
3	**1**	**ID**	**R**		**0091**	**Query Priority**
4	**10**	**ST**	**R**			**Query ID**
5	1	ID			0107	Deferred response type
6	26	TS				Deferred response date/time
7	**10**	**CQ**	**R**		**0126**	**Quantity limited request**
8	**60**	**XCN**	**R**	**Y**		**Who subject filter**
9	**60**	**CE**	**R**	**Y**	**0048**	**What subject filter**
10	**60**	**CER**	**R**	**Y**		**What department data code**
11	20	CM		Y		What data code value qualifier
12	1	ID			0108	Query results level

Total Sequence positions: 12 Skipped Sequence positions: none

Field Notes:

QRD-1 The sending application program generated date the query. The minimum format of YYYYMMDD is required. A null/invalid value results in message rejection

QRD-2 Query/response format code. SCI-RegEx requires this field and only accepts a value of "R". A null/invalid value results in message rejection

QRD-3 Time frame in which the response is expected. A null/invalid value results in message rejection.

QRD-4 Unique identifier for the query assigned by the querying application. SCI-RegEx requires this field and null/invalid values result in message rejection. This field is returned intact by SCI-RegEx in a response (VXR).

QRD-5 Used to indicate a deferred response

QRD-6 Used to indicate the date/time of the deferred response

QRD-7 Maximum length of the response that can be accepted by the requesting system. Only accepts a value of "RD" in the 2nd component. The 1st component is a numerical value. A null/invalid value in either sub-component results in message rejection. CARES-SIIS will interpret the units as the maximum number of client.

QRD-8 Identifies the subject of the query or whom the inquiry is about. The 2nd component is required by SCI-RegEx. If the First or last name OR both names are missing it results in message rejection.

QRD-9 Describes the kind of information required to satisfy the request. SCI-RegEx requires this field and a value of "VXI" and text description would be 'VACCINE INFORMATION'

QRD-10 Identifies the "what" department data code. SCI-RegEx requires this field and value set to 'SIIS'. Null/invalid values will result in message rejection.

QRD-11 Further refines the inquiry by data code qualifiers by providing a window or range. This is an optional and repeatable field.

QRD-12 Used to control level of detail in results

Example

QRD|199705221605|R|I|19970522GA05|||25^RD|^KENNEDY^JOHN^FITZGERALD^JR|VXI^VACCINE INFORMATION^HL70048|^SIIS|<CR><LF>

Query Definition (QRF) Segment

Used with the QRD segment to further refine the content of a query.

SEQ	LEN	DT	R/M/C	RP/#	TBL#	ELEMENT NAME
1	**26**	ST	**R**	**Y**		**Where subject filter**
2	20	TS				When data start date/time
3	26	TS				When data end date/time
4	26	ST		Y		What user qualifier
5	60	ST		Y		Other query subject filter
6	60	ID		Y	0156	Which data/time qualifier
7	12	ID		Y	0157	Which date/time status qualifier
8	12	ID		Y	0158	Date/time selection qualifier
9	12	TQ				When quantity/timing qualifier

Total Sequence positions: 9 Skipped Sequence positions: none

Field Notes:

QRF-1 Identifies the department, system or subsystem to which the query pertains. A null/invalid value results in message rejection.

QRF-2 Data representing dates and times. Used SCI-RegEx to enter a Shot Date Range

QRF-3 Data representing dates and times. Used SCI-RegEx to enter a Shot Date Range

QRF-4 An identifier to further defines characteristics of the data of interest. The field is allowed to repeat.

QRF-5 A filter defined locally for use between two systems. (See table below)

Other Query Subject Filter

Position	Component	Data Type	Description/Examples
1	Patient Social Security Number~	ST	In U.S., use SSN without hyphens
2	Patient Birth Date~	DT	July 4, 1976 = 19760704
3	Patient Birth State~	ID	In U.S., use 2-letter postal code, e.g., IN, NY, and CA. In other countries, locally applicable postal table may be used.
5	Patient Medicaid Number~	ST	When relevant
6	Mother's Name Last^First^Middle~	PN	<family name>^<given name>^<middle name or initial>^<suffix>^<prefix>^<degree>. E.g., Smith^Mary^Elizabeth
7	Mother's Maiden Name~	ST	Family name of mother before marriage. E.g., Jones

Total Sequence positions: 10 Skipped Sequence positions: 4, 8-10

Field Notes:

SCI-RegEx does not supported position 4, 8, 9, 10.

Example

QRF|SIIS||||256946789~19900607~MA~MA99999999~88888888~KENNEDY^JACQUELINE^LEE~BOUVIER~898666725~KENNEDY^JOHN^FITZGERALD~822546618|<CR> <LF>

Patient Identification (PID) Segment

The PID segment is used by all applications as the primary means of communicating patient identification information. This segment contains information that used by SCI-Registry.

SEQ	LEN	DT	R/M/C	RP/#	TBL#	ELEMENT NAME
2	**10**	**CX**	**C**			**Patient ID**
3	**10**	**CX**	**R**	**Y**	**0203**	**Patient ID (Internal ID) [DO NOT stored SSN in this Field]**
4	20	CX				Alternate patient ID – PID
5	**48**	**XPN**	**R**	**Y**		**Patient Name**
6	48	XPN		Y		Mother's Maiden Name
7	**26**	**TS**	**C**			**Date/Time of Birth**
8	**1**	**IS**	**C**		**0001**	**Sex**
10	80	CE	C	Y	0005	Race
11	106	XAD		Y		Patient Address
12	4	IS			0289	County Code
13	40	XTN				Patient Phone
19	16	ST				SSN Number – Patient
22	80	CE	C	Y	0189	Ethnic Group

Total Sequence positions: 30 Skipped Sequence positions: 1, 9,1,14-18,20-21,23-30

Field Notes:

PID-2 This field contains provider internal number to identify a patient. **For SCI-Registry, the max length is 10 characters.**

PID-3 This field contains the list of identifiers (one or more) used by immunization registries and their participants to **uniquely** identify a patient (e.g., medical record number, billing number, birth registry, national unique individual identifier, etc.). You **must** include the Identifier type code (see table 0203) along with the ID number. If Identifier type is not include SCI-RegEx will default to Patient ID. **For SCI-Registry, the max length is 10 characters SCI-Registry supports the following: patient identification number (max length 10), medical record number(max length 10), Medicaid number, and social security number (SSN will only be used for querying and it will not be saved in the SCI Registry).**

PID-5 See the XPN data type. **Last name and first name are required in the first two components**. If the Name Type Code component is included, use L-Legal. When DHEC sending immunization record this field displays only client's name. **SCI-Registry does not support repetition of this field.**
NOTE: If patient does not have a first name, the value " NO FIRST NAME" must be entered.

PID-6 See the XPN data type. In this context, where the mother's name is used for client identification, SCI-Registry uses only last name and first name. SCI-Regisry does not support repetition of this field.

PID-7 Give the year, month, and day of birth (YYYYMMDD). **For VXU messages this field is required**

PID-8 See Table 0001. Use F, M, or U. **For VXU messages this field is required**

PID-10 See Table 0005. SCI-Registry can only be accepted if ethnic group is also available

PID-11 **SCI-Registry does not support repetition of this field.** Components: <street address (ST)> ^ <other designation (ST)> ^ <city (ST)> ^ <state or province (ST)> ^ <zip or postal code(ST)> ^ <country (ID)>
Format Street Address: House Number<space>House Suffix <space>Street Prefix<space>Street Name<space>Street Type<space>Street Suffix
Example: |925 B NORTHEAST GREEN STREET WEST^ BLDG 12^San Francisco^CA^95123^USA
Note: Use "other designation" segment to store either Unit Number/Apartment Num or Care of Information. If both are present then store Apartment info at end of Street address and Care of Info in "Other…"

PID-12 See Table 0289. (**South Carolina Counties Only**)

PID-13 **SCI-Registry does not support repetition of this field.** See the XTN data type. SCI-Registry will use the 6th, 7th, 8th and 9th components for specification of area code, phone number, extension and text, respectively. Otherwise, **SCI-Registry** will assume that the phone number is specified in the first component in the [NNN] [(999)]999-9999[X99999][B99999][C any text] format.
Example: ^PRN^PH^test@test.com^^734^6777777 or (734)677-7777^PRN^PH (4th component can be used for Email address)

PID-19 Social security number is used for identification purposes only, and is not displayed in screens or distributed to trading partners. Support of PID-19 is for backwards compatibility only

PID-22 See Table 0189. SCI-Registry can only be accepted if race is also available

Example

PID||K5671|221345671^^^^SS^22134^^^^MR^||KENNEDY^JOHN^FITZGERALD^JR|BOUVIER^^^^^^M|19900607|M|||~^^^^MA^^^BDL|<CR><LF>
PID|| K5671|221345671^^^^SS^~22134^^^^MR^||KENNEDY^JOHN^FITZGERALD^JR^^^L|BOUVIER^^^^^^M|19900607|M| | 2106-3^WHITE^HL70005|123 MAIN ST^APT 3B^LEXINGTON^MA^00210^^||(617)555-1212^PRN^PH^test@test.com^^617^5551212^^|| ||||||N^NOT HISPANIC OR LATINO^HL70189^||<CR><LF>

Pharmacy/Treatment Administration (RXA) Segment

The RXA carries pharmacy administration data. It is a repeating segment and can record unlimited number of vaccinations.

SEQ	LEN	DT	R/M/C	RP/#	TBL#	ELEMENT NAME
1	**4**	**NM**	**R**			**Give Sub-ID counter**
2	**4**	**NM**	**R**			**Administration Sub-ID Counter**
3	**26**	**TS**	**R**			**Date/Time Start of Administration**
4	**26**	**TS**	**R**			**Date/Time End of Administration**
					0292	
5	**100**	**CE**	**R**		**NIP001**	**Administered Code**
6	**20**	**NM**	**R**			**Administered Amount**
9	200	CE		Y		Administration Notes
11	200	CM				Administered-at location
15	20	ST		Y		Substance Lot Number
16	26	TS		Y		Substance Expiration date
17	60	CE		Y	0227	Substance Manufacturer Name
21	2	ID			0323	Action code-RXA
22	26	TS				System entry date/time

Total Sequence positions: 22 Skipped Sequence positions: 7-8, 10,12-14,18-21

Field Notes:

RXA-1 Required by HL7. Use "0" for SCI-Registry

RXA-2 Required by HL7. Use "999" for SCI-Registry

RXA-3 This field to show the vaccination date.
Time stamp (TS) data type must be in the format: YYYY[MM[DD[HHMM[SS[.S[S[S[S]]]]]]]][+/-ZZZZ]^<degree of precision>

RXA-4 Where administration continues over some time, the end date/time may be recorded. For typical vaccines, the end of administration is the same as the start of administration given in *RXA-3*

RXA-5 This field identifies the medical substance administered. If the substance administered is a vaccine, CVX codes{ XE "CVX codes" } should be used in the first triplet to code this field (see *HL7 Table 0292 - Codes for vaccines administered*). The second set of three components could be used to represent the same vaccine using the Current Procedural Terminology (CPT){ XE "Current Procedural Terminology (CPT)" }. If a vaccine does not have CVX Code then use CPT Code or vice versa.
For SCI-Registry system, must include either CVX code or CPT (C4) code.

RXA-6 This field records the amount of pharmaceutical administered.
SCI-Registry system does not support amount, if no amount is present then trading partners should enter '999'.

RXA-11 Name of facility where medical substance was administered

RXA-15 Manufacturer's lot number for the vaccine. .

RXA-16 Manufacturer's lot number expiration date for the vaccine.
Time stamp (TS) data type must be in the format: YYYY[MM[DD[HHMM[SS[.S[S[S[S]]]]]]]][+/-ZZZZ]^<degree of precision>

RXA-17 Vaccine manufacturer from Table 0227, for example |AB^Abbott^ MVX^^^|. The HL7 2.4 specification recommends use of the external code set MVX. "When using this code system to identify vaccines, the coding system component of the CE field should be valued as "MVX" not as "HL70227." SCI-Registry does not support repetition of this field.
For SCI-Registry system, must include MVX code.

RXA-21 Status of record. This field provides a method of correcting vaccination information previously transmitted with incorrect patient identifying information. Refer to *HL7 Table 0323 – Action code* for valid values.

RXA-22 This field records the date/time the administration information was entered into the source system

Example sending only CVX Code: RXA|0|1|19910907|19910907|50^ DTAP-HIB ^CVX|999<CR><LF>

Example sending only CPT Code: RXA|0|1|19910907|19910907|^^^90721^DTAP-HIB^C4|999<CR><LF>

Example sending both CVX &CPT: RXA|0|1|19910907|19910907|50^ DTAP-HIB^CVX^90721^DTAP-HIB^C4|999<CR><LF>

Pharmacy/Treatment Route (RXR) Segment

The Pharmacy/Treatment Route Segment contains the alternative combination of route and site.

SEQ	LEN	DT	R/M/C	RP/#	TBL#	ELEMENT NAME
1	**60**	**CE**	**R**		**0162**	**Route**
2	60	CE			0163	Site

Total Sequence positions: 5 Skipped Sequence positions: 3-5

Field Notes:

RXR-1 See table 0162. This is the route of administration

RXR-2 See table 0163. This is the site of the route of administration

RXR|IM^INTRAMUSCULAR^HL70162|LA^LEFT ARM^HL70163||<CR>><LF>

Message Acknowledgment (MSA) Segment

The MSA segment contains information sent while acknowledging another message.

SEQ	LEN	DT	R/M/C	RP/#	TBL#	ELEMENT NAME
1	**2**	**ID**	**R**		**0008**	**Acknowledgment Code**
2	**20**	**ST**	**R**			**Message Control ID**
3	80	ST				Text Message

Total Sequence positions: 6 Skipped Sequence positions: 4-6

Field Notes:

MSA-1 Acknowledgement code giving receiver's response to a message.

- AA (Application Accept) means the message was processed normally.
- AE (Application Error) means an error prevented normal processing. An error message will be put in MSA-3, and for ACK messages the optional ERR segment will be included.

MSA-2 The message control ID from MSH-10 in the message being acknowledged. This allows the sending system to associate this response with the message being responded to.

MSA-3 Text of error message, used when MSA-1 does not have the normal value of AA.

Query Acknowledgment (QAK) Segment

Used to send information with responses to a query.

SEQ	LEN	DT	R/M/C	RP/#	TBL#	ELEMENT NAME
1	32	ST	C		0696	Query Tag
2	2	ID			0708	Query response status

Total Sequence positions: 2 Skipped Sequence positions: none

Field Notes:

QAK-1 This field is valued by the initiating system to identify the query and can be used to match response messages to the originating query. If it is valued, the responding system is required to echo it back as the first field in the QAK. SCI-Registry uses the value specified in the QRD-04

QAK-2 This field allows the responding system to return a precise response status

Error (ERR) Segment

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

SEQ	LEN	DT	R/M/C	RP/#	TBL#	ELEMENT NAME
1	80	CM	R	Y		Error Code and Location

Total Sequence positions: 1 Skipped Sequence positions: none

Field Notes:

ERR-1 A composite field with four components.

<segment ID (ST)>^<sequence (NM)>^<field position (NM)>^<field component ordinal number (NM)

The first component identifies the segment ID containing the error. The second component identifies the input file line number of the segment containing the error. The third component identifies by ordinal number the field containing the error. The fourth component identifies, by ordinal number, the field component containing the error (0 is used if not applicable) The remaining five components of the CE data type are not valued and their '^' separators are not generated. Note that error text is transmitted in field MSA-3. For example, if the NK1 segment is missing a mandatory field:

ERR|NK1^10^2^1

This error message identifies the NK1 segment occurring on line 10 of the input file whose mandatory second field (Name) is missing the mandatory 1st component (Family Name).

Batch Files of HL7 Messages

The definitions above tell how to create messages containing client and immunization data. Each message can logically stand on its own and HL7 is compatible with various methods of online and batch transmission. HL7 provides special header and footer segments to structure batch files. These segments are not part of any message, but serve to bracket the messages defined above. The structure of a batch file is as follows.

FHS (file header segment)
{ BHS (batch header segment)
{ [MSH (zero or more HL7 messages)
....
....
....
] }
BTS (batch trailer segment)
}
FTS (file trailer segment)

File Header (FHS) Segment

The FHS segment is used to head a file (group of batches).

SEQ	LEN	DT	R/M/C	RP/#	TBL#	ELEMENT NAME
1	**1**	**ST**	**R**			**File Field Separator**
2	**4**	**ST**	**R**			**File Encoding Characters**
3	15	ST				File Sending Application
4	**20**	**ST**	**M**			**File Sending Facility**
5	15	ST				File Receiving Application
6	20	ST				File Receiving Facility
7	26	TS				File Creation Date/Time
8	40	ST	C			File Security
9	**20**	**ST**	**M**			**File Name/ID**
10	80	ST				File Header Comment
11	20	ST				File Control ID
12	20	ST				Reference File Control ID

Total Sequence positions: 12 Skipped Sequence positions: none

Field Notes:

FHS1 thru 8 Same definition as the corresponding field in the MSH segment
FHS-9 Batch File Name or ID number
FHS-10 This is a free text comment field that is not further defined in the HL7 protocol
FHS-11 This field is used to uniquely identify a particular file. It can be echoed back in FHS-12-reference file control ID.
FHS-12 This field contains the value of FHS-11-file control ID when this file was originally transmitted. This field is not valued if this file is being sent for the first time

File Trailer (FTS) Segment

The FTS segment defines the end of a file

SEQ	LEN	DT	R/M/C	RP/#	TBL#	ELEMENT NAME
1	**10**	**NM**	**R**			**File Batch Count**
2	80	ST				File Trailer Comment

Total Sequence positions: 2 Skipped Sequence positions: none

Field Notes:

FTS-1 This field contains the number of batches contained in the file
FTS-2 The use of this free text field is not further defined in the HL7 protocol

Batch Header (BHS) Segment

The BHS segment defines the start of a batch

SEQ	LEN	DT	R/M/C	RP/#	TBL#	ELEMENT NAME
1	**1**	**ST**	**R**			**Batch Field Separator**
2	**4**	**ST**	**R**			**Batch Encoding Characters**
3	15	ST				Batch Sending Application
4	**20**	**ST**	**M**			**Batch Sending Facility**
5	15	ST				Batch Receiving Application
6	20	ST				Batch Receiving Facility
7	**26**	**TS**	**M**			**Batch Creation Date/Time**
8	40	ST	C			Batch Security
9	20	ST				Batch Name/ID
10	80	ST				Batch Comment
11	20	ST	M			Batch Control ID
12	20	ST				Reference Batch Control ID

Total Sequence positions: 12 Skipped Sequence positions: none

Field Notes:

BHS 1 through 8 Same definition as the corresponding field in the MSH segment

BHS-9 This field can be used by the application processing the batch

BHS-10 This field is a comment field that is not further defined in the HL7 protocol

BHS-11 This field is used to uniquely identify a particular batch. It can be echoed back in BHS-12-reference batch control ID if an answering batch is needed

BHS-12 This field contains the value of BHS-11-batch control ID when this batch was originally transmitted. This field is not valued if this batch is being sent for the first time

Batch Trailer (BTS) Segment

The BTS segment defines the end of a batch

SEQ	LEN	DT	R/M/C	RP/#	TBL#	ELEMENT NAME
1	**10**	**ST**	**R**			**Batch Message Count**
2	80	ST				Batch Comment
3	100	NM				Batch Totals

Total Sequence positions: 3 Skipped Sequence positions: none

Field Notes:

BTS-1 This field contains the count of the individual messages contained within the batch

BTS-2 This field is a comment field that is not further defined in the HL7 protocol.

BTS-3 This field may carry, as separate repeating components, as many types of totals as needed for the batch. Each component is an NM data type. This field may be defined as a CM data type for backwards compatibility with HL7 2.2 and 2.1. Users of the field in later HL7 2.x versions should use the NM data type and define it as "repeating" as illustrated below.

Components: <total 1 (NM)>~<total 2 (NM)>~....

Appendix A – CDC Recommended Core Data set for IIS

The following table is excerpted or adapted CDC listing of core data items. The "DHEC SCI-Registry" column list those data items, which are available to trading partners.

Data Item	CDC Status	DHEC SCI-Registry
Patient name: first, middle (if applicable), last	**Required**	**Required**
Patient alias name: first, middle(if applicable), last (former names for management of adoptions and name changes)	Optional	Optional
Patient address, phone number (these variables should be locally defined)	Optional	Optional
Birthing facility (these variables should be locally defined)	Optional	
Patient Social Security number (SSN)	Optional	Querying (info will not be save to SCI-Registry)
Patient birth date	**Required**	**Required**
Patient sex	**Required**	**Required**
Patient race	Optional	Conditional
Patient primary language	Optional	Not Available
Patient birth order	Optional	Not Available
Patient birth registration number	Optional	Not Available
Patient birth State/country	**Required**	Querying (info will not be save to SCI-Registry)
Patient Medicaid number	Optional	Querying (info will not be save to SCI-Registry)
Mother's name: first, middle(if applicable), last, maiden	**Required**	Optional
Mother's SSN	Optional	Not Available
Father's name: first, middle(if applicable), last	Optional	Not Available
Father's SSN	Optional	Not Available
Vaccine type	**Required**	**Required**
Vaccine Manufacturer	**Required**	Optional
Vaccine dose number	Optional	Optional
Vaccine expiration date	Optional	Optional
Vaccine injection site	Optional	Optional
Vaccination date	**Required**	**Required**
Vaccine lot number	**Required**	Conditional
Vaccine provider	Optional	Not Available
Historical vaccination flag indicator	Optional	Not Available
VFC eligibility	Optional	Not Available
History of varicella disease indicator	Optional	Not Available
Patient status indicators that include active, inactive, MOGE, and other classifications	Optional	Not Available

Appendix B -- HL7 Data Types

Please refer to CDC Guidelines for Exchange of Immunizations Transactions, v2.3, regarding information on Data Types. The following descriptions of HL7 data types are excerpted or adapted from the HL7 standard. See the field notes within each segment definition above on how to use data types in particular fields. Some data types have complex definitions much of which does not apply to SCI-Registry usage, and for these we omit much of the HL7 definition of the data type, referring instead to the field notes in the segment definitions.

CE Coded Element	Components: <identifier (ST)> ^ <text (ST)> ^ <name of coding system (ST)> ^ <alternate identifier (ST)> ^ <alternate text (ST)> ^ <name of alternate coding system (ST)> Example: |F-11380^CREATININE^I9^2148-5^CREATININE^LN| This data type transmits codes and the text associated with the code. To allow all six components of a CE data type to be valued, the maximum length of this data type must be at least 60.
Identifier (ST)	Sequence of characters (the code) that uniquely identifies the item being referenced by the <text>. Different coding schemes will have different elements here.
Text (ST)	Name or description of the item in question. E.g., myocardial infarction or X-ray impression. Its data type is string (ST).
Name of coding system (ST)	Each coding system is assigned a unique identifier. This component will serve to identify the coding scheme being used in the identifier component. The combination of the **identifier** and **name of coding system** components will be a unique code for a data item. Each system has a unique identifier. ASTM E1238-94, Diagnostic, procedure, observation, drug ID, and health outcomes coding systems are identified in the tables in Section 7.1.4 [of the full HL7 standard], "Coding schemes." Others may be added as needed. When an HL7 table is used for a CE data type, the ***name of coding system*** component is defined as ***HL7nnnn*** where ***nnnn*** is the HL7 table number.
Alternate components	These three components are defined analogously to the above for the alternate or local coding system. If the Alternate Text component is absent, and the Alternate Identifier is present, the Alternate Text will be taken to be the same as the Text component. If the Alternate Coding System component is absent, it will be taken to mean the locally defined system. **Note:** The presence of two sets of equivalent codes in this data type is semantically different from a repetition of a CE-type field. With repetition, several distinct codes (with distinct meanings) may be transmitted. **Note:** For HL7-defined tables which have not been adopted from some existing standard, the third component, "name of coding system," is constructed by appending the table number to the string "HL7." Thus, the field *RXR-2-site*, is a CE data type that refers to HL7 table number 0163. Its "name of coding system" component is "HL70163".
CM Composite	Components: <point of care (IS)> ^ <room (IS) ^ <bed (IS)> ^ <facility (HD) ^ <location status (IS) ^ <patient location type (IS)> ^ <building (IS)> ^ <floor (IS)> ^ < street address (ST)> ^ <other designation (ST)> ^ <city (ST)> ^ <state or province (ST)> ^ <zip or postal code (ST)> ^ <country (ID)> ^ <address type (ID)> ^ <other geographic designation (ST)> Subcomponents of facility (HD): <namespace ID (IS)> & <universal ID (ST)> & <universal ID type (ID)> Example: |^^^Valley Clinic|
ID Coded Value for HL7 Defined Tables	The value of such a field follows the formatting rules for a ST field except that it is drawn from a table of legal values. There shall be an HL7 table number associated with ID data types. Examples of ID fields include religion and sex. This data type should be used only for HL7 tables. The reverse is not true, since in some circumstances it is more appropriate to use the CE data type for HL7 tables.

IS
Coded Value for User Defined Tables

The value of such a field follows the formatting rules for a ST field except that it is drawn from a site-defined (or user-defined) table of legal values. There shall be an HL7 table number associated with IS data types. An example of an IS field is the *Event reason code* defined in Section 3.3.1.4 [of the full HL7 standard], "Event reason code." This data type should be used only for user-defined tables. The reverse is not true, since in some circumstances, it is more appropriate to use the CE data type for user-defined tables.

NM
Numeric

A number represented as a series of ASCII numeric characters consisting of an optional leading sign (+ or -), the digits and an optional decimal point. In the absence of a sign, the number is assumed to be positive. If there is no decimal point the number is assumed to be an integer. Examples: |999| |-123.792|

Leading zeros, or trailing zeros after a decimal point, are not significant. For example, the following two values with different representations, "01.20" and "1.2", are identical. Except for the optional leading sign (+ or -) and the optional decimal point (.), no non-numeric ASCII characters are allowed. Thus, the value <12 should be encoded as a structured numeric (SN) (preferred) or as a string (ST) (allowed, but not preferred) data type.

ST
String Data

String data is left justified with trailing blanks optional. Any displayable (printable) ACSII characters (hexadecimal values between 20 and 7E, inclusive, or ASCII decimal values between 32 and 126) except the defined delimiter characters. Example: |almost any data at all|

To include any HL7 delimiter character (except the segment terminator) within a string data field, use the appropriate HL7 escape sequence.

Usage note: the ST data type is intended for short strings (e.g., less than 200 characters). For longer strings the TX or FT data types should be used.

TS
Time Stamp

Format: YYYY[MM[DD[HHMM[SS[.S[S[S[S]]]]]]]][+/-ZZZZ]^<degree of precision>

Contains the exact time of an event, including the date and time. The date portion of a time stamp follows the rules of a date field and the time portion follows the rules of a time field. The specific data representations used in the HL7 encoding rules are compatible with ISO 8824-1987(E).

In prior versions of HL7, an optional second component indicates the degree of precision of the time stamp (Y = year, L = month, D = day, H = hour, M = minute, S = second). This optional second component is retained only for purposes of backward compatibility.

In the current and future versions of HL7, limiting the number of digits used, unless the optional second component is present, indicates the precision. Thus, YYYY is used to specify a precision of "year," YYYYMM specifies a precision of "month," YYYYMMDD specifies a precision of "day," YYYYMMDDHH is used to specify a precision of "hour," YYYYMMDDHHMM is used to specify a precision of "minute," YYYYMMDDHHMMSS is used to specify a precision of seconds, and YYYYMMDDHHMMSS.SSSS is used to specify a precision of ten thousandths of a second. In each of these cases, the time zone is an optional component. Maximum length of the time stamp is 26.

Examples:

19760704010159-0600	1:01:59 on July 4, 1976 in the Eastern Standard Time zone.
19760704010159-0500	1:01:59 on July 4, 1976 in the Eastern Daylight Saving Time zone.
198807050000	Midnight of the night extending from July 4 to July 5, 1988 in the local time zone of the sender.
19880705	Same as prior example, but precision extends only to the day. Could be used for a birth date, if the time of birth is unknown

XAD Address	Components: <street address (ST)> ^ <other designation (ST)> ^ <city (ST)> ^ <state or province (ST)> ^ <zip or postal code(ST)> ^ <country (ID)> ^ < address type (ID)> ^ <other geographic designation (ST)>^ <county/parish code (IS)> ^ <census tract (IS)> ^ <address representation code (ID)> Example: |1234 Easy St.^Ste. 123^San Francisco^CA^95123^USA^B^^SF^^|
Street address (ST)	The street or mailing address of a person or institution
Other designation (ST)	Second line of address. In general, it qualifies address. Examples: Suite 555 or Fourth Floor.
State or province (ST)	State or province should be represented by the official postal service codes for that country.
Zip or postal code (ST)	Zip or postal codes should be represented by the official codes for that country. In the US, the zip code takes the form 99999[-9999], while the Canadian postal code takes the form A9A-9A9.
Country (ID)	Defines the country of the address. See Table 0212
Address type (ID)	Address type is optional.
Other geographic designation (ST)	Other geographic designation includes country, bioregion, SMSA, etc.
County/parish code (IS)	A code that represents the county in which the specified address resides. Refer to *user-defined table 0289 - County/parish*. When this component is used to represent the county (or parish), component 8 "other geographic designation" should not duplicate it (i.e., the use of "other geographic designation" to represent the county is allowed only for the purpose of backward compatibility, and should be discouraged in this and future versions of HL7).
XPN Extended Person Name	Components: <family name (ST)> & <last name prefix (ST)> ^ <given name (ST)> ^ <middle initial or name (ST)> ^ <suffix (e.g., JR or III) (ST)> ^ <prefix (e.g., DR) (ST)> ^ <degree (e.g., MD) (ST)> ^ <name type code (ID) > ^ <name representation code (ID)> Example: |Smith&St^John^J^III^DR^PHD^L|
Suffix (ST)	Used to specify a name suffix (e.g., Jr. or III).
Prefix (ST)	Used to specify a name prefix (e.g., Dr.).
Degree (ST)	Used to specify an educational degree (e.g., MD).
Name type code (ID)	A code that represents the type of name. Refer to *HL7 table 0200 - Name type* for valid values. **Note:** The legal name is the same as the current married name.
Name representation code (ID)	This component can be used when names are represented in ideographic or non-alphabetic systems. NMSIIS ignores this component.
XTN Extended Telecommunication Number	Components: [**N**NN] [(999)]999-9999 [X99999] [B99999] [C any text] ^ <telecommunication use code (ID)> ^ <telecommunication equipment type (ID)> ^ <email address (ST)> ^ <country code (NM)> ^ <area/city code (NM)> ^ <phone number (NM)> ^ <extension (NM)> ^ <any text (ST)> Example: (415)555-3210^ORN^FX^ **[(999)] 999-9999 [X99999] [C any text]** Defined as the TN data type, except that the length of the country access code has been increased to three.
Telecommunication use code (ID)	A code that represents a specific use of a telecommunication number. Refer *to HL7 table 0201 - Telecommunication use code* for valid values.
Telecommunication equipment type (ID)	A code that represents the type of telecommunication equipment. Refer *to HL7 table 0202 - Telecommunication equipment type* for valid values.

Appendix C -- HL7 Tables

The following tables are excerpted or adapted from the HL7 standard. They give valid values for fields in the segments defined in this document. Please refer to CDC Guidelines for Exchange of Immunizations Transactions, v2.3, for further information on reference Tables listed in this document.

HL7-defined Table 0003 - Event type{ XE "Code Tables:Event type" **}** [only selected values listed] (use in MSH-9, second component)

Value	Description
V01	VXQ - Query for vaccination record
V03	VXR - Vaccination record response
V04	VXU - Unsolicited vaccination record update

HL7-defined Table 0008 - Acknowledgment code{ XE "Code Tables:Acknowledgment code" **}** (use in MSA-1)

Value	Description
AA	Original mode: Application Accept Enhanced mode: Application acknowledgment: Accept
AE	Original mode: Application Error Enhanced mode: Application acknowledgment: Error
AR	Original mode: Application Reject Enhanced mode: Application acknowledgment: Reject

HL7-defined Table 0048 - What subject filter{ XE "Code Tables:What subject filter" **}** (use in QRD-9)

Value	Description
VXI	Vaccine Information

HL7-defined Table 0076 - Message type{ XE "Code Tables:Message type" **}** (use in MSH-9, first component)

Value	Description
ACK	General acknowledgment
QCK	Query general acknowledgment
VXQ	Query for vaccination record
VXR	Vaccination query record response
VXU	Unsolicited vaccination record update

HL7-defined Table 0091 - Query priority{ XE "Code Tables:Query priority" **}** (use in QRD-3)

Value	Description
D	Deferred
I	Immediate

User-defined Table 0203 - Identifier type (use in PID-3)

Value	Description
MA	Medicaid number
MR	Medical Record number
PI	Patient Internal Number
SS	Social Security Number

HL7-defined Table 0103 - Processing ID{ XE "Code Tables:Processing ID" **}** (use in MSH-11)

Value	Description
D	Debugging
P	Production
T	Training

HL7-defined Table 0104 - Version ID{ XE "Code Tables:Version ID" **}** (use in MSH-12)

Value	Description
2.2	Release 2.2 December 1994
2.3	Release 2.3 March 1997
2.3.1	Release 2.3.1 May 1999
2.4	Release 2.4 October 2000

HL7-defined Table 0155 - Accept/Application acknowledgment conditions{ XE "Code Tables:Accept/Application acknowledgment conditions" **}** (use in MSH-15 and 16)

Value	Description
AL	Always
NE	Never
ER	Error/Reject conditions only
SU	Successful completion only

User-defined Table 0208 - Query response status{ XE "Code Tables:Query response status" **}** [values suggested by HL7] (use in QAK-2)

Value	Description
OK	Data found, no errors (this is the default)
NF	No data found, no errors
AE	Application error
AR	Application reject

HL7-defined Table 0357 - Message error status codes{ XE "Code Tables:Message error status codes" **}** (use in ERR-1)

Status code	Status text	Description/Comment
Success		
0	Message accepted	Success. Optional, as the AA conveys this. Used for systems that must always return a status code.
Error status codes		
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., an NM 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.
Rejection status codes		
200	Unsupported message type	The Message type is not supported.
201	Unsupported event code	The Event Code is not supported.
202	Unsupported processing ID	The Processing ID is not supported.
203	Unsupported version ID	The Version ID is not supported.
207	Application internal error	A catchall for internal errors not explicitly covered by other codes.

User-defined Table 0441 - Immunization registry status{ XE "Code Tables:Immunization registry status" **}** (use in PD1-16)

Value	Description
A	Active
I	Inactive
L	Inactive-Lost to follow-up (cannot contact)
M	Inactive-Moved or gone elsewhere (transferred)
P	Inactive-Permanently inactive (do not re-activate or add new entries to this record)
O	Other
U	Unknown

NIP-defined NIP001 - Immunization information source{ XE "Code Tables:Immunization information source" **} (use in RXA-9)**

Value	Description
00	New immunization record
01	Historical information - source unspecified
02	Historical information - from other provider
03	Historical information - from parent's written record
04	Historical information - from parent's recall
05	Historical information - from other registry
06	Historical information - from birth certificate
07	Historical information - from school record
08	Historical information - from public agency

NIP-defined NIP002 - Substance refusal reason{ XE "Code Tables:Substance refusal reason" **}** (use in RXA-18)

Value	Description
00	Parental decision
01	Religious exemption
02	Other (must add text component of the CE field with description)
03	Patient decision

HL7-defined Table 0322 - Completion status{ XE "Code Tables:Completion status" **}** (use in RXA-20)

Value	Description
CP	Complete
RE	Refused
NA	Not Administered
PA	Partially Administered

HL7-defined Table 0323 - Action code{ XE "Code Tables:Action code" **}** (use in RXA-21)

Value	Description
A	Add
D	Delete
U	Update

User-defined Table 0001 – Sex { XE "Code Tables:Sex" **}** (use in PID-8)

Value	Description
F	Female
M	Male
U	Unknown

User-defined Table 0396 – Coding system{ XE "Code Tables:Coding System" **}** [only selected values listed] (Use in CE data types to denote the coding system used for coded values)

Value	**Description**
99zzz or L	Local general code (where z is an alphanumeric character)
C4	CPT-4
C5	CPT-5
CDCA	CDC Analytic Codes
CDCM	CDC Methods/Instruments Codes
CPTM	CPT Modifier Code
CVX	CDC Vaccine Codes
HB	HIBCC
HCPCS	HCFA Common Procedure Coding System
HL7nnnn	HL7 Defined Codes where nnnn is the HL7 table number
HPC	HCFA Procedure Codes (HCPCS)
I10	ICD-10
I10P	ICD-10 Procedure Codes
I9	ICD9
I9C	ICD-9CM
ISOnnnn	ISO Defined Codes where nnnn is the ISO table number
LN	Logical Observation Identifier Names and Codes (LOINC®)
MCD	Medicaid
MCR	Medicare
MVX	CDC Vaccine Manufacturer Codes
NPI	National Provider Identifier
SNM	Systemized Nomenclature of Medicine (SNOMED®)
SNM3	SNOMED International
SNT	SNOMED topology codes (anatomic sites)
UML	Unified Medical Language
UPC	Universal Product Code

NIP-defined NIP003 - Observation identifiers{ XE "Code Tables:Observation identifiers" **}** (use in OBX-3)

LOINC®{ XE "LOINC®" } Code	Description **Vaccines Due Next**	Corresponding data type (indicate in OBX-2)	Corresponding observation value ***EXAMPLE*** OR code table to use (value in OBX-5)
30979-9	Vaccines due next	(CE)	HL70292 (CVX)
30980-7	30979-9&30980-7 – Date vaccine due	(TS)	19980526
30973-2	30979-9&30973-2 -- Vaccine due next dose number	(NM)	1
30981-5	30979-9&30981-5 – Earliest date to give	(TS)	19980522
30982-3	30979-9&30982-3 – Reason applied by forecast logic to project this vaccine	(CE) or (ST)	Codes for forecast logic reason locally defined.

User-defined Table 0212 - Nationality{ XE "Code Tables:Nationality" **}** (use in PID-28)

Value	Description
CAN	Canada
MEX	Mexico
USA	United States
UMI	United States Minor Outlying Islands

HL7-defined Table 0201 - Telecommunication use code [only selected values listed] { XE "Code Tables:Telecommunication use code" } (use in all XTN data types; PID-13, 14)

Value	Description
PRN	Primary residence number
ORN	Other residence number
WPN	Work number
NET	Network (email) address
BPN	Beeper number

HL7-defined Table 0202 - Telecommunication equipment type [only selected values listed { XE "Code Tables:Telecommunication equipment type" } (use in all XTN data types; PID-13, 14)

Value	Description
PH	Telephone
FX	Fax
CP	Cellular phone
BP	Beeper

HL7-defined Table 0190 - Address type{ XE "Code Tables:Address type" } (use in all XAD data types; PID-11)

Value	Description
C	Current or temporary
P	Permanent
M	Mailing
B	Firm/Business
O	Office
H	Home
F	Country of origin
L	Legal address

HL7-defined Table 0227 - Manufacturers of vaccines (code = MVX){ XE "Code Tables:Manufacturers of Vaccines (code = MVX)" }
Please refer to CDC web site under Immunization Information Systems for more information.
(http://www.cdc.gov/vaccines/programs/iis/default.htm)

HL7-defined Table 0292 - Codes for Vaccines administered (code=CVX or Code=CPT){ XE "Code Tables:Codes for vaccines administered (code = CVX)" }
Please, refer to CDC web site under Immunization Information Systems for more information.
(http://www.cdc.gov/vaccines/programs/iis/default.htm)

HL7-User-defined Table 0289 – South Carolina Counties{ XE "Code Tables:Ethnic Group" } (use in PID-11)

01	Abbeville	17	Dillon	33	Marion
02	Aiken	18	Dorchester	34	Marlboro
03	Allendale	19	Edgefield	35	McCormick
04	Anderson	20	Fairfield	36	Newberry
05	Bamberg	21	Florence	37	Oconee
06	Barnwell	22	Georgetown	38	Orangeburg
07	Beaufort	23	Greenville	39	Pickens
08	Berkeley	24	Greenwood	40	Richland
09	Calhoun	25	Hampton	41	Saluda
10	Charleston	26	Horry	42	Spartanburg
11	Cherokee	27	Jasper	43	Sumter
12	Chester	28	Kershaw	44	Union
13	Chesterfield	29	Lancaster	45	Williamsburg
14	Clarendon	30	Laurens	46	York
15	Colleton	31	Lee	99	Out of State
16	Darlington	32	Lexington		

HL7-defined Table 0162 - Route of administration{ XE "Code Tables:Route of administration" **}** [only selected values listed] (use in RXR-1)

Value	Description
ID	Intradermal
IM	Intramuscular
IN	Intranasal
IV	Intravenous
PO	Oral
OTH	Other/Miscellaneous
SC	Subcutaneous
TD	Transdermal

HL7-defined Table 0163 - Administrative site{ XE "Code Tables:Administrative site" **}** [only selected values listed] (use in RXR-2)

Value	Description
LT	Left Thigh
LA	Left Arm
LD	Left Deltoid
LG	Left Gluteous Medius
LVL	Left Vastus Lateralis
LLFA	Left Lower Forearm
RA	Right Arm
RT	Right Thigh
RVL	Right Vastus Lateralis
RG	Right Gluteous Medius
RD	Right Deltoid
RLFA	Right Lower Forearm

User-defined Table 0005 - Race{ XE "Code Tables:Race" **}** (use in PID-10)

US race codes (included in HL7 Version 2.4) (entire hierarchical set of codes at http://www.cdc.gov/od/hissb/docs/Race-EthnicityCodeSet.pdf)	Description	NIP original race codes	Description
1002-5	American Indian or Alaska Native	I	American Indian or Alaska Native
2028-9	Asian	A	Asian or Pacific Islander
2076-8	Native Hawaiian or Other Pacific Islander	A	Asian or Pacific Islander
2054-5	Black or African-American	B	Black or African-American
2106-3	White	W	White
2135-2	Hispanic or Latino	H	Hispanic
2186-5	not Hispanic or Latino	N	
2131-1	Other Race	O	Other
	Unknown	U	Unknown

User-defined Table 0189 - Ethnic Group{ XE "Code Tables:Ethnic Group" **}** (use in PID-22)

US ethnicity codes	HL7 Version 2.4 ethnicity codes	NIP's original temporary values (obsolete)	Description
2135-2	H	H	Hispanic or Latino
2186-5	N	NH	not Hispanic or Latino
	U		Unknown

Appendix D – Examples

The following HL7 examples are excerpted or adapted from the CDC Guidelines for Exchange of Immunizations Transactions v2.2.

Unsolicited Vaccination Record Update (VXU)

The example below of an unsolicited update of a vaccination record demonstrates a message with only the minimum number of fields valued.

MSH|^~\&|testIIS|554^testIIS|SIIS|SC-DHEC|20110613133136418||VXU^V04|19970522MA53|P|2.3.1||<CR><LF>
PID|||221345671^^^^SS||KENNEDY^JOHN^FITZGERALD^JR|BOUVIER^^^^^^M|19900607|M|||~^^^^MA^^^BDL|<CR><LF>
RXA|0|1|19900607|19900607|08^HEPB-PEDIATRIC/ADOLESCENT^CVX|.5|ML^^ISO+|||||||| MRK12345||MSD^MERCK^MVX|<CR><LF>
RXA|0|1|19900608|19900608|03^DTAP ^CVX|.5|ML^^ISO+|||||||| MRK12345||MSD^MERCK^MVX|<CR><LF>
RXA|0|1|19900607|19900609|^^^90721^DTAP-HIB^C4|<CR><LF>

Query for Vaccination Record (VXQ)

MSH|^~\&|TESTIIS|554^TEST0000|SIIS|SC-DHEC|199705221605||VXQ^V01|19970522GA40|T|2.3.1|||NE|AL|<CR><LF>
QRD|199705221605|R|I|19970522GA05|||25^RD|^KENNEDY^JOHN^FITZGERALD^JR|VXI^VACCINE INFORMATION^HL70048|^SIIS|<CR><LF>
QRF|SC-DHEC||||256946789~19900607~MA~MA99999999~88888888~KENNEDY^JACQUELINE^LEE~BOUVIER~898666725~KENNEDY^JOHN^FITZGERALD~822546618|<CR><LF>

In this query, the Georgia state registry with Location ID (GA0000) is sending a request to the SCI-Registry for the immunization record of John Fitzgerald Kennedy, Jr., who was born on June 7, 1990. The request is being sent on May 22, 1997, at 4:05 p.m. All known patient identifiers are included in the sample query for use in matching records. These identifiers are defined by their position in the QRF segment. The responding system is expected to return all query items in its response.

If the requestor knew only the patient's SSN and birth date, this is how the QRF-5 would appear: |400551234~19900607|

If in addition to the SSN and birth date, the patient's birth state and mother's current and maiden name were known, this is how the QRF-5 would appear: |400551234~19900607~MA~~~KENNEDY^JACQUELINE^LEE~BOUVIER|

Response to Vaccination Query Returning the Vaccination Record (VXR)

The example below reflects a vaccination record response from an immunization registry to a query from an immunization registry in one state to another state registry, but is typical of a response from an immunization registry to one of its participating private health care providers. The example demonstrates the use of optional segments in the message to provide more detail about the patient. Having made an exact match, this response provides the immunization history.

MSH |^~\&| TESTIIS |123457689^Test|SIIS|SC-DHEC|199705221605||VXR^V03^V03|1997052XXX40|T|2.4|||NE|AL||<CR><LF>
MSA|AA|19970522GA40||<CR><LF>
QRD|199705221605|R|I|19970522GA05|||25^RD|^KENNEDY^JOHN^FITZGERALD^JR|VXI^VACCINE INFORMATION^HL70048|^SIIS||<CR><LF>
QRF|SC-DHEC||||256946789~19900607~MA~MA99999999~88888888~KENNEDY^JACQUELINE^LEE~BOUVIER~898666725~KENNEDY^JOHN^FITZGERALD~822546618||<CR><LF>
PID|||||KENNEDY^JOHN^FITZGERALD^JR^^^L||<CR><LF>
RXA|0|1|19910907|19910907|50^DTAP-HIB^CVX^90721^DTAP-HIB^C4|.5|||||||||W46932777|199208|PMC^PASTEUR MERIEUX CONNAUGHT ^MVX|||||19910907120030||<CR><LF>
RXR|IM^INTRAMUSCULAR^HL70162|LA^LEFT ARM^HL70163||<CR>
RXA|0|1|19910907|19910907|03^MMR^CVX|.5|||||||||W2348796456|19920731|MSD^MERCK^MVX||<CR><LF>
RXR|SC^SUBCUTANEOUS^HL70162|LA^LEFT ARM^HL70163||<CR><LF>
RXA|0|5|19950520|19950520|^^^90721^DTAP-HIB^C4|.5|||||||||W22532806|19950705| PMC^PASTEUR MERIEUX CONNAUGHT ^MVX||<CR><LF>
RXR|IM^INTRAMUSCULAR^HL70162|LA^LEFT ARM^HL70163||<CR><LF>

Appendix D – Misc.

Error Messages:

The messages below describe some of standard error or warning message you may receive during processing.

Messages	Meanings
Error	
ADDING INDIVIDUAL SHOT RECORD	Error occurred while adding Vaccination Shot.
NO INDIVIDUAL PATIENT IDENTIFIED	No action was taken do to multiple patients found based on search parameter given.
MESSAGE TYPE NOT SUPPORTED	HL7 Message Type is not support by SCI-Registry system
ADDING INDIVIDUAL PATIENT RECORD	Error occurred while adding Client demographic information
Duplicate Shot Information	The Vaccine CPT/CVX Code and Date already exist in the clients record
Duplicate Shot Information (Lot Present)	The incoming update request does not have a Lot Number and SCI-Registry has a record in the client's history with the same Vaccine CPT/CVX Code, Date and a Lot Number. SCI-Registry will not update record.
Rec – <##> – {Shot Name} – Message	Indicate which Shot record wasn't uploaded into SCI-Registry due specified Error message.
Warning	
Warning: MVX Code[Mxv Code ID] not on file in SCI-Registry	The MVX supplied is not present in SCI-Registry however the shot record was added without this information.
ADDING INDIVIDUAL SHOT RECORD	Error occurred while adding Demographic (address, phone, etc) information however Shot information was added to SCI-Registry

Examples:

```
MSH|^~\&|SIIS|SC-DHEC|TESTIIS|559999|20100806161406||ACK|SC20100806161406579|P|2.4|1|||||||||
MSA|AE|103405test|ERROR: ADDING INDIVIDUAL SHOT RECORD|||207^Rec 1-Error: Duplicate Shot
Information; Rec 2-Error: Duplicate Shot Information; Rec 3-Error: Duplicate Shot Information;
^HL70357

MSA|AE|103405test|Error: No Client Found|||
ERR|0^MESSAGE ACCEPTED^HL70357
QAK|103405test|NF||||
```

SFTP Transmission

HIE-<Process Date>_<Filename>.ack	This file contains acknowledgement messages process within the filename.
<Filename>.Err	This file indicate that a system processing error occurred which the user should contact DHEC SCI-Registry HelpDesk for further information (SCIRegistryEx@dhec.sc.gov).
RESEND_ <Filename>	This File indicates that your file was re-process by DHEC due to system processing error.
HIE-<Process Date>_RESEND_<Filename>.ack	This file contains acknowledgement messages process within the filename.