

Implementation Guide for Immunization Messaging 2.8.2

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# Introduction

The reduction of vaccine-preventable diseases is a major goal of clinical care providers and the Public Health community. The exchange of data between systems which operate at the point of clinical care, including Electronic Health Record systems (EHR-S) and systems which consolidate vaccination data is critical to achieving this goal. Immunization information systems (IIS) are defined by the Centers for Disease Control and Prevention (CDC) as confidential, population-based, computerized databases that record all immunization doses administered by participating providers to persons residing within a given geopolitical area. IIS receive and share data on individual clients/patients (note that client and patient are terms which we interchangeably in this document) with a number of other systems, including EHR-S and other IIS. This implementation guide documents the electronic data exchange requirements for a number of use cases within the immunization workspace in the US Realm.

Health Level Seven (HL7) is a nationally recognized standard for electronic data exchange between systems housing health care data. The HL7 standard is a key factor that supports this two-way exchange of information because it defines a syntax or grammar for formulating the messages that carry this information. It further describes a standard vocabulary that is used in these messages. It does not depend on specific software, that is, it is platform independent.

## Purpose

This document represents the collaborative effort of the immunization community to improve inter-system communication of immunization records. The effort has received input from the National Institute of Standards and Technology (NIST) to improve the capacity to test conformance with this Implementation Guide. In addition, this document addresses a need to specify usage requirements for data elements that are not included in the standard HL7 usage designations. It is based on HL7 Version 2.8.2, as published by the HL7 organization (www.hl7.org). The content of this document is based on Release 1.5 of the Implementation Guide for Immunization Messaging published by the American Immunization Registry Association (AIRA) and CDC. Release 1.5 is the latest in a series of implementation guides, the first of which was balloted through HL7 as a "for comment" document. Minor changes have been made to account for the move from version 2.5.1 to version 2.8.2, but otherwise the majority of the content of this document is based on the Release 1.5 workflows and specifications.

This document defines message profiles which are used as the basis for building and consuming individual messages during an exchange. Message profiles are combined to define message exchanges which will support the major use cases. Each profile will be in a separate section. All profiles will rely on the common data type definitions.

## Audience

This document is intended for analysts and developers from systems who wish to exchange immunization data. Such systems include but are not limited to IIS and EHR-S that must implement these guidelines. For all readers, we strive for an unambiguous specification for creating and interpreting messages.

It is important to note that HL7 specifies the exchange between 2 systems. It does not specify how any given system is implemented to accomplish the goals of messaging.

Readers of this document should be familiar with the basic premises of the HL7 Version 2.x.

## Scope

This document is intended to facilitate the exchange of immunization records between different systems.

While this document is intended to be applicable across a large range of systems and jurisdictions, local policies and requirements may necessitate additional constraints. One way to insure success in such a scenario is to publish a local profile or implementation guide that outlines the local business rules and processes. These guides may further constrain this document, but may not contradict it. We strongly recommend that local implementation guides are published in he format of a "delta" document which only highlights areas where the local guide diverges from this one.

### In Scope

The following items are in scope for this document:

* Sending immunization events for a patient, including sending demographics and observations about a patient or immunization event (this may include patient eligibility for a funding program, reactions,immunity, etc)
* Acknowledging receipt of immunization events
* Requesting a complete immunization history for a patient
* Responding to a request for a complete immunization history
* Requesting an evaluated history and forecast for a patient
* Responding to requests for an evaluated history and forecast
* Reporting errors in the messaging process

### Out of Scope

The following items are in scope for this document:

* Business rules, which are not implicit in HL7, applied when creating a message, including defining events which trigger the creation of the message
* Business rules, which are not implicit in HL7, applied when processing a received message
* A standard transport layer (although use of standard transport methods is highly recommended)
* Search process used when responding to a query
* Business rules used to deduplicate clients or events
* Management of vaccine inventory
* Legal and governance issues regarding data access authorizations, data ownership and data use
* Maintenance of Master Person Index (MPI).

## Key Technical Decisions

This section will contain a basic description of the terms and definitions, which are used in this document in order to understand the Health Level 7 standard as it applies to immunization information systems. More detail may be found in the HL7 2.8.2 standard in Chapters 1, 2 ,2A, 2B and 2C.

### Use of Vocabulary Standards

This guide calls for specific vocabulary standards for the exchange of immunization information such as LOINC and SNOMED. Standard vocabularies enable automated decision support for patient healthcare, as well as for public health surveillance of populations. Terminology is updated periodically and it is best practice to use the most current version of the coding system when allowed by the value set. In particular, support for the most recent iterations of the CVX (vaccine) and MVX (manufacturer) codes sets is required.

### Conventions

This guide adheres to the following conventions:

* This document is constructed assuming the implementer has access to the Version 2.8.2 of the HL7 Standard. Although some information from the standard is included in this implementation guide, much information from the standard has not been repeated here.
* Data types have been described separately from the fields that use the data types. Where requirements for the data type diverge from the base standard "date type flavors" have been defined. Each flavor is cconstrained to suit a particular use for a message element. For some data types, multiple flavors are defined as the requirements for the data type varies by location in the message.
* No conformance information is provided for optional message elements. This includes length, usage, cardinality, value sets and descriptive information. Implementers who want to use optional message elements should refer to the base HL7 V2.8.2 Standard to determine how these optional message elements will be used.
* This document uses X as a conformance usage indicator very sparingly. Where the underlying standard indicates the segment/field/component is present as withdrawn ("W") an X will be used. Some conditional elements may have a usage of X if the predicate condition is the only case where the element is used. For all other fields/components O is used to enable trading partners to explore additional capabilities. Note that without a clearly agreed to complementary profile between trading partners, a sender does not have to send any elements marked as an "O", nor does a receiver have to process any elements marked as an "O".

### Keywords

The following keywords in this document are to be interpreted as follows:

**MUST**or the terms "**REQUIRED**" or "**SHALL**", mean that the definition is an absolute requirement of the specification.

**MUST NOT** or the phrase "**SHALL NOT**", mean that the definition is an absolute prohibition of the specification.

**SHOULD**or the adjective "**RECOMMENDED**", mean that there may exist valid reasons in particular circumstances to ignore a particular item, but the full implications must be understood and carefully weighed before choosing a different course.

**SHOULD NOT** or the phrase "**NOT RECOMMENDED**" mean that there may exist valid reasons in particular circumstances when the particular behavior is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behavior described with this label.

**MAY**or the adjective "**OPTIONAL**", mean that an item is truly optional. One software supplier may choose to include the item to enable certain capabilities while another software supplier may omit the same item. In either case, the communication partner cannot be expected to either provide it (sender) or process it (receiver) without clear and voluntary agreement between the partners.

An implementation which does not include a particular segment/field/component marked as optional **MUST**be prepared to interoperate with another implementation which does include the optional segment/field/component, though perhaps with reduced functionality. In the same vein an implementation which includes a particular segment/field/component marked as optional **MUST**be prepared to interoperate with another implementation which does not include the optional segment/field/component.

### Message Acknowledgement

Original Mode processing is supported by this Implementation Guide. Enhanced Mode Acknowledgement is not supported.

The conversation between an initiating system and a responding system consists of a message (VXU, QBP) and a response (ACK, RSP). Responding systems are expected to process the message and send a response. The system receiving the acknowledgement response does not acknowledge the response. In other words, the system receiving a VXU is expected to return an ACK. The system receiving that ACK is not expected to respond back to that ACK.

All response messages (profiles Z23, Z32, Z31, Z33 and Z42) shall be returned synchronously. That is, the receiving process gives the response immediately or in a short period during which the originating process will wait for the response. The originating process will not send a new message until a response has been received. The originating process will not send a new message until a response has been received. A system may initiate multiple simultaneous processes if allowed, but each process must wait for a response to a given message before sending the next one. For query interactions, this behavior is controlled by the constrained value of I in the Query Priority (RCP-2) field. See Chapter 5 of the HL7 2.8.2 Base Standard for more details.

Profiles Z22, Z34 and Z44 have constrained values of ER for Accept Acknowledgement Type (MSH-15) and AL for Application Acknowledgement Type (MSH-16). When processing a message conformant with one of these profiles, the responding system shall evaluate the message for unsupported message types, version ID, and processing IDs or other issues unrelated to format or content. If the message fails this validation, an ACK message conforming to profile Z23 shall be returned. This is consistent with ER in MSH-15. Messages which pass this initial validation are then processed and an appropriate Application level response message is returned. This is consistent with AL in MSH-16. Note that messages which fail the initial validation are not processed further and therefore do not have the opportunity to trigger an Application level response message. The responding system only returns one message per incoming message. This process is diagrammed in Figure xxx (Z22 profile), Figure xxx (Z34 profile) and Figure xxx (Z44 profile).

Receipt and processing of ACK messages has a number of significant benefits:

* Notification of errors and rejected data alerts sender that message has errors and may require correction
* Alerting sending user that the data did not get into the receivers system

Some messages pass through intermediary systems like a Health Information Exchange (HIE). It is important that the intermediary system pass the ACK back to the initiating system to allow that system to be aware of and deal with messaging errors.

### Other Decisions

**Delete Indicator:**The delete indicator ("") should not be sent in immunization messages.

**Z segments:**All message types, trigger event codes, and segment ID codes beginning with Z are reserved for locally defined messages. No such codes will be defined within the HL7 Standard. The users of this document have agreed to eliminate Z segments from their implementations in order to produce a standard method that will be used nationally to transmit immunization data. Even though the profile identifier used by this this implementation guide (Z22, Z23, etc) begin with Z they are not locally defined and they are not Z-segments.

# Use Cases

This document defines a number of constrainable profiles that are combined to produce message exchanges which fulfill specific use cases. These use cases will be defined below. These use cases set the overall context for data exchange and are not intended to be the basis of a software design process.

## Actors

There are a number of primary actors involved in data exchange. These include:

* Immunization Information System (IIS)
* Electronic Health Record Systems (EHR-S) operating at the point of clinical care
* Other systems interested in contributing or leveraging immunization data
* Master Person Index (MPI) in a supporting role
* Health Information Exchange (HIE) in a supporting role
* Intermediary systems who act as a pass-through for messages between the originating system and ultimate intended recipient

This document will focus on the first 2 actors. These actors can be suppliers of data or consumers/requesters of data. Because all interactions involve an initiating message and a response message, interacting systems both send and receive messages during a single interaction. We will use the terms "initiating system" or "initiator" to describe the system which begins the interaction by constructing and transmitting the initial message. We will use terms "responding system" or "responder" to describe the system which is the ultimate recipient the initial message and who constructs and transmits a response message.

Note that we do not assume that the initiator or responder is a specific data source (IIS or EHR-S). One IIS may query another IIS or an EHR-S. Similarly, an EHR-S may send an immunization events to another EHR-S.

Other actors have an interest in the functions of an IIS and messaging. These include

* Clients/patients
* Users
* Policy makers
* Researchers
* Public Health agencies
* Clinicians
* Billing systems

These actors will not be directly addressed in this document. They interact through the primary actors to accomplish their needs.

The table below lists a number of messaging needs that relate to IIS and EHR-S. These are all candidates for HL7 messaging, although some are not currently implemented or are out of scope for this document.

**Table x-y Actors and Goals for Messaging**

|  |  |  |
| --- | --- | --- |
| **Actor** | **Responsibility** | **Messaging Goals** |
| Immunization Information System (IIS) | * Provide access to a complete, consolidated immunization record for each person in its catchment area * Supply individual immunization records to authorized users and systems * Support aggregate reporting and analysis * Evaluate immunization history and make recommendations for next doses * Store medical conditions that affect what vaccines are recommended * Support inventory management * Protect privacy of immunization data | * Receive immunization events and updates * Receive demographic updates * Receive requests for individual records * Receive observations about a person * Send observations about a person * Send immunization records to other systems * Send other systems evaluated immunization histories and forecasts of next doses due for a specific person * Request immunization record * Acknowledge receipt of message * Report processing errors from receipt of message |
| Electronic Health Record system (EHR-S) | * House a person's electronic health record * Make a person's record available to authorized persons * Provide decision support for clinical decisions. * Support inventory management * Protect privacy of immunization data | * Generate immunization event and updates * Generate demographic updates * Send immunization records to other systems * Generate observations about a person * Generate observations about a person * Request complete immunization history * Request evaluation on an immunization history and recommendations for next dose |

## General Assumptions

### Assumptions

* Infrastructure is in place to allow accurate and secure information exchange between information systems
* Providers access immunization information through either an EHR-S or immunization information system (IIS)
* Privacy and security has been implemented at an appropriate level
* Legal and governance issues regarding data access authorizations, data ownership and data use are outside the scope of this document
* The immunization record and demographic record for each patient contains sufficient information for the sending system to construct the immunization and demographic message properly
* External business rules are assumed to be documented locally

### Pre-conditions

* The patient exists in the initiating system
* The provider enters documentation of an immunization (either a new administration or a reported historical administration)
* The provider or the system activates a trigger to query an external system for a patient history (complete or evaluated)

### Post-conditions

* The responding system processes and, as necessary, stores and displays data from the message
* The responding system generates a response message appropriate for the initiating message profile
* The initiating system consumes and, as necessary, stores and displays data form the response message for technical or clinical use

## Use Case 1-Send Immunization Event

### Context

**Goal:**To send data about one or more immunization events for an individual client from one system to another and to receive an acknowledgement message back in return. The Sending System may be an Electronic Health Record system (EHR-S), an Immunization Information System (IIS) or another type of health information system. This use case includes new administrations, updates of existing administrations, deletion of existing administrations and documentation of immunization refusals. It also includes the messaging of patient and administration level observations. In addition to EHR-S and IIS, other systems could use this message to send immunization event information.

**Trigger Event:** A user or other actor or process adds, updates or deletes relevant information about a client or immunization event for a client in the sending system

**Initial Message Profiles:** Z22 (VXU^V04)

**Responding System Outcome:** The responding system processes the Z22 message and returns an acknowledgement message, including errors if any

**Response Message Profile:**Z23 (ACK)

**Initiating System Outcome:**The initiating system processes the Z23 acknowledgement message.

**Processing Mode:** The goal of a Z22 message is to send up-to-date information about a vaccination event and the patient receiving the vaccine. A conformant message may contain a view of the entire patient vaccination history as known by the system originating the VXU^V04 message, but it is not required to do so. In other words, a given Z22 conformant message may contain only a subset of all vaccinations events on the patient record, typically only those that have been added, updated or deleted as part of the event leading to the triggering of a message. The responding system is responsible for applying business rules to integrate the data received but should not assume that the message being processed represents the entire patient vaccination history. The data within any single order group (set of one ORC segment, one RXA segment and associated RXR and OBX segments, if any) should represent the complete set of data, as defined by the required (as per this implementation guide) and locally agreed to data elements, about the vaccination event as known by the system originating the message.

### User Story

A typical user story for the Send Immunization Event use case is as follows. A patient presents to a clinic for an encounter. A clinic staff member collects basic patient demographic information including name, date of birth and sex. A clinic provider reviews the patient's vaccination history and determines that the patient previously received a number of doses that are not yet currently documented electronically. The staff member determines that the patient needs additional vaccinations to meet standard recommendations. A clinician prepares and administers the doses to the patient and then enters the data into the EHR and transmits it to the IIS.

### Interaction Definition

This sequence diagram illustrates the message flow. The sender sends an immunization record in a VXU message. The trigger may be a new record or an update or delete of an existing record in the sending system records or may be triggered by some other event. The receiver accepts the message and processes it. The receiver sends an acknowledgment message in an ACK message. The transactions that are of interest are indicated by bold arrows.

It is important to note that the message may pass through intermediaries, such as a Health Information Exchange (HIE). The message comes from the initiating sender and the acknowledgement MUST be returned to the initiating system.

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**Figure xxx - Send Immunization Event Sequence Diagram**

### Dynamic Defintion

The following diagram illustrates the expected flow of events. Some event triggers the sending system to create and send a VXU. The receiving system accepts the VXU. If the message is of an unsupported message type, has an unsupported event code, has an unsupported processing ID or is unable to be processed for reasons unrelated to format or content, then the receiving system returns an ACK with the acknowledgement code of AR. Otherwise, the receiving system continues to process the message. It parses the message and processes according to the specifications of this profile and applies local business rules. If there are no errors, the acknowledgment code is set to AA. If there are errors, the acknowledgement code is set to AE. If the errors are fatal, then the message is rejected, otherwise the data are integrated into the receiving system. The acknowledgement code is returned to the sending system in an ACK message.

[MISSING IMAGE: , ]

**Figure xxx - Send VXU Activity Diagram**

### Scenarios

#### **Sending Adds**

When an administration is first documented in the initiating system, a "add" message is generated. The administration can either be a new administration (one for which the initiating system is claiming ownership) or a reported administration (performed elsewhere) which the initiating system is documenting (see documentation on RXA-9 for distinguishing between these using the Information Source code).

#### **Sending Updates or Deletions**

There are occasions when a system that has sent an immunization record to another system wishes to update or delete the record on the other system. Each system may have rules about the requester's right to change records.

If a system allows updates or deletions by HL7 message, use RXA-21 (Action Code) to request an update to or deletion of a specific record. The following diagram illustrates how the ORC-3 may be used to identify an immunization record for update. Note that the sending system includes the sending system unique ID for the immunization in the ORC-3 first component. The second component is the assigning authority, in this case a system that is labeled MYIIS. In order for a later message to be successful, the receiving system must store those values. A subsequent request to update or delete an immunization record includes the sending system ID and assigning authority. The receiving system searches for an immunization record with the same sending system id and assigning authority. In this case we show that the record match is made and the record is updated in or deleted from the receiving system.

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**Figure xxx - Deleting an Immunization Record Sequence Diagram**

#### **Sending Patient Eligibility Status**

Federal regulations specify that Patient Eligibility status be assessed at each immunization encounter. It is a key data element for creating the Vaccines for Children (VFC) report on vaccine usage. Support for this report requires that systems store a history of eligibility statuses at the dose administered level.

Immunization event messages must be able to convey the eligibility status of a recipient when they received immunizations. That is, for each dose administered, the person's eligibility should be recorded. Eligibility refers to what funding program should pay for the vaccine. This is distinctly different from funding source, which refers to what funding program actually paid for the vaccine.

In the past, eligibility was recorded for each visit where a patient received an immunization. Recent guidance from the Modeling Immunization Registry Operations Workgroup (MIROW) has clarified that the eligibility status of the patient should be recorded for each vaccine dose administered. As described in the MIROW document, a variety of factors play a role in determination of Patient Eligibility Status: VFC and grantee policies, age, private insurance coverage, type of provider, and type of vaccine to be administered. For instance, a person who was an Alaska Native receiving an MMR would have an eligibility status code of V04. Note that when an event could meet more than one eligibility, selection is based on priority and that eligibilities are mutually exclusive.

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**Figure xxx - Eligibility Status Determination**

Initiating systems which collect the eligibility status for each visit will need to associate the status recorded for that visit on each immunization administered at that visit. They should consider if the vaccine administered was eligible for the funding program when deciding what to assign as the eligibility for each immunization.

The following table is an illustration of the expected outcomes for eligibility determination:

**Table xxx - Sample Eligibility Outcomes**

|  |  |  |
| --- | --- | --- |
| **Determined Patient Eligibility** | **Vaccine Type Eligibility** | **Eligibility Outcome** |
| VFC eligible (V02-V05) | Vaccine type is eligible for VFC (e.g. DTAP, MMR, etc.) | Patient is VFC eligible |
| Any patient eligibility reason | Vaccine type is not eligible for VFC ( e.g. Yellow fever) | Patient is not VFC eligible |
| Not VFC eligible (V01) and no state or local program applies. | Any | Patient is not VFC eligible |
| Eligible for state or local vaccine program and not eligible for VFC | Vaccine is eligible for state or local program. | State or local eligibility |

Local requirements may necessitate the use of locally defined codes to message state specific codes.

If a locally defined funding program eligibility code is sent, then the person is presumed to be not eligible for VFC funded vaccine.

The OBX segment indicating patient eligibility in association with the dose administered is composed of a number of data elements. OBX-3 indicates that the segment contains patient eligibility status (LOINC 64994-7). OBX-5 indicates the eligibility status. OBX-17 indicates the method of observation (per visit or per immunization).

The method of capture is messaged in OBX-17 (Observation Method). If the eligibility is captured by vaccine dose, OBX-17 will be valued:

VXC40^per immunization^CDCPHINVS

If the method of capture is per visit, OBX-17 shall be valued:

VXC41^per visit^CDCPHINV

Patient eligibility status should not be recorded for immunizations that represent a historical record of an immunization.

#### **Sending Vaccine Funding Source**

The funding source in the context of an HL7 message indicates whether a dose of vaccine came from public or private funded inventory. Identification of the actual funding source for a given immunization is necessary to support inventory management and vaccine use accountability. Every immunization that is a current administration has one funding source.

Funding source codes usually reflects physical storage at provider site and indicate the inventory stock for either a two-stock storage model (Public or Private) or three-stock storage model (Public VFC, Public non-VFC, Private) from which each vaccine dose was taken. For publicly purchased vaccine, an IIS will use either VXC50 code (i.e., public) or the combination of VXC51 (i.e., Public VFC) and VXC52 (i.e., Public non-VFC) codes to record the inventory stock for publicly purchased vaccine. All funding source values should be mutually exclusive.

#### **Sending Vaccine Information Statements (VIS)**

The Vaccine Information Statement (VIS) is a document presented to patients or the legal guardians that explains the reasons for a vaccine and the potential risks from receiving the vaccine. IIS track the fact that a VIS was shared with the client or parent.

Historically, two methods have existed to transmit information in an HL7 message describing the VIS document(s). The first involves the use of 2D VIS barcode data strings, VIS Fully-encoded text string. The second involves the identification of the vaccine type or group along with the VIS publication date. The use of the VIS Fully-encoded text string is highly recommended when messaging VIS information. The alternative of using the vaccine type, publication date and presentation date LOINC codes is problematic and fails in several use cases including when sending manufacturer specific VIS information (such as for HPV) or when sending the Multiple Vaccines VIS document. This approach will not be described in this guide.

There are two pieces of information about each event.

* The VIS document type
* The date that the VIS was presented to the client/parent.

These elements are transmitted in separate OBX segments associated with a vaccination event (RXA). The OBX are linked by the value in the SubID field. (OBX-4).

The 13 digit Global Document Type Identifier (GDTI) is used to identify a document type while the 24 digit VIS Fully-encoded text string begins with 253 and includes the GDTI as well as the publication date. The VIS Fully-encoded text string represents a particular version of the VIS document and the publication date may be inferred from the VIS Fully-encoded text string (24 digits). It is the VIS Fully-encoded text string and not the GDTI that should be sent in OBX-5. The GDTI, Fully-encoded text string, and Edition Date are available in the VIS Lookup Table (http://www.cdc.gov/vaccines/programs/iis/code-sets/vis-barcode-lookup-table.html).

VIS documentation is required for all patients, but only for specific vaccines. Note that the most current list will be found on PHIN VADS.

#### **Sending Administration Refusals**

Patients or their parents may choose not to be immunized against a particular disease or diseases. It is important to share this information when sending immunization events using HL7. There are several components to messaging a refusal. The refusal reason is indicated in RXA-18. The Completion Status in RXA-20 indicates that the vaccine was not given. The amount given should be 0. Note that the ORC is still required. Filler Order Number is still required, but is not unique.

#### **Sending Partial Administrations**

There are occasions when a dose is not completely administered. For example, a child may jump away during injection and an unknown quantity was administered. In this case, the dose needs to be recorded to support accurate inventory management and to allow for recall of the client if there is a recall of the vaccine. This is accomplished using the Completion status in RXA-20. The RXA is completed as usual, but the completion status is set to PA. If more details are of interest, then this information may be placed in an NTE segment under an OBX segment.

#### **Sending Adverse Reactions**

**Definition:** An adverse reaction is a negative physical condition that occurs shortly after one or more immunizations have been received.

Information Systems (IIS) record these in conjunction with a specific immunization event. Occasionally, the exact immunization event information is unknown. (e.g. anaphylaxis occurred after a previous dose, years in the past.)

#### **Sending Evidence of Immunity**

**Definition:** Evidence of immunity indicates that a person has plausible evidence that they have already developed immunity to a particular disease. The strongest evidence of immunity is when serological evidence indicates immunity. An alternative evidence of immunity is when a clinician has determined that the patient has a history of the disease.

Infection with the diseases that are the target of immunizations leads to long-term immunity. Further immunization against the disease is not likely to provide benefit.

#### **Sending Contraindications**

**Definition:**A contraindication is any physical condition, current medication or other factor that indicates that a person should not receive an immunization that may be associated with the contraindication. This contraindication may be temporary or permanent.

There are a number of contraindications to immunization. One is a history of reactions to previous immunization. Others include allergies to components of vaccines, physical conditions, current medication and current illnesses.

#### **Sending Special Indications**

**Definition:**A risk factor is some characteristic of an individual, which may lead to a recommendation for a specific vaccine.

Several factors can drive the need for a specific immunization or a change in the normal schedule for immunization. These may be an exposure to an infection, such as rabies. Other risk factors may include membership in a risk group.

#### **Sending Acknowledgements**

Sending an acknowledgement can accomplish one of a number of tasks. It can indicate that the message that was sent was successfully received and processed. It can also indicate that the processing of the message resulted in errors.

The ability to accept ACK messages allows sending system managers to trouble-shoot communications. It allows them to identify systematic problems with message creation or data mapping. Being able to send ACK allows receiving system managers to inform sending system managers about the nature of errors received. The process can keep senders informed that some or all of the data they had sent did not make into the receiving system.

It is vital that when messages are passed on by an intermediary, like a Health Information Exchange (HIE), the ACK is passed back to the initiating system.

An error may be as serious as the rejection of an entire message or as trivial as the receipt of an unexpected field of data. ACK messages are intended to inform the original sender of the outcome of the message they had sent. Errors may be of a number of types. The error may be caused by:

* A violation of an HL7 standard
* A violation of local processing rules
* A failure in the transport layer between the 2 systems
* A failure by the sending system to be authenticated by the receiving system

Only the first 2 types of errors are addressed by this Implementation Guide.

##### **Sending Success Acknowledgements**

The originating system should expect to receive an acknowledgment message, even when the responding system successfully processed the message. Similarly, the responding system must be prepared to send an acknowledgement even wen it successfully processed the message. The purpose of this success acknowledgement is to inform the originating system that the data was received and processed.

The Acknowledgement Code (MSA-1) reports acceptance (AA).

While not recommended, in this scenario, an optional ERR segment may be sent with an HL7 Error Code (ERR-3.1) of and an Severity (ERR-4) of I. Such a segment would indicate that the responding system wishes to inform the originating system of additional non-error information, such as a confirmation of the number of new administrations processed.

##### **Sending Message Rejection Acknowledgements**

A responding system will reject the message and respond with an Acknowledgement Code (MSA-1) of AR only under one of the following 4 conditions:

* Unsupported Message Type (MSH-9)
* Unsupported Processing ID (MSH-11)
* Unsupported Version ID (MSH-12)
* Unable to process for reasons unrelated for format or content (system down, internal error, etc.).

##### **Sending Message Processing Error Acknowledgements**

A responding system may reject some or all of a message based on HL7 rules, including the following conditions:

* Empty or missing Required segment(s) not in a segment group (PID for example)
* Empty or missing Required segment(s) group
* Empty or missing Required segment(s) in a segment group
* Empty or missing Required field(s) in a Required segment

There may be additional rules that a receiving system enforces beyond those defined by HL7 definitions. For example, a local business rule may be that The date of birth shall be on or before today. If a message were received with a birth date in the future for the patient, the application would generate an error and the field could be treated as empty.

Because this is an error, the Acknowledgement Code (MSA-1) reports an error (AE). This error caused the receiving system to identify this as a serious error with data loss.

**<add content from ACK guidance document here>**

#### **Sample Messages**

##### **Add, Eligibility, Funding Source, VIS**

This scenario includes sending patient eligibility status, vaccine funding source and VIS documentation as well as historical and new administration records.

A two-month old male infant, Darren Franklin Wilson, is brought to the West Clinic for a well-child visit by his mother Tamara Violet Wilson (nee Scott) and his father Robert Wilson. A clinic staff member collects basic patient demographic information including name, date of birth and sex. A clinic provider, Vivian Jordan (physician ID 724) reviews the patient's vaccination history and determines that the child previously received Hepatitis B vaccine 1 day after birth and 1 month after birth. The staff member determines that the patient needs DTaP, Hib, IPV, Rotavirus and Pneumococcal vaccinations. Because of the patient's status of Native American, he qualifies for all Vaccine For Children (VFC) supplied vaccines under the status of VFC eligible " American Indian/Alaska Native. The parents are given 5 Vaccine Information Sheets (VIS) to review. After reading them, they agree that the child should receive all the vaccinations recommended. They also agree that the data should be shared once it is incorporated into the local IIS. Appropriate doses of DTaP/Hib/IPV (Pentacel), Rotavirus (RotaTeq) and Pneumococcal (Prevnar13) are selected from the clinics stock of publically funded vaccines. A clinician, Spencer Hill (ID 9914) prepares and administers the doses to the patient and then enters the data into the EHR and transmits it to the IIS.

MSH|^~\&||wcEHR||IIS|20160720123514.373-0500||VXU^V04^VXU\_V04|4850|P|2.8.2|||ER|AL|||||Z22^CDCPHINVS|wcEHR|IIS
PID|1||998756^^^wcEHR^MR||Wilson^Darren^Franklin^^^^L|Scott^^^^^^M|20160517|M||1002-5^American Indian or Alaska Native^CDCREC|99 Wellington Street^^Carson City^NV^89701^USA^P||^PRN^PH^^^775^5558458|||||||||2186-5^Not Hispanic or Latino^CDCREC||N|1|||||N
PD1|||||||||||07^Recall only - no calls^HL70215|Y|20160720|||A|20160512|20160720
NK1|1|Wilson^Tamara^Violet^^^^L|MTH^Mother^HL70063|99 Wellington Street^^Carson City^NV^89701^USA^P|^PRN^PH^^^775^5558458
NK1|2|Wilson^Robert^^^^^L|FTH^Father^HL70063|99 Wellington Street^^Carson City^NV^89701^USA^P|^PRN^PH^^^775^5558458
ORC|RE|3598^wcEHR|94560^wcEHR|||||||9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN||724^Jordan^Vivian^Sarah^^^^^wcEHR^L^^^MD|||||wcEHR^West Clinic^HL70362
RXA|0|1|20160720||49281-0560-05^Pentacel^NDC^120^DTaP-Hep B-IPV^CVX|0.5|mL^mL^UCUM||00^New Record^NIP001|9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN|||||170167|20170118|SKB^GlaxoSmithKline^MVX|||CP|A
RXR|C28161^Intramuscular^NCIT|RT^Right Thigh^HL70163
OBX|1|CE|30963-3^Vaccine Funding Source^LN|1|VXC50^Public^CDCPHINVS||||||F|||20160720
OBX|2|CE|64994-7^Vaccine Funding Program Eligibility^LN|2|V04^VFC Eligible - American Indian/Alaska Native^HL70064||||||F|||20160720|||VXC40^per immunization^CDCPHINVS
OBX|3|CE|69764-9^Document Type^LN|3|253088698300003511070517^Diphtheria/Tetanus/Pertussis (DTaP) VIS^cdcgs1vis||||||F|||20160720
OBX|4|DT|29769-7^Date Vis Presented^LN|3|20160720||||||F|||20160720
OBX|4|CE|69764-9^Document Type^LN|4|253088698300006611150402^Haemophilus Influenzae type b VIS^cdcgs1vis||||||F|||20160720
OBX|5|DT|29769-7^Date Vis Presented^LN|4|20160720||||||F|||20160720
OBX|5|CE|69764-9^Document Type^LN|5|253088698300017211111108^Polio VIS^cdcgs1vis||||||F|||20160720
OBX|6|DT|29769-7^Date Vis Presented^LN|5|20160720||||||F|||20160720
ORC|RE|4820^wcEHR|72363^wcEHR|||||||9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN||724^Jordan^Vivian^Sarah^^^^^wcEHR^L^^^MD|||||wcEHR^West Clinic^HL70362
RXA|0|1|20160720||00006-4047-20^RotaTeq^NDC^116^rotavirus, pentavalent^CVX|0.5|mL^mL^UCUM||00^New Record^NIP001|9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN|||||73048|20161207|MSD^Merck and Co., Inc.^MVX|||CP|A
RXR|C38288^Oral^NCIT|
OBX|1|CE|30963-3^Vaccine Funding Source^LN|1|VXC50^Public^CDCPHINVS||||||F|||20160720
OBX|2|CE|64994-7^Vaccine Funding Program Eligibility^LN|2|V04^VFC Eligible - American Indian/Alaska Native^HL70064||||||F|||20160720|||VXC40^per immunization^CDCPHINVS
OBX|3|CE|69764-9^Document Type^LN|3|253088698300019611150415^Rotavirus VIS^cdcgs1vis||||||F|||20160720
OBX|4|DT|29769-7^Date Vis Presented^LN|3|20160720||||||F|||20160720
ORC|RE|7021^wcEHR|82006^wcEHR|||||||9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN||724^Jordan^Vivian^Sarah^^^^^wcEHR^L^^^MD|||||wcEHR^West Clinic^HL70362
RXA|0|1|20160720||00005-1971-01^Prevnar 13^NDC^133^Pneumococcal conjugate PCV 13^CVX|0.5|mL^mL^UCUM||00^New Record^NIP001|9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN|||||802701|20161123|PFR^Pfizer, Inc^MVX|||CP|A
RXR|C28161^Intramuscular^NCIT|LT^Left Thigh^HL70163
OBX|1|CE|30963-3^Vaccine Funding Source^LN|1|VXC50^Public^CDCPHINVS||||||F|||20160720
OBX|2|CE|64994-7^Vaccine Funding Program Eligibility^LN|2|V04^VFC Eligible - American Indian/Alaska Native^HL70064||||||F|||20160720|||VXC40^per immunization^CDCPHINVS
OBX|3|CE|69764-9^Document Type^LN|3|253088698300015811130227^Pneumococcal Conjugate (PCV13) VIS^cdcgs1vis||||||F|||20160720
OBX|4|DT|29769-7^Date Vis Presented^LN|3|20160720||||||F|||20160720
ORC|RE|6183^wcEHR|96117^wcEHR|||||||9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN|||||||wcEHR^West Clinic^HL70362
RXA|0|1|20160513||45^Hep B, unspecified formulation^CVX|999|||01^Historical Administration^NIP001|||||||||||CP|A
ORC|RE|6939^wcEHR|40389^wcEHR|||||||9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN|||||||wcEHR^West Clinic^HL70362
RXA|0|1|20160612||45^Hep B, unspecified formulation^CVX|999|||01^Historical Administration^NIP001|||||||||||CP|A

##### **Update**

After document vaccinations for Darren Wilson the clinician, Spencer Hill (ID 9914) recognizes that an error was made during data entry for the Pneumococcal vaccine. The Lot Number was entered incorrectly. He updates the data in the EHR and transmits it to the IIS.

MSH|^~\&||wcEHR||IIS|20160720123514.373-0500||VXU^V04^VXU\_V04|4850|P|2.8.2|||ER|AL|||||Z22^CDCPHINVS|wcEHR|IIS
PID|1||998756^^^wcEHR^MR||Wilson^Darren^Franklin^^^^L|Scott^^^^^^M|20160517|M||1002-5^American Indian or Alaska Native^CDCREC|99 Wellington Street^^Carson City^NV^89701^USA^P||^PRN^PH^^^775^5558458|||||||||2186-5^Not Hispanic or Latino^CDCREC||N|1|||||N
PD1|||||||||||07^Recall only - no calls^HL70215|Y|20160720|||A|20150612|20160720
NK1|1|Wilson^Tamara^Violet^^^^L|MTH^Mother^HL70063|99 Wellington Street^^Carson City^NV^89701^USA^P|^PRN^PH^^^775^5558458
NK1|2|Wilson^Robert^^^^^L|FTH^Father^HL70063|99 Wellington Street^^Carson City^NV^89701^USA^P|^PRN^PH^^^775^5558458
ORC|RE|7021^wcEHR|82006^wcEHR|||||||9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN||724^Jordan^Vivian^Sarah^^^^^wcEHR^L^^^MD|||||wcEHR^West Clinic^HL70362
RXA|0|1|20160720||00005-1971-01^Prevnar 13^NDC^133^133^Pneumococcal conjugate PCV 13^CVX|0.5|mL^mL^UCUM||00^New Record^NIP001|9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN|||||807201|20161123|PFR^Pfizer, Inc^MVX|||CP|U
RXR|C28161^Intramuscular^NCIT|LT^Left Thigh^HL70163
OBX|1|CE|30963-3^Vaccine Funding Source^LN|1|VXC50^Public^CDCPHINVS||||||F|||20160720
OBX|2|CE|64994-7^Vaccine Funding Program Eligibility^LN|2|V04^VFC Eligible - American Indian/Alaska Native^HL70064||||||F|||20160720|||VXC40^per immunization^CDCPHINVS
OBX|3|CE|69764-9^Document Type^LN|3|253088698300015811130227^Pneumococcal Conjugate (PCV13) VIS^cdcgs1vis||||||F|||20160720
OBX|4|DT|29769-7^Date Vis Presented^LN|3|20150720||||||F|||20160720

##### **Delete**

An adult female, Emily Smith, visits the West Clinic for a well woman visit. A clinic staff member collects basic patient demographic information including name, date of birth and sex. A clinic provider, Vivian Jordan (physician ID 724) reviews the patient's vaccination history and determines she is in need of a tetanus booster. Because of the patient's age she does not qualify for Vaccine For Children (VFC) supplied. Elise is given the appropriate Vaccine Information Sheet (VIS) to review. After reading it, she agrees to receive the recommended vaccination. She also agrees that the data should be shared once it is incorporated into the local IIS. An appropriate dose Tdap is selected from the clinics stock of privately funded vaccines. A clinician, Spencer Hill (ID 9914) prepares and administers the doses to the patient and then enters the data into the EHR and transmits it to the IIS.

After administering a Tdap vaccination to the 36 year old female Emily Smith the clinician, Spencer Hill (ID 9914) realizes that the vaccination was documented on the incorrect patient chart. He deletes the vaccination from the patient chart and transmits the change to the IIS.

**Initial message:**

MSH|^~\&||wcEHR||IIS|20160720130626.946-0500||VXU^V04^VXU\_V04|90336|P|2.8.2|||ER|AL|||||Z22^CDCPHINVS|wcEHR|IIS
PID|1||376122^^^wcEHR^MR||Smith^Emily^^^^^L||19790118|F||2106-3^White^CDCREC|324 Meadowwood Court^^Carson City^NV^89701^USA^P||^PRN^PH^^^775^5556023~^NET^^Emily.Smith@isp.com|||||||||2186-5^Not Hispanic or Latino^CDCREC||N|1|||||N
PD1|||||||||||02^Reminder/recall - any method^HL70215|Y|20160720|||A|19790118|20160720
ORC|RE|8097^wcEHR|36380^wcEHR|||||||9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN||724^Jordan^Vivian^Sarah^^^^^wcEHR^L^^^MD|||||wcEHR^West Clinic^HL70362
RXA|0|1|20160720||49281-0400-58^Adacel^NDC^115^Tdap^CVX|0.5|mL^mL^UCUM||00^New Record^NIP001|9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN|||||511875|20170803|SKB^GlaxoSmithKline^MVX|||CP|A
RXR|C28161^Intramuscular^NCIT|RD^Right Deltoid^HL70163
OBX|1|CE|30963-3^Vaccine Funding Source^LN|1|PHC70^Private^CDCPHINVS||||||F|||20160720
OBX|2|CE|64994-7^Vaccine Funding Program Eligibility^LN|2|V01^Not VFC Eligible^HL70064||||||F|||20160720|||VXC40^per immunization^CDCPHINVS
OBX|3|CE|69764-9^Document Type^LN|3|253088698300027111150224^Tetanus/Diphtheria/Pertussis (Tdap) VIS^cdcgs1vis||||||F|||20160720
OBX|4|DT|29769-7^Date Vis Presented^LN|3|20160720||||||F|||20160720

**Deletion message:**

MSH|^~\&||wcEHR||IIS|20160720130626.946-0500||VXU^V04^VXU\_V04|90336|P|2.8.2|||ER|AL|||||Z22^CDCPHINVS|wcEHR|IIS
PID|1||376122^^^wcEHR^MR||Smith^Emily^^^^^L||19790118|F||2106-3^White^CDCREC|324 Meadowwood Court^^Carson City^NV^89701^USA^P||^PRN^PH^^^775^5556023~^NET^^Emily.Smith@isp.com|||||||||2186-5^Not Hispanic or Latino^CDCREC||N|1|||||N
PD1|||||||||||02^Reminder/recall - any method^HL70215|Y|20160720|||A|19790118|20160720
ORC|RE|8097^wcEHR|36380^wcEHR|||||||9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN||724^Jordan^Vivian^Sarah^^^^^wcEHR^L^^^MD|||||wcEHR^West Clinic^HL70362
RXA|0|1|20160720||49281-0400-58^Adacel^NDC^115^Tdap^CVX|0.5|mL^mL^UCUM||00^New Record^NIP001|9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN|||||511875|20170803|SKB^GlaxoSmithKline^MVX|||CP|D
RXR|C28161^Intramuscular^NCIT|RD^Right Deltoid^HL70163
OBX|1|CE|30963-3^Vaccine Funding Source^LN|1|PHC70^Private^CDCPHINVS||||||F|||20160720
OBX|2|CE|64994-7^Vaccine Funding Program Eligibility^LN|2|V01^Not VFC Eligible^HL70064||||||F|||20160720|||VXC40^per immunization^CDCPHINVS
OBX|3|CE|69764-9^Document Type^LN|3|253088698300027111150224^Tetanus/Diphtheria/Pertussis (Tdap) VIS^cdcgs1vis||||||F|||20160720
OBX|4|DT|29769-7^Date Vis Presented^LN|3|20160720||||||F|||20160720

##### **Refusal**

This scenario includes both accepted and refused vaccinations.

A 1 year old male, Owen Kevin Lark, is brought to the West Clinic for a well-child visit. He is accompanied by his father James Terrence Lark. A clinic staff member collects basic patient demographic information including name, date of birth and sex. A clinic provider, Vivian Jordan (physician ID 724) reviews the patients vaccination history and determines that the child requires Hib, Hep A, MMR and Varicella vaccinations. The child is covered by insurance and does not qualify for all Vaccine For Children (VFC) supplied vaccines. The father is given the appropriate Vaccine Information Sheets (VIS) to review. After reading them, the father agrees that the child should receive the Hib, Hep A and MMR vaccines but refuses the Varicella vaccine. He also agrees that the data should be shared once it is incorporated into the local IIS. Appropriate doses of Hib, Hep A and MMR are selected from the clinics stock of privately funded vaccines. A clinician, Spencer Hill (ID 9914) prepares and administers the doses to the patient and then enters the data into the EHR and transmits it to the IIS.

MSH|^~\&||wcEHR||IIS|20160720132654.366-0500||VXU^V04^VXU\_V04|48480|P|2.8.2|||ER|AL|||||Z22^CDCPHINVS|wcEHR|IIS
PID|1||17782^^^wcEHR^MR||Lark^Owen^Kevin^^^^L||20150501|M||2106-3^White^CDCREC|111 44th Ave^^Carson City^NV^89701^USA^P||^PRN^PH^^^775^5552971|||||||||2186-5^Not Hispanic or Latino^CDCREC||N|1|||||N
PD1|||||||||||02^Reminder/recall - any method^HL70215|Y|20150720|||A|20150501|20160720
NK1|1|Lark^James^Terrence^^^^L|FTH^Father^HL70063|111 44th Ave^^Carson City^NV^89701^USA^P|^PRN^PH^^^775^5552971
ORC|RE|4428^wcEHR|8357^wcEHR|||||||9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN||724^Jordan^Vivian^Sarah^^^^^wcEHR^L^^^MD|||||wcEHR^West Clinic^HL70362
RXA|0|1|20160720||49281-0547-58^Acthib^NDC^48^Hib (PRP-T)^CVX|0.5|mL^mL^UCUM||00^New Record^NIP001|9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN|||||88097|20170104|SKB^GlaxoSmithKline^MVX|||CP|A
RXR|C28161^Intramuscular^NCIT|RT^Right Thigh^HL70163
OBX|1|CE|30963-3^Vaccine Funding Source^LN|1|PHC70^Private^CDCPHINVS||||||F|||20160720
OBX|2|CE|64994-7^Vaccine Funding Program Eligibility^LN|2|V01^Not VFC Eligible^HL70064||||||F|||20160720|||VXC40^per immunization^CDCPHINVS
OBX|3|CE|69764-9^Document Type^LN|3|253088698300006611150402^Haemophilus Influenzae type b VIS^cdcgs1vis||||||F|||20150620
OBX|4|DT|29769-7^Date Vis Presented^LN|3|20160720||||||F|||20160720
ORC|RE|2455^wcEHR|37487^wcEHR|||||||9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN||724^Jordan^Vivian^Sarah^^^^^wcEHR^L^^^MD|||||wcEHR^West Clinic^HL70362
RXA|0|1|20160720||00006-4095-01^Vaqta^NDC^83^Hep A, ped/adol, 2 dose^CVX|0.5|mL^mL^UCUM||00^New Record^NIP001|9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN|||||131036|20161228|MSD^Merck and Co., Inc.^MVX|||CP|A
RXR|C28161^Intramuscular^NCIT|RT^Right Thigh^HL70163
OBX|1|CE|30963-3^Vaccine Funding Source^LN|1|PHC70^Private^CDCPHINVS||||||F|||20160720
OBX|2|CE|64994-7^Vaccine Funding Program Eligibility^LN|2|V01^Not VFC Eligible^HL70064||||||F|||20160720|||VXC40^per immunization^CDCPHINVS
OBX|3|CE|69764-9^Document Type^LN|3|253088698300004211111025^Hepatitis A VIS^cdcgs1vis||||||F|||20160720
OBX|4|DT|29769-7^Date Vis Presented^LN|3|20160720||||||F|||20160720
ORC|RE|7598^wcEHR|76819^wcEHR|||||||9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN||724^Jordan^Vivian^Sarah^^^^^wcEHR^L^^^MD|||||wcEHR^West Clinic^HL70362
RXA|0|1|20160720||00006-4681-01^MMR II^NDC^03^MMR^CVX|0.5|mL^mL^UCUM||00^New Record^NIP001|9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN|||||775088|20170201|MSD^Merck and Co., Inc.^MVX|||CP|A
RXR|C28161^Intramuscular^NCIT|LT^Left Thigh^HL70163
OBX|1|CE|30963-3^Vaccine Funding Source^LN|1|PHC70^Private^CDCPHINVS||||||F|||20160720
OBX|2|CE|64994-7^Vaccine Funding Program Eligibility^LN|2|V01^Not VFC Eligible^HL70064||||||F|||20160720|||VXC40^per immunization^CDCPHINVS
OBX|3|CE|69764-9^Document Type^LN|3|253088698300012711120420^Measles/Mumps/Rubella VIS^cdcgs1vis||||||F|||20160720
OBX|4|DT|29769-7^Date Vis Presented^LN|3|20150720||||||F|||20160720
ORC|RE||9999^wcEHR|||||||9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN|||||||wcEHR^West Clinic^HL70362
RXA|0|1|20160501||21^varicella^CVX|999||||||||||||00^Parental decision^NIP002||RE|A

##### **Partial Administration**

This scenario includes a decision not to share immunization data in the IIS.

An 18 month old male, Manuel Jose Vasquez, is brought to the West Clinic for a well-child visit by his mother Sofia Maria Vasquez. A clinic staff member collects basic patient demographic information including name, date of birth and sex. A clinic provider, Vivian Jordan (physician ID 724) reviews the patient's vaccination history and determines that the child requires a Hep A vaccination. The child is covered by insurance and does not qualify for all Vaccine For Children (VFC) supplied vaccines. The mother is given the Vaccine Information Sheet (VIS) to review. After reading it, the mother agrees that the child should receive the Hep A vaccine. However, she decides that the data should not be shared once it is incorporated into the local IIS. An appropriate dose of Hep A is selected from the clinics stock of privately funded vaccines. A clinician, Spencer Hill (ID 9914) prepares and administers the doses to the patient, however the patient moves unexpectedly during the administration and only a portion of the dose is actually administered. The clinician enters the data into the EHR as a partial administration and transmits it to the IIS.

MSH|^~\&||wcEHR||IIS|20160720133836.789-0500||VXU^V04^VXU\_V04|32752|P|2.8.2|||ER|AL|||||Z22^CDCPHINVS|wcEHR|IIS
PID|1||8009^^^wcEHR^MR||Vasquez^Manuel^Jose^^^^L||20150113|M||2106-3^White^CDCREC|42 Lincoln Way^^Carson City^NV^89701^USA^P||^PRN^PH^^^775^5555299|||||||||2135-2^Hispanic or Latino^CDCREC||N|1|||||N
PD1|||||||||||04^Reminder only - any method^HL70215|N|20150720|||A|20140113|20150720
NK1|1|Vasquez^Sofia^Maria^^^^L|MTH^Mother^HL70063|42 Lincoln Way^^Carson City^NV^89701^USA^P|^PRN^PH^^^775^5555299
ORC|RE|9087^wcEHR|12149^wcEHR|||||||9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN||724^Jordan^Vivian^Sarah^^^^^wcEHR^L^^^MD|||||wcEHR^West Clinic^HL70362
RXA|0|1|20160720||00006-4095-01^Vaqta^NDC^83^Hep A, ped/adol, 2 dose^CVX|0.5|mL^mL^UCUM||00^New Record^NIP001|9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN|||||343288|20151005|MSD^Merck and Co., Inc.^MVX|||PA|A**|<add rxa-27>xxx**
RXR|C28161^Intramuscular^NCIT|LT^Left Thigh^HL70163
OBX|1|CE|30963-3^Vaccine Funding Source^LN|1|PHC70^Private^CDCPHINVS||||||F|||20150720
OBX|2|CE|64994-7^Vaccine Funding Program Eligibility^LN|2|V01^Not VFC Eligible^HL70064||||||F|||20160720|||VXC40^per immunization^CDCPHINVS
OBX|3|CE|69764-9^Document Type^LN|3|253088698300004211111025^Hepatitis A VIS^cdcgs1vis||||||F|||20160720
OBX|4|DT|29769-7^Date Vis Presented^LN|3|20160720||||||F|||20160720

##### **Success Acknowledgment**

An EHR-S records a new administration and generates a VXU message and sends it to the IIS. The IIS returns a positive acknowledgement message indicating that no errors were found during the course of filing the message.

**Initial message MSH segment:**

MSH|^~\&||wcEHR||IIS|20160721121329.094-0500||VXU^V04^VXU\_V04|86150|P|2.8.2|||ER|AL|||||Z22^CDCPHINVS|wcEHR|IIS

**ACK message:**

MSH|^~\&||IIS||wcEHR|20160721121329.094-0500||ACK^V04^ACK|31210|P|2.8.2|||NE|NE|||||Z23^CDCPHINVS|IIS|wcEHR
MSA|AA|86150

Note that MSH-10 from the initial message is echoed back in MSA-2 of the acknowledgement message and that MSH-10 of the acknowledgement message is a unique value.

##### **Message Rejection Acknowledgement**

An EHR records a new administration and generates a VXU message and sends it to the IIS. Due to a configuration error the wrong HL7 version is sent in MSH-12. The IIS is unable to process the message due to the incorrect HL7 version and rejects the message.

MSH|^~\&||IIS||wcEHR|20150721121047.853-0500||ACK^V04^ACK|67112|P|2.8.2|||NE|NE|||||Z23^CDCPHINVS|IIS|wcEHR
MSA|AR|39077
ERR||MSH^12^1^1|203^Unsupported Version ID^HL70357|E||||Version ID not recognized - message rejected

##### **Message Processing Error Acknowledgement**

An EHR records a new administration and generates a VXU message and sends it to the IIS. Due to a mapping error in a CVX table, the IIS is unable to recognize the CVX code sent in RXA-5. The IIS is unable to identify the appropriate vaccine, which is a required element, and rejects the message.

MSH|^~\&||IIS||wcEHR|20160721121047.853-0500||ACK^V04^ACK|67112|P|2.8.2|||NE|NE|||||Z23^CDCPHINVS|IIS|wcEHR
MSA|AE|39077
ERR||RXA^1^5^1^1|999^Application error^HL70357|E|5^Table value not found^HL70533|||Vaccine code not recognized - message rejected

An EHR records a new administration and generates a VXU message and sends it to the IIS. The EHR populates PID-2 which is an unsupported field. The IIS is able to process the message but sends back a warning that PID-2 was not used.

MSH|^~\&||IIS||wcEHR|20160721131116.112-0500||ACK^V04^ACK|32851|P|2.8.2|||NE|NE|||||Z23^CDCPHINVS|IIS|wcEHR
MSA|AE|76112
ERR||PID^1^2|999^Application error^HL70357|W||||PID-2 is not supported -- data ignored

#### **Sample Message (Add)**

This scenario includes sending patient eligibility status, vaccine funding source and VIS documentation as well as historical and new administration records.

A two month old male infant, Darren Franklin Wilson, is brought to the West Clinic for a well-child visit by his mother Tamara Violet Wilson (nee Scott) and his father Robert Wilson. A clinic staff member collects basic patient demographic information including name, date of birth and sex. A clinic provider, Vivian Jordan (physician ID 724) reviews the patients vaccination history and determines that the child previously received Hepatitis B vaccine 1 day after birth and 1 month after birth. The staff member determines that the patient needs DTaP, Hib, IPV, Rotavirus and Pneumococcal vaccinations. Because of the patients status of Native American, he qualifies for all Vaccine For Children (VFC) supplied vaccines under the status of VFC eligible " American Indian/Alaska Native. The parents are given 5 Vaccine Information Sheets (VIS) to review. After reading them, they agree that the child should receive all the vaccinations recommended. They also agree that the data should be shared once it is incorporated into the local IIS. Appropriate doses of DTaP/Hib/IPV (Pentacel), Rotavirus (Rota Teq) and Pneumococcal (Prevnar13) are selected from the clinics stock of publically funded vaccines. A clinician, Spencer Hill (ID 9914) prepares and administers the doses to the patient and then enters the data into the EHR and transmits it to the IIS.

MSH|^~\&||wcEHR||IIS|20150720123514.373-0500||VXU^V04^VXU\_V04|4850|P|2.5.1|||ER|AL|||||Z22^CDCPHINVS|wcEHR|IIS

PID|1||998756^^^wcEHR^MR||Wilson^Darren^Franklin^^^^L|Scott^^^^^^M|20150517|M||1002-5^American Indian or Alaska Native^CDCREC|99 Wellington Street^^Carson City^NV^89701^USA^P||^PRN^PH^^^775^5558458|||||||||2186-5^Not Hispanic or Latino^CDCREC||N|1|||||N

PD1|||||||||||07^Recall only - no calls^HL70215|Y|20150720|||A|20150512|20150720

NK1|1|Wilson^Tamara^Violet^^^^L|MTH^Mother^HL70063|99 Wellington Street^^Carson City^NV^89701^USA^P|^PRN^PH^^^775^5558458

NK1|2|Wilson^Robert^^^^^L|FTH^Father^HL70063|99 Wellington Street^^Carson City^NV^89701^USA^P|^PRN^PH^^^775^5558458

ORC|RE|3598^wcEHR|94560^wcEHR|||||||9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN||724^Jordan^Vivian^Sarah^^^^^wcEHR^L^^^MD|||||wcEHR^West Clinic^HL70362

RXA|0|1|20150720||110^DTaP-Hep B-IPV^CVX|0.5|mL^mL^UCUM||00^New Record^NIP001|9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN|^^^wcEHR||||170167|20160118|SKB^GlaxoSmithKline^MVX|||CP|A

RXR|C28161^Intramuscular^NCIT|RT^Right Thigh^HL70163

OBX|1|CE|30963-3^Vaccine Funding Source^LN|1|VXC50^Public^CDCPHINVS||||||F|||20150720

OBX|2|CE|64994-7^Vaccine Funding Program Eligibility^LN|2|V04^VFC Eligible - American Indian/Alaska Native^HL70064||||||F|||20150720|||VXC40^per immunization^CDCPHINVS

OBX|3|CE|69764-9^Document Type^LN|3|253088698300003511070517^Diphtheria/Tetanus/Pertussis (DTaP) VIS^CDCPHINVS||||||F|||20150720

OBX|4|DT|29769-7^Date Vis Presented^LN|3|20150720||||||F|||20150720

OBX|4|CE|69764-9^Document Type^LN|4|253088698300005911120202^Hepatitis B VIS^CDCPHINVS||||||F|||20150720

OBX|5|DT|29769-7^Date Vis Presented^LN|4|20150720||||||F|||20150720

OBX|5|CE|69764-9^Document Type^LN|5|253088698300017211111108^Polio VIS^CDCPHINVS||||||F|||20150720

OBX|6|DT|29769-7^Date Vis Presented^LN|5|20150720||||||F|||20150720

ORC|RE|4820^wcEHR|72363^wcEHR|||||||9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN||724^Jordan^Vivian^Sarah^^^^^wcEHR^L^^^MD|||||wcEHR^West Clinic^HL70362

RXA|0|1|20150720||116^rotavirus, pentavalent^CVX|0.5|mL^mL^UCUM||00^New Record^NIP001|9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN|^^^wcEHR||||73048|20151207|MSD^Merck and Co., Inc.^MVX|||CP|A

RXR|C38288^Oral^NCIT|

OBX|1|CE|30963-3^Vaccine Funding Source^LN|1|VXC50^Public^CDCPHINVS||||||F|||20150720

OBX|2|CE|64994-7^Vaccine Funding Program Eligibility^LN|2|V04^VFC Eligible - American Indian/Alaska Native^HL70064||||||F|||20150720|||VXC40^per immunization^CDCPHINVS

OBX|3|CE|69764-9^Document Type^LN|3|253088698300019611150415^Rotavirus VIS^CDCPHINVS||||||F|||20150720

OBX|4|DT|29769-7^Date Vis Presented^LN|3|20150720||||||F|||20150720

ORC|RE|7021^wcEHR|82006^wcEHR|||||||9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN||724^Jordan^Vivian^Sarah^^^^^wcEHR^L^^^MD|||||wcEHR^West Clinic^HL70362

RXA|0|1|20150720||133^Pneumococcal conjugate PCV 13^CVX|0.5|mL^mL^UCUM||00^New Record^NIP001|9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN|^^^wcEHR||||802701|20151123|PFR^Pfizer, Inc^MVX|||CP|A

RXR|C28161^Intramuscular^NCIT|LT^Left Thigh^HL70163

OBX|1|CE|30963-3^Vaccine Funding Source^LN|1|VXC50^Public^CDCPHINVS||||||F|||20150720

OBX|2|CE|64994-7^Vaccine Funding Program Eligibility^LN|2|V04^VFC Eligible - American Indian/Alaska Native^HL70064||||||F|||20150720|||VXC40^per immunization^CDCPHINVS

OBX|3|CE|69764-9^Document Type^LN|3|253088698300015811130227^Pneumococcal Conjugate (PCV13) VIS^CDCPHINVS||||||F|||20150720

OBX|4|DT|29769-7^Date Vis Presented^LN|3|20150720||||||F|||20150720

ORC|RE|6183^wcEHR|96117^wcEHR|||||||9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN|||||||wcEHR^West Clinic^HL70362

RXA|0|1|20150513||45^Hep B, unspecified formulation^CVX|999|||01^Historical Administration^NIP001|||||||||||CP|A

ORC|RE|6939^wcEHR|40389^wcEHR|||||||9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN|||||||wcEHR^West Clinic^HL70362

RXA|0|1|20150612||45^Hep B, unspecified formulation^CVX|999|||01^Historical Administration^NIP001|||||||||||CP|A

### Functional Requirements

I don't think we want to get into this in this release of the IG

# Use Case 2-Request Complete Immunization History

## Context

**Goal:** The goal of this use case is to request and receive a complete immunization history for an individual client from another system.

**Trigger Event:** The sending system requests a complete immunization history using demographic information and/or other identifiers. The request may be initiated by end user activity (such as clicking a button) or by an automated process (such as automatically at patient arrival).

**Initial Message Profiles:**Z32 (QBP)

**Receiving System Outcome:** The receiving system processes the message and returns a response message, including errors if any. There are 5 possible results:

1. One client matches exactly the criteria sent
2. One or more clients match the criteria sent (inexact match)
3. No clients match the criteria sent
4. An exact match is found but they have requested that their data not be shared
5. There were errors or other problems

**Response Message Profile:** Z31 (RSP), Z32 (RSP), Z33 (RSP), Z23 (ACK)

**Sending System Outcome:**The sending system processes the acknowledgement message, consuming client data when returned. Typically, this is presented to the person who requested the evaluated history and forecast.

**Processing Mode:**The goal of the Z32 is to return a complete immunization history in response to a query request. Conformant messages should contain a view of the entire patient vaccination history as known by the system that originates the RSP^K11 message. The receiving system may process the message as required by local rules and needs. Depending on the situation and construction of the receiving system data base, the content of the message may completely overwrite existing query response data or may need to be reconciled against existing data on the patient record, the latter happening when the receiving system is likely to contain data not known to the system originating the RSP^K11 message. The data within any single order group (set of one ORC segment, one RXA segment and associated RXR and OBX segments, if any) should represent the complete set of data, as defined by the required (as per this implementation guide) and locally agreed to data elements, about the vaccination event as known by the system originating the message.

It is important to be able to accept immunization histories from different sources and have a method for integrating them. This implies that a system should not assume that any record sent is new. If the system makes this assumption and receives a history that has overlapping immunization records, there is a risk for duplicate records. There is best practice guidance on handling this from the American Immunization Registry Association (AIRA) in the Modeling Immunization Registry Operations Workgroup (MIROW) documents available the AIRA website. (immregistries.org)

Note that systems must deal with the situation where a Client has indicated that his/her records must be protected. (Only the owning provider may view) This should be clearly documented.

**Table xxx - Response to Different Outcomes**

|  |  |
| --- | --- |
| **Outcome of Query** | **Response Message** |
| No match found | Return Acknowledgement Profile Z33 - Response indicates that message was successfully processed and that no clients matched the criteria that were sent in the query. |
| Exactly one high confidence match found | Return Complete Immunization History Profile Z32 - Response includes a complete immunization history. |
| At least one lower confidence match is found, but <= maximum number allowed (More than one high confidence match is considered a set of lower confidence matches) | Return Candidate List Profile Z31 - If state law allows, the Response returns one PID with associated NK1 segments for each potential match. No immunization history is returned. |
| More than the maximum number of matches allowed are found | Return Acknowledgement Profile Z33 " Response indicates that the message was successfully processed, but that too many potential matches were found.  The maximum number allowed is the lower of the maximum number requested and the maximum number that the responding system will return. |
| Message is not well formed and has fatal errors | Return Acknowledgement Profile Z33 " Response indicates that the message was not successfully processed and will indicate errors. |
| Message was rejected because one of the following occurred:   * Unsupported message type * Unsupported event code * Unsupported processing ID * Unable to process for reasons unrelated for format or content | Return Acknowledgement Profile Z23 " Return ACK message with errors. |
| Message cant be identified as an HL7 message | No HL7 message is returned. |

## User Story

A typical user story for the Request Complete Immunization History use case is as follows. An analyst at an IIS recognizes that a patient has entered the jurisdiction from a neighboring state. To ensure the IIS database is fully populated, the analyst triggers a query to the neighboring IIS requesting a complete immunization history for the patient.

## Interaction Definition

The following sequence diagram shows the message flows involved for one possible outcome for this use case. The sending system creates a query and sends it. The responding system sends a response. This scenario assumes that a single high threshold patient match is found by the receiving system.

[MISSING IMAGE: , ]

**Figure xxx - Return Complete Immunization History Sequence Diagram (Single Match Found)**

Other possible outcomes, including matching to 0 patients or multiple patients follow a similar sequence, the difference being the profile of the message returned.

## Dynamic Defintion

The following activity diagram shows the flow of activities associated with this profile and its partners. This is described in the table below the diagram.

[MISSING IMAGE: , ]

**Figure xxx - Send VXU Activity Diagram**

|  |  |
| --- | --- |
|  |  |

## Scenarios

### Single High Threshold Match

A user or system initiates a query to an IIS requesting a complete patient history. If a single high threshold matching patient is found, the IIS returns a complete patient history.

Note that if an evaluated history and/or forecast is desired, then the Request Evaluated History and Forecast profile (Z44) should be used.

### No Matching Patients

A user or system initiates a query to an IIS requesting a complete patient history. If no high threshold matching patients are found, the IIS returns a message indicating that no patients were found using the criteria in the query.

### Sample Messages

#### **Single High Threshold Match**

A family including a child, Rebecca Elaine Forsythe, has moved from the jurisdiction of IISR to the jurisdiction of IISQ. IISQ becomes aware of the move and requests a complete immunization history from IISR using demographics and IDs from the IISQ system. IISQ finds a single high threshold matching patient and returns the complete history.

Query Message:

MSH|^~\&||IISQ||IISR|20150727131307.180-0500||QBP^Q11^QBP\_Q11|35869|P|2.8.2|||ER|AL|||||Z34^CDCPHINVS|wcEHR|IIS
QPD|Z34^Request Immunization History^CDCPHINVS|16|17782^^^IISQ^SR|Warrens^Cynthia^Destiny^^^^L|Smith^^^^^^M|20150203|F|122 Aspen Ct^^Buffalo^NY^14201^USA^P|^PRN^PH^^^716^5558243|N|1
RCP|I|5^RD&Record&HL70126

Response Message:

MSH|^~\&||IISR||IISQ|20150727131307.181-0500||RSP^K11^RSP\_K11|3695|P|2.8.2|||NE|NE|||||Z32^CDCPHINVS|IIS|wcEHR
MSA|AA|35869
QAK|16|OK|Z34^Request Immunization History^CDCPHINVS
QPD|Z34^Request Immunization History^CDCPHINVS|16|17782^^^IISQ^SR|Warrens^Cynthia^Destiny^^^^L|Smith^^^^^^M|20150203|F|122 Aspen Ct^^Buffalo^NY^14201^USA^P|^PRN^PH^^^716^5558243|N|1
PID|1||17782^^^IISR^SR||Warrens^Cynthia^Destiny^^^^L|Smith^^^^^^M|20150203|F||2054-5^African American^CDCREC|65 Keen Road^^Harrisburg^PA^17106^USA^P||^PRN^PH^^^716^5558243|||||||||2186-5^Not Hispanic or Latino^CDCREC||N|1|||||N
PD1|||||||||||07^Recall only - no calls^HL70215|Y|20150727|||A|20150203|20150727
NK1|1|Warrens^Alexander^Thomas^^^^L|FTH^Father^HL70063|65 Keen Road^^Harrisburg^PA^17106^USA^P|^PRN^PH^^^716^5558243
ORC|RE|698^ghEHR|89492^ghEHR|||||||228^Brown^Janelle^Olivia^^^^^ghEHR^L^^^PRN||714^Warner^Aaron^Thomas^^^^^ghEHR^L^^^PRN|||||ghEHR^General Hospital^HL70362
RXA|0|1|20150203||08^Hep B, adolescent or pediatric^CVX|0.5|mL^mL^UCUM||01^New Record^NIP001|228^Brown^Janelle^Olivia^^^^^ghEHR^L^^^PRN|^^^ghEHR||||126439|20150421|SKB^GlaxoSmithKline^MVX|||CP
RXR|C28161^Intramuscular^NCIT|RT^Right Thigh^HL70163
ORC|RE|2013^wcEHR|48434^wcEHR|||||||9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN||724^Jordan^Vivian^Sarah^^^^^wcEHR^L^^^MD|||||wcEHR^West Clinic^HL70362
RXA|0|1|20150303||08^Hep B, adolescent or pediatric^CVX|0.5|mL^mL^UCUM||01^New Record^NIP001|9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN|^^^wcEHR||||69298|20150915|SKB^GlaxoSmithKline^MVX|||CP
RXR|C28161^Intramuscular^NCIT|RT^Right Thigh^HL70163
ORC|RE|5842^wcEHR|30262^wcEHR|||||||9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN||724^Jordan^Vivian^Sarah^^^^^wcEHR^L^^^MD|||||wcEHR^West Clinic^HL70362
RXA|0|1|20150403||133^Pneumococcal conjugate PCV 13^CVX|0.5|mL^mL^UCUM||01^New Record^NIP001|9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN|^^^wcEHR||||729925|20151016|PFR^Pfizer, Inc^MVX|||CP
RXR|C28161^Intramuscular^NCIT|RT^Right Thigh^HL70163
ORC|RE|460^wcEHR|49424^wcEHR|||||||9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN||724^Jordan^Vivian^Sarah^^^^^wcEHR^L^^^MD|||||wcEHR^West Clinic^HL70362
RXA|0|1|20150403||120^DTaP-Hib-IPV^CVX|0.5|mL^mL^UCUM||01^New Record^NIP001|9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN|^^^wcEHR||||846401|20151106|PMC^Sanofi Pasteur^MVX|||CP
RXR|C28161^Intramuscular^NCIT|LT^Left Thigh^HL70163
ORC|RE|4437^wcEHR|19717^wcEHR|||||||9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN||724^Jordan^Vivian^Sarah^^^^^wcEHR^L^^^MD|||||wcEHR^West Clinic^HL70362
RXA|0|1|20150403||116^rotavirus, pentavalent^CVX|2.0|mL^mL^UCUM||01^New Record^NIP001|9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN|^^^wcEHR||||703792|20150828|MSD^Merck and Co., Inc.^MVX|||CP
RXR|C38288^Oral^NCIT|
ORC|RE|5727^wcEHR|35771^wcEHR|||||||9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN||724^Jordan^Vivian^Sarah^^^^^wcEHR^L^^^MD|||||wcEHR^West Clinic^HL70362
RXA|0|1|20150603||133^Pneumococcal conjugate PCV 13^CVX|0.5|mL^mL^UCUM||01^New Record^NIP001|9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN|^^^wcEHR||||246361|20160120|PFR^Pfizer, Inc^MVX|||CP
RXR|C28161^Intramuscular^NCIT|RT^Right Thigh^HL70163
ORC|RE|4543^wcEHR|65480^wcEHR|||||||9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN||724^Jordan^Vivian^Sarah^^^^^wcEHR^L^^^MD|||||wcEHR^West Clinic^HL70362
RXA|0|1|20150603||120^DTaP-Hib-IPV^CVX|0.5|mL^mL^UCUM||01^New Record^NIP001|9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN|^^^wcEHR||||806044|20150729|PMC^Sanofi Pasteur^MVX|||CP
RXR|C28161^Intramuscular^NCIT|LT^Left Thigh^HL70163
ORC|RE|9477^wcEHR|36151^wcEHR|||||||9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN||724^Jordan^Vivian^Sarah^^^^^wcEHR^L^^^MD|||||wcEHR^West Clinic^HL70362
RXA|0|1|20150603||116^rotavirus, pentavalent^CVX|2.0|mL^mL^UCUM||01^New Record^NIP001|9914^Hill^Spencer^Tyler^^^^^wcEHR^L^^^PRN|^^^wcEHR||||268502|20151118|MSD^Merck and Co., Inc.^MVX|||CP
RXR|C38288^Oral^NCIT|

#### **Protected Patient**

A family including a child,Cynthia Destiny Warrens has moved from the jurisdiction of IISR to the jurisdiction of IISQ. IISQ becomes aware of the move and requests a complete immunization history from IISR using demographics and IDs from the IISQ system. IISQ finds a matching patient, but the patient data is marked as protected. For IISQ, local laws, regulations and IIS policy dont strictly prohibit sending some indication that a patient even exists in the IIS.

Query Message:

MSH|^~\&||IISQ||IISR|20150727131307.180-0500||QBP^Q11^QBP\_Q11|793543|P|2.8.2|||ER|AL|||||Z34^CDCPHINVS
QPD|Z34^Request Immunization History^CDCPHINVS|16|17782^^^IISQ^SR|Warrens^Cynthia^Destiny^^^^L|Smith^^^^^^M|20150203|F|122 Aspen Ct^^Buffalo^NY^14201^USA^P|^PRN^PH^^^716^5558243|N|1
RCP|I|5^RD&Record&HL70126

Response Message:

MSH|^~\&||IISR|IISQ|99990|20140701041038+0700||RSP^K11^RSP\_K11|7731029|P|2.8.2|||NE|NE|||||Z33^CDCPHINVS
MSA|AA|793543
ERR|||207^Application Internal Error^HL70357|I||||A match was found in the IIS but no value is returned since Data Sharing for the record is set to No|
QAK|37374859|NF|Z44^ Request Evaluated History and Forecast^CDCPHINVS
QPD|Z34^Request Immunization History^CDCPHINVS|16|17782^^^IISQ^SR|Warrens^Cynthia^Destiny^^^^L|Smith^^^^^^M|20150203|F|122 Aspen Ct^^Buffalo^NY^14201^USA^P|^PRN^PH^^^716^5558243|N|1

#### **No Matching Patients**

A family including a child, Rebecca Elaine Forsythe, has moved from the jurisdiction of IISR to the jurisdiction of IISQ. IISQ becomes aware of the move and requests a complete immunization history from IISR using demographics and IDs from the IISQ system. IISQ finds a single high threshold matching patient and returns the complete history.

Query Message:

MSH|^~\&||IISQ||IISR|20150727131307.180-0500||QBP^Q11^QBP\_Q11|35869|P|2.8.2|||ER|AL|||||Z34^CDCPHINVS
QPD|Z34^Request Immunization History^CDCPHINVS|16|17782^^^IISQ^SR|Warrens^Cynthia^Destiny^^^^L|Smith^^^^^^M|20150203|F|122 Aspen Ct^^Buffalo^NY^14201^USA^P|^PRN^PH^^^716^5558243|N|1
RCP|I|5^RD&Record&HL70126

Response Message:

MSH|^~\&||IISR||IISQ|20150727131307.181-0500||RSP^K11^RSP\_K11|3695|P|2.8.2|||NE|NE|||||Z33^CDCPHINVS
MSA|AA|35869
QAK|16|NF|Z34^Request Immunization History^CDCPHINVS
QPD|Z34^Request Immunization History^CDCPHINVS|16|17782^^^IISQ^SR|Warrens^Cynthia^Destiny^^^^L|Smith^^^^^^M|20150203|F|122 Aspen Ct^^Buffalo^NY^14201^USA^P|^PRN^PH^^^716^5558243|N|1

#### **More Than the Maximum Number of Patients Found**

A family including a child, Rebecca Elaine Forsythe, has moved from the jurisdiction of IISR to the jurisdiction of IISQ. IISQ becomes aware of the move and requests a complete immunization history from IISR using demographics and IDs from the IISQ system. IISQ finds a single high threshold matching patient and returns the complete history.

Query Message:

MSH|^~\&||IISQ||IISR|20150727131307.180-0500||QBP^Q11^QBP\_Q11|35869|P|2.8.2|||ER|AL|||||Z34^CDCPHINVS
QPD|Z34^Request Immunization History^CDCPHINVS|16|17782^^^IISQ^SR|Warrens^Cynthia^Destiny^^^^L|Smith^^^^^^M|20150203|F|122 Aspen Ct^^Buffalo^NY^14201^USA^P|^PRN^PH^^^716^5558243|N|1
RCP|I|5^RD&Record&HL70126

Response Message:

MSH|^~\&||IISR||IISQ|20150727131307.181-0500||RSP^K11^RSP\_K11|3695|P|2.8.2|||NE|NE|||||Z33^CDCPHINVS
MSA|AA|35869
QAK|16|NF|Z34^Request Immunization History^CDCPHINVS
QPD|Z34^Request Immunization History^CDCPHINVS|16|17782^^^IISQ^SR|Warrens^Cynthia^Destiny^^^^L|Smith^^^^^^M|20150203|F|122 Aspen Ct^^Buffalo^NY^14201^USA^P|^PRN^PH^^^716^5558243|N|1

#### **Message Not Well Formed**

A family including a child, Rebecca Elaine Forsythe, has moved from the jurisdiction of IISR to the jurisdiction of IISQ. IISQ becomes aware of the move and requests a complete immunization history from IISR using demographics and IDs from the IISQ system. IISQ determines that the message contains a fatal error and is unable to process the request.

Query Message:

MSH|^~\&||IISQ||IISR|20150727131307.180-0500||QBP^Q11^QBP\_Q11|35869|P|2.8.2|||ER|AL|||||Z34^CDCPHINVS
QPD|Z34^Request Immunization History^CDCPHINVS||17782^^^IISQ^SR|Warrens^Cynthia^Destiny^^^^L|Smith^^^^^^M|20150203|F|122 Aspen Ct^^Buffalo^NY^14201^USA^P|^PRN^PH^^^716^5558243|N|1
RCP|I|5^RD&Record&HL70126

Response Message:

MSH|^~\&||IISR||IISQ|20150727131307.181-0500||RSP^K11^RSP\_K11|3695|P|2.8.2|||NE|NE|||||Z33^CDCPHINVS
MSA|AE|7731029
ERR||QPD^1^2|101^required field missing^HL70357|E
QAK||AE|Z34^CDCPHINVS<CR>
QPD|Z34^Request Immunization History^CDCPHINVS|16|17782^^^IISQ^SR|Warrens^Cynthia^Destiny^^^^L|Smith^^^^^^M|20150203|F|122 Aspen Ct^^Buffalo^NY^14201^USA^P|^PRN^PH^^^716^5558243|N|1

Note that in the example above the QAK-1 Query tag is empty because it was missing in the initiating query (which is the source of the error).

#### **Message Header Errors**

A family including a child, Rebecca Elaine Forsythe, has moved from the jurisdiction of IISR to the jurisdiction of IISQ. IISQ becomes aware of the move and requests a complete immunization history from IISR using demographics and IDs from the IISQ system. IISQ determines that the message contains a fatal error in MSH-12 and is unable to process the request.

Query Message:

MSH|^~\&||IISQ||IISR|20150727131307.180-0500||QBP^Q11^QBP\_Q11|35869|P|2.5.1|||ER|AL|||||Z34^CDCPHINVS
QPD|Z34^Request Immunization History^CDCPHINVS||17782^^^IISQ^SR|Warrens^Cynthia^Destiny^^^^L|Smith^^^^^^M|20150203|F|122 Aspen Ct^^Buffalo^NY^14201^USA^P|^PRN^PH^^^716^5558243|N|1
RCP|I|5^RD&Record&HL70126

Response Message:

MSH|^~\&||IISR||IISQ|20150727131307.181-0500||ACK^Q11^ACK|3695|P|2.8.2|||NE|NE|||||Z23^CDCPHINVS
MSA|AR|35869
ERR||MSH^1^12|203^Unsupported version ID^HL70357|E

## Functional Requirements

A complete immunization history may also include the following observations:

* Contraindications
* Adverse Reaction
* Immunity
* Indicates to Immunize

# No Matching Patients16130

# Multiple Matching Patients37531

# More Than the Maximum Number Patients Found24317

# Message Not Well Formed16659

# Message Infrastructure

## Conformance Profiles

## Segments and Field Descriptions

## Datatypes

## Value Sets