

**Vermont Department of Health | Information Technology**  
**Onboarding Guide:**  
**HL7 2.5.1 Queries for Immunization Records**  
**Version 6.0**

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# Vermont Department of Health

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## REVISION HISTORY

Date	Version	Description	Author
12/22/2022	2.0	Approved by Bridget Ahrens, IMR Mgr. Saved as version 2.0	Bridget Ahrens
12/29/2022	2.1	Updated diagrams and <i>Section 2.5 Transition to Production Environment</i> to reflect 3-week monitoring period prior to attestation.	Ellie Mack
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3/1/2023	4.0	Updated <i>Section 4.1.1 Z32 and Z42: Return Complete Immunization History</i> to include RXA 5.2 Administered Vaccine Name. Added <i>Section 2.3.1.1</i> to describe VACMANPIN requirement in SOAP payload	Ellie Mack
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5/22/2023	5.0	Updated <i>Section 4.4.2</i> and <i>Appendix E</i> to clarify that when a LOINC is unmapped for the <i>Status in Series</i> OBX, all related forecast OBX segments for the vaccine group will be omitted from the response. Added paragraph before forecast table to clarify all business rules regarding omitting OBX sections/groups. Reapproved by T. Webster, approved by B. Ahrens.	Ellie Mack
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6/22/2023	6.0	Additional modifications based on VITL feedback. Changed "onboarding" to "connectivity to the VHIE and VDH IMR". Updated sections related to onboarding, tracking spreadsheet.	Ellie Mack

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## 1. Introduction

### 1.1 Document Purpose & Scope

The Vermont Department of Health (VDH), in partnership with Vermont Information Technology Leaders (VITL), offers healthcare providers the ability to send HL7 query messages from their EHR to obtain individual immunization records from the Vermont Immunization Registry (IMR).

The goal of this document is to describe the end-to-end onboarding process provider organizations must complete before they can submit HL7 query messages to the Vermont IMR. This includes legal requirements, detailed connectivity requirements, and message formatting instructions for submitting HL7 2.5.1 query messages (Z34 or Z44) to VITL. This document also provides details on the return HL7 2.5.1 messages (Z32, Z42, Z31, Z33, Z23) that can be expected in response to Vermont IMR queries.

All message specifications presented in this document represent either a reiteration or a narrowing of the specifications outlined in the [CDC HL7 Version 2.5.1 Implementation Guide for Immunization Messaging](#).

**This guide only applies to HL7 2.5.1 query (QBP) messages sent as a means of querying the Vermont IMR for individual immunization records. All other HL7 message exchanges with the Vermont IMR (i.e., VXU) will continue to follow the implementation standards and guidelines described in [Vermont Implementation Guide for HL7 VXU Immunization Messaging](#).**

### 1.2 Intended Audience

This guide is intended for technical groups from Health Information Exchanges (HIE), Immunization Information Systems (IIS), and Electronic Health Record (EHR) systems that must implement these technical guidelines. Users of this guide must be familiar with the details of HL7 message construction and processing, as HL7 message construction and processing are outside the scope of this document.

This guide is also intended for stakeholders at participating organizations, as it contains important information regarding the legal agreements required to become an approved querying entity, and other onboarding expectations for connecting to the Vermont IMR via the Vermont Health Information Exchange (VHIE), which is operated by VITL.

## **PART ONE: Bidirectional Onboarding Process**

### 2. Onboarding Process for Bidirectional Immunization Record Queries

VDH has established a two-way encrypted SOAP API – known as the VDH HL7 SOAP API – to accept HL7 2.5.1 Z34 or HL7 2.5.1 Z44 messages for the purpose of querying the Vermont IMR for individual immunization records. Participating provider organizations will submit HL7 2.5.1 Z34 or HL7 2.5.1 Z44 messages to the VHIE, which will serve as a passthrough to the VDH HL7 SOAP API. This partnership will make it easier for provider organizations to link their EHR solutions with the VHIE, a connection which may already exist for other HL7 message exchanges.

The onboarding process – documented in the Onboarding Implementation Plan (see Section 2.2) – is defined by achieving the following milestones:

- 1) VITL provides the provider organization with the most recent *Onboarding Guide: HL7 2.5.1 Queries for Immunization Records* (this document)
- 2) Provider Organization signs all applicable legal agreements with VITL and VDH
- 3) Planning Kickoff and Implementation Plan Development

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- 4) Provider Organization VACMANPIN is added to VDH Facility Whitelists
- 5) VITL Connectivity and Build Testing
- 6) Validation Testing with VDH
- 7) Go-Live

A diagram of the complete onboarding process can be found in [Appendix A: HL7 Queries for Immunization Records Onboarding Workflow](#).

## 2.1 Legal Agreements and Approved Querying Entities

### 2.1.1 VDH Site Level Agreement (SLA)

For a provider organization to be permitted to query the IMR, there must be a signed VDH Site Level Agreement (SLA) on file with VDH. The VDH SLA for bidirectional querying is a new document – distinct from other user and/or confidentiality agreements – and is required for every querying organization. A provider organization’s current ability to submit HL7 immunization records or access the VDH IMR Portal does not make them automatically eligible to submit HL7 query messages to obtain immunization records.

The VDH IMR Program Manager will send the VDH SLA to the provider organization. Once signed, the provider organization will return the form to the VDH IMR Program, which is responsible for storing and managing all VDH SLA documentation. **All legal agreements must be signed before a provider organization can proceed with connectivity to the VHIE and the VDH IMR.**

#### 2.1.1.1 Approved Querying Entities and VACMANPIN

Once a VDH SLA is signed and on file with VDH, the provider organization is considered an “*approved querying entity*” and can move forward with connectivity to the VHIE and the VDH IMR. Each approved querying entity has a VACMANPIN (this is the same identifier issued to provider organizations already submitting VXU messages to the VDH IMR), and this identifier will be added to a list of entities authorized to submit HL7 queries to the Vermont IMR.

### 2.1.2 VITL Legal Agreements and Documentation

This partnership necessitates additional legal agreements between the provider organization and VITL. Any VITL-required documentation will be provided by the VITL Interface Lead. **All legal agreements must be signed before a provider organization can proceed with onboarding.** If a legal agreement is already in place and only an updated order form is required, then the provider organization can proceed with connectivity to the VHIE; an updated order form must be signed prior to the production use of the interface.

## 2.2 Onboarding Implementation Plan with VITL

Once a provider organization has signed all necessary legal agreements, the VITL Interface Lead will manage the remainder of the onboarding process, engaging with the provider organization and the EHR vendor. VITL is responsible for developing an Onboarding Implementation Plan and schedule for each implementation effort. VITL will manage an integrated implementation that includes onboarding milestones for each provider organization. VITL will track, monitor, and communicate all project progress with VDH and the client; this will include the project status, milestone dates and statuses, and notes on any issues or “blockers” that impede progress. Communication between VDH and VITL is also accomplished via regular meetings and progress is tracked using the established tracking tool.

**At the discretion of VITL and the VDH IMR Program, multiple provider organizations may be onboarded in a single implementation plan if they are part of a parent organization using a shared EHR. The approach should be clearly defined in the *Onboarding Implementation Plan*.**

Participating provider organizations must complete the defined process with VITL to establish

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connectivity and ensure quality data exchanges among all systems. The VITL *Onboarding Implementation Plan* document includes the following phases:

### 1) **Planning**

- a) Project Planning Kickoff Meeting
- b) HL7 questionnaires and technical exploration with VITL
- c) Creation of Implementation Schedule, which must include:
  1. Milestone progress, targets, and actuals for:
    - i. VDH SLA, VITL Agreements and Documentation
    - ii. EHR Development
    - iii. Connectivity Testing with VITL
    - iv. Build Testing with VITL
    - v. VDH Validation Testing
    - vi. Go-Live
  2. Resource Names (with actual names)
  3. Issue/Blocker Resolution Escalation Path
- d) **Agreement to Proceed** decision

### 2) **Execution**

- a) EHR establishes connectivity with the VHIE
- b) EHR vendor configures EHR to generate, send, and consume the applicable HL7 messages.
- a) VITL Build Testing: Send test data to the VHIE test environment; receive response messages from VITL.
- b) End-to-End Validation Testing with VDH IMR Program (see *2.4 Validation Testing with VDH IMR Program*)
- c) Go-Live

### 3) **Monitoring**

- a) Verify provider organization has received PROD data.
- a) VITL, VDH, and clients monitor for 2 weeks to confirm successful patient queries to the production environment.

The provider organization will be responsible for the technical work and costs associated with configuring EHRs to exchange HL7 query and response messages with the VHIE.

## **2.3 EHR Development for Sending and Receiving HL7 Messages**

### **2.3.1 HL7 Messages**

During the Execution Phase, the provider organization will work with VITL and its EHR vendor to configure the EHR to be able to construct and send at least one of the following HL7 2.5.1 message profiles:

- HL7 2.5.1 Z34 [QBP]
- HL7 2.5.1 Z44 [QBP]

Additionally, the provider organization's EHR must be able to consume the following response and acknowledgement messages:

- HL7 2.5.1 Z32 [RSP] and/or HL7 2.5.1 Z42 [RSP] (based on which QBP is developed)
- HL7 2.5.1 Z31 [RSP]
- HL7 2.5.1 Z33 [RSP]
- HL7 2.5.1 Z23 [ACK]

Detailed HL7 message specifications can be found in *Part Two* of this document. All message specifications presented in this document represent either a reiteration or a narrowing of the specifications outlined in the [CDC HL7 Version 2.5.1 Implementation Guide for Immunization Messaging](#).

**Important Note: While the CDC accepts TLS 1.1 encryption, the VHIE requires a minimum of Transport Layer Encryption (TLS) 1.2 for bidirectional query messages.**

### 2.3.1.1 SOAP Messages

All incoming messages to the VDH HL7 SOAP API will be sent via SOAP-based transport and conform to the SOAP Version 1.2 specification for *submitSingleMessage*. **VITL has adopted this requirement and requires EHRs to submit queries according to the same specification.** Technical implementation details about SOAP messages can be found in the CDC document [EHR-IIS Interoperability Enhancement Project – Transport Layer Protocol Recommendation Formal Specification](#).

SOAP v1.2 Payload to VITL   submitSingleMessage			
Parameter	Input/Output	Data Type	Description
Username	Input	String	HIE username
Password	Input	String	HIE password
facilityID	Input	String	VACMANPIN
HL7Message	Input	String	Raw HL7 version 2.5.1 message

### 2.3.2 VITL Connectivity and Build Testing

Once the provider organization’s EHR is configured to construct and consume HL7 QBP/RSP messages, it must establish connectivity to VITL which will serve as a message passthrough to the VDH HL7 SOAP API. The EHR will be configured to send and receive HL7 messages through VITL’s web service. Testing will be performed in a test environment. VITL will validate the sending server by a) establishing and validating mutual authentication from the sending EHR, b) validating the VACMANPIN in the request, and c) validating messages are properly formatted.

### 2.4 Validation Testing with VDH IMR Program

Before a provider organization is given final approval to send HL7 QBP messages it must complete end-to-end validation testing. During validation testing the VDH IMR Program will assess the QBP message quality and verify the VDH responses are received/consumed appropriately by the EHR.

**Depending on the scope defined in the *Onboarding Implementation Plan*, if one provider organization passes validation testing, and is part of a parent organization where multiple provider organizations share the same EHR instance, the validation may extend to all provider organizations within that provider group that use the same EHR instance. Specific details about which provider organizations must execute validation testing will be defined in the *Onboarding Implementation Plan*.**

The VDH IMR Business Application Support Specialist (BASS) is responsible for maintaining a *Validation Test Plan* containing test case scenarios and input data, which the provider organization will use to construct HL7 QBP test messages. The *Validation Test Plan* will be distributed by VITL, who will schedule a window in which validation testing will occur. Test messages will be validated for data content and formatting expectations. Upon receipt of VDH response messages, the provider organization must screenshot or record the receiving EHR record and share those screenshots or recordings with VITL, who will forward the information to the VDH IMR BASS. The VDH IMR BASS will verify data has been received and/or mapped appropriately in the EHR. If all testing criteria (as defined in the *Validation Test Plan*) are met, the VDH IMR BASS will notify VITL that validation testing has been successfully completed.

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## 2.5 Transition to Production Environment

At the successful conclusion of validation testing, the VITL Interface Lead will schedule a production Go-Live date, after which the ordering provider will be permitted to submit queries for Vermont IMR immunization records.

VITL will coordinate and execute all technical steps required to migrate the implementation setup into the production environment, including a confirmation that the provider organization has successfully received PROD data from the Vermont IMR.

## 3. Ongoing Technical Support for Provider Organizations

The following section describes the processes and procedures for technical support once a provider organization is “live” and exchanging QBP/RSP messages with the Vermont IMR production environment. A diagram representing this Maintenance and Operations support model can be found in [Appendix B: M&O Technical Support for Provider Organizations](#)

### 3.1 Query and Response Issues

Once a provider organization is “live” and submitting queries to the Vermont IMR production environment, if the provider organization receives an error response message and are unable to successfully resubmit a query, the provider organization should contact VITL. VITL will assess the HL7 message to ensure it is formatted according to the VDH Implementation Guide and expected standards. If the message is properly formatted but the issue remains unresolved, and the root cause is suspected to be at the VDH-level, VITL will reach out to the VDH IMR BASS for further assistance. If there is an issue with the HL7 message, VITL will work with the provider organization and EHR vendor to resolve the issue.

### 3.2 Performance Level Expectations and Platform Maintenance

VDH has established the following performance level expectations:

- The end-to-end query process has an expected response time of under five seconds.
- The VDH HL7 SOAP API will cap a single provider organization (represented by a Facility ID) at seven messages per 10 seconds. **Provider organizations should not generate “batch reports” to submit high volume queries, nor should automation be used to trigger large queues of queries.**
- All downtime processes shall incorporate practices in which coming back online will not generate a queue of queries pending transmission to the VDH HL7 SOAP API endpoint.

If a provider organization notices that queries and responses fall short of these expectations, they should contact VITL (<https://vitl.net/contact-us/>).

If either VDH or VITL is aware of service outages – planned or unplanned – on their respective platforms, VDH and VITL will do their best to notify users of the outage and the estimated timeframe for when services will be restored. VDH will put any available information on the VDH IMR website, and VITL will share any available information through the MyVITL portal.

### 3.3 Performance Monitoring

The Vermont IMR Program will monitor VDH HL7 SOAP API usage for instances of repeat queries, high-volume querying by provider organizations, and instances where queries are “unsuccessful” and result in an unexpected volume of Z23, Z31, or Z33 response messages. If unusual activity is observed, and cannot be attributed to technical issues at VDH, the VDH IMR BASS will contact VITL to notify them of the issue. **The VDH IMR Program maintains the right to suspend access – temporarily or permanently – to any provider organization on the grounds of data security or system misuse.**

## PART TWO: HL7 MESSAGE SPECIFICATIONS

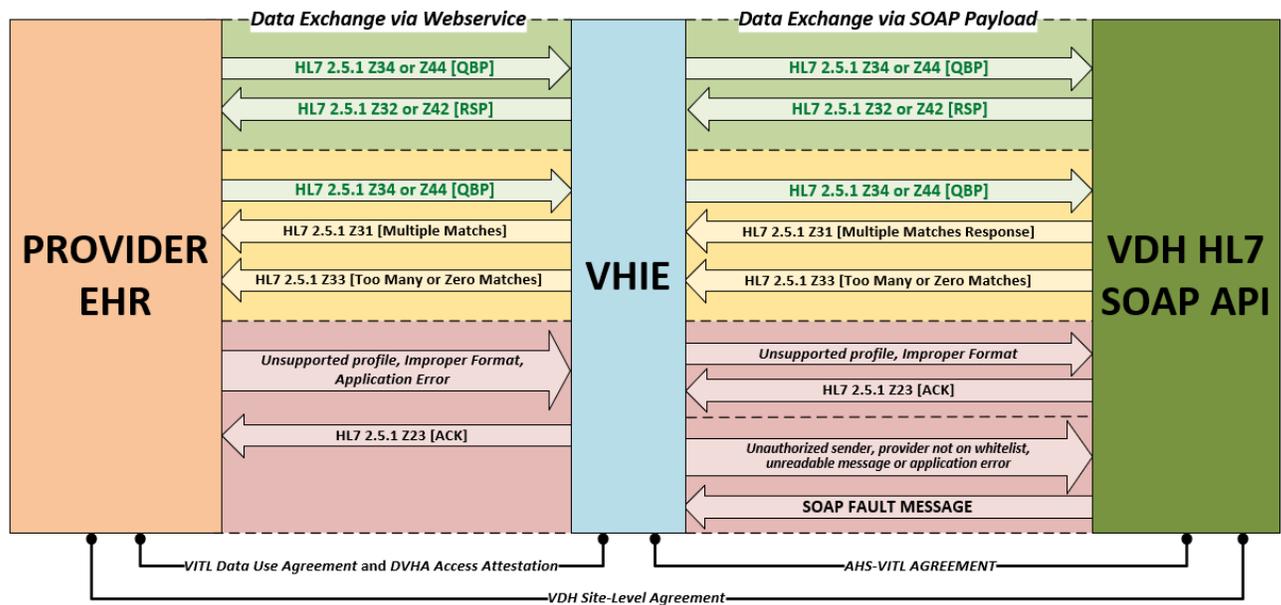
### 4. HL7 Messages for Immunization Record Queries

#### 4.1 Basic Message Flow

The basic steps in the HL7 query data flow are as follows:

- 1) Requesting EHR sends HL7 2.5.1 QBP Z34/Z44 to the VHIE via the VHIE webservice.  
*(Important Note: While the CDC accepts TSL 1.1 encryption, VITL requires a minimum of Transport Layer Encryption (TLS) 1.2 for bidirectional query messages.)*
- 2) The VHIE receives and validates message (ensures SOAP is accurate, approved VACMANPIN, expected server).
- 3) The VHIE enriches the username and password data elements per SOAP message standards and VDH Specifications.
- 4) The VHIE sends HL7 query message to VDH HL7 SOAP API endpoint.
- 5) VDH HL7 SOAP API receives HL7 query message, validates message, and authenticates originating sender.
- 6) VDH HL7 SOAP API returns query result (or error message) to the VHIE.
- 7) The VHIE validates the VDH response for SOAP Fault errors.
- 8) The VHIE returns successful HL7 2.5.1 RSP message (or a single Client EHR error from a subset of possible errors) to requesting EHR via the VHIE webservice.

**Table 1. Context Diagram for Bidirectional Query Data Exchanges**



#### 4.2 Request Processing Performance and Message Rate Limit

The end-to-end query process has an expected response time of under five seconds. The VDH HL7 SOAP API will limit the number of QBP messages processed at any given time to preserve performance for all onboarded entities. The VDH HL7 SOAP API will cap a single provider organization (represented by a Facility ID) at seven messages per 10 seconds. Provider organizations should not generate “batch reports” to submit high volume queries, nor should automation be used to trigger large queues of queries.

### 4.3 QBP Message Profiles: Message Segments, Fields, and Definitions

This specification pertains to the HL7 2.5.1 QBP message querying providers are expected to send to the VHIE. All message specifications presented in this document represent either a reiteration or a narrowing of the specifications outlined in the [CDC HL7 Version 2.5.1 Implementation Guide for Immunization Messaging](#).

**Important Note: While the CDC accepts TLS 1.1 encryption, the VHIE requires a minimum of Transport Layer Encryption (TLS) 1.2 for bidirectional query messages.**

The data elements in the tables below are the fields VDH will use when processing Z34 and Z44 query messages.

- MSH (Message Header)
- QBP (Query by Parameter)
- RCP (Response Control Parameters)

#### 4.3.1 Required Field Definitions

Symbol	Definition	Implementation Requirement	Operation Requirement
R	Required	The application shall implement "R" elements	The application shall populate "R" elements with a non-empty value.
RE	Required by may be empty	The application shall implement "RE" elements	The application shall populate "RE" elements with non-empty value if there is relevant data.
X	Not supported in this guide	The application (or as configured) shall not implement "X" elements	The application shall not populate "X" elements
O	Optional	None. The usage indicator for this element is not defined. For an implementation profile, all optional elements	Not applicable.

#### 4.3.2 Message Header Fields (MSH)

LEN	Data Type	Segment Field Name	Element Name	HL7 Usage	VT IMR Usage	Description/Constraint
1	ST	MSH.1	Field Separator	R	R	The MSH-1 field shall be
4	ST	MSH.2	Encoding Characters	R	R	The MSH-2 field shall be ^~ &
	HD	MSH.3	Sending Application	RE	R	
	HD		Sending Facility PIN	RE	R	
	HD	MSH_5	Receiving Application	RE	R	"VDH"
	HD		Receiving Facility	RE	R	"VDH"
26	TS		Date/Time of Message	R	R	
40	ST		Security	O	X	
15	MSG	MSH-9	Message Type	R	R	QBP^Q11^QBP_Q11
199	ST	MSH-10	Message Control ID	R	R	Unique to each query
3	PT	MSH-11	Processing ID	R	R	"T" or "P" (Test or Production)
	VID	MSH-12	Version ID	R	R	2.5.1
15	NM	MSH-13	Sequence Number	O	X	
180	ST	MSH-14	Continuation Pointer	O	X	
2	ID	MSH-15	Accept Acknowledgement Type	R	R	Default value is "NE" (never)
2	ID	MSH-16	Application Acknowledgement Type	R	R	Default value is "AL" (always)
	EI	MSH-21	Message Profile Identifier	R	R	Z34^CDCPHINVS or Z44^CDCPHINVS
	XON	MSH_22.6	Responsible Sending Organization – Assigning Authority	RE	O	"VDH"
	XON	MSH_22.7	Responsible Sending Organization – Identifier Type Code	RE	R	"VACMANPIN"
	XON	MSH_22.10	Sending Responsible Organization Identifier	RE	R	VACMANPIN identifier
	XON	MSH_23	Receiving Responsible Organization	RE	RE	Optional but should contain VDH or IMR values if sent.

#### 4.3.3 Query Parameters (QPD)

LEN	Data Type	Segment Field Name	Element Name	HL7 Usage	VT IMR Usage	Description/Constraint
	CE	QPD_1.1	Message Query Name	R	R	Z34^Request Immunization History^HL70471 or Z44^Request Evaluated History and Forecast^HL70471
32	ST	QPD_2	Query Tag	R	R	
	CX	QPD_3.1	Patient List Identifier	RE	RE	Repeats in segments that include the next two elements.
		QPD_3.5	Patient List Identifier Type Code	RE	RE	Repeats in segments that include the previous and the next element.
		QPD_3.4.1	Patient List Assigning Facility	RE	RE	Repeats in segments that include the previous two elements.
	FN	QPD_4.1.1	Patient Family Name	R	R	
	ST	QPD_4.2	Patient Given Name	R	R	
	ST	QPD_4.3	Patient Further Name	RE	RE	
	ST	QPD_4.4	Patient Suffix	RE	RE	
	FN	QPD_5.1.1	Mother Maiden Family Name	RE	RE	
	ST	QPD_5.2	Mother Given Name	RE	RE	

	ID	QPD_5.7	Mother Maiden Name Type	RE	RE	
26	TS_NZ	QPD_6.1	Patient DOB	RE	R	
1	IS	QPD_7	Patient Sex	RE	R	
	SAD	QPD_8.1.1	Patient Street Address	RE	RE	
	ST	QPD_8.3	Patient City	RE	RE	
	ST	QPD_8.4	Patient State	RE	RE	
	ST	QPD_8.5	Patient Zip	RE	RE	
	IS	QPD_8.7	Patient Home Address Type	RE	RE	
		QPD_9.5	Patient Country Code	RE	RE	
3	NM	QPD_9.6	Patient Home Area Code	RE	RE	
7	NM	QPD_9.7	Patient Home Local Number	RE	RE	
1	ID	QPD_10	Multiple Birth Indicator	RE	RE	N, Y
2	NM	QPD_11	Patient Birth Order	RE	RE	

#### 4.3.4 Response Control Parameters (RCP)

LEN	Data Type	Segment Field Name	Element Name	HL7 Usage	VT IMR Usage	Description/Constraint
10	CQ	RCP_2.1	Quantity Limited Request	RE	O	

#### 4.4 Response Message Profiles: Message Segments, Fields, and Definitions

This section contains details about the format and content of the returned response messages, including “happy path” responses and alternative error flows. This section contains tables with codes for the applicable message segments.

The querying provider will receive one of five possible response message profiles, depending on the QBP profile type and the overall success of the query:

1. Z32 – Return Complete Immunization History
2. Z42 – Return Evaluated History and Forecast
3. Z31 – Multiple Matches – Return a List of Candidates
4. Z33 – Error – Return an Acknowledgement with No Person Records, Too Many Records
5. Z23 – Error – Return an Acknowledgement with Errors

##### 4.4.1 Z32 – Return Complete Immunization History

A returned Z32 message fulfills the request for an individual’s complete immunization history.

<b>Z32– Return Complete Immunization History</b>				
Segment Field Component	Field Name	Component Name	Constant Value	Usage
MSH-3:Sending Application	Sending Application	Sending Application		RE
MSH-4:SendingFacility	Sending Facility	Sending Facility		RE
MSH-5:ReceivingApplication	Receiving Application	Receiving Application		RE
MSH-6:Receiving Facility	Receiving Facility	Receiving Facility		RE
MSH-7:DateTimeOfMessage	Date Time Of Message	Date Time Of Message	Current DateTime when HL7 message is created	R
MSH-9.1:Message Type Message Code	Message Type	Message Code	RSP	R
MSH-9.2:Message Type Trigger Event	Message Type	Trigger Event	K11	R
MSH-9.3:Message Type Message Structure	Message Type	Message Structure	RSP_K11	R

<b>Z32-- Return Complete Immunization History</b>				
<b>Segment Field Component</b>	<b>Field Name</b>	<b>Component Name</b>	<b>Constant Value</b>	<b>Usage</b>
MSH-10:Message Control ID	Message Control ID	Message Control ID		R
MSH-11:Processing ID	Processing ID	Processing ID	Defaults to "P" for PROD; "T" required in TEST	R
MSH-12:VersionID	Version ID	Version ID	2.5.1	R
MSH-15:Accept Acknowledgement Type	Accept Acknowledgement Type	Accept Acknowledgement Type	NE	R
MSH-16:Application Acknowledgement Type	Application Acknowledgement Type	Application Acknowledgement Type	NE	R
MSH-21.1:Message Profile Identifier Entity identifier	Message Profile Identifier	Entity identifier		R
MSH-21.2:Message Profile Identifier Namespace ID	Message Profile Identifier	Namespace ID	CDCPHINVS	R
MSH-22:Sending Responsible Organization	Sending Responsible Organization	Sending Responsible Organization	Defaults to "VDH"	RE
MSH-23:ReceivingResponsibleOrganization	Receiving Responsible Organization	Receiving Responsible Organization	Defaults to "VDH"	RE
MSH-23.6:AssigningAuthority	Receiving Responsible Organization	Assigning Authority		
MSH-23.7:IdType	Receiving Responsible Organization	Id Type		
MSH-23.10:AssigningAuthority	Receiving Responsible Organization	Receiving Responsible Organization		
MSA-1:Acknowledgement Code	Acknowledgement Code	Acknowledgement Code		R
MSA-2:Message Control ID	Message Control ID	Message Control ID		R
ERR-2.1:Error Segment ID	Error Location	Error Segment ID		RE
ERR-2.2:Error Segment Sequence	Error Location	Error Segment Sequence		RE
ERR-2.3:Error Field Position	Error Location	Error Field Position		RE
ERR-3.1:Error Code	HL7 Error Code	Error Code		R
ERR-4:Error Severity	Severity	Error Severity		R
ERR-5.1:Application Error Code	Application Error Code	Application Error Code		RE
ERR-8:User Message	User Message	User Message		R
QAK-1:Query Tag	Query Tag	Query Tag		R
QAK-2:Query Response Status	Query Response Status	Query Response Status		RE
QAK3.1:MessageQueryNameIdentifier	Message Query Name	Identifier		R
QAK3.2:MessageQueryNameText	Message Query Name	Text		R
QAK3.3:MessageQueryNameNameofCodingSystem	Message Query Name	Name of Coding System	CDCPHINVS	R
QPD1.1:Message Query Name Identifier	Message Query Name	Identifier		R
QPD1.2:MessageQueryNameText	Message Query Name	Text		RE
QPD1.3:MessageQueryNameNameofCodingSystem	Message Query Name	Name of Coding System	CDCPHINVS	R
QPD2:QueryTag	Query Tag	Query Tag		R
QPD3:PatientListId	Patient List (Can repeat)	ID		RE
QPD3:PatientListIdentifierTypeCode	Patient List (Can repeat)	Identifier Type		RE
QPD3:PatientListAssigningFacility	Patient List (Can repeat)	Assigning Facility		RE
QPD4.1:PatientFamilyName	PatientName	Family Name		RE

<b>Z32-- Return Complete Immunization History</b>				
<b>Segment Field Component</b>	<b>Field Name</b>	<b>Component Name</b>	<b>Constant Value</b>	<b>Usage</b>
QPD4.2:PatientGivenName	PatientName	Given Name		RE
QPD4.3:PatientFurtherName	PatientName	Second or Further Given Names		RE
QPD4.4:PatientSuffix	PatientName	Suffix		RE
QPD.4.7:Name Type Code	Patient Name	Name Type Code	"L"	RE
QPD5.1:MotherMaidenFamilyName	MotherMaidenName	Family Name		RE
QPD5.2:MotherMaidenGivenName	MotherMaidenName	Given Name		RE
QPD5.7:MotherMaidenNameType	MotherMaidenName	Name Type		RE
QPD6:PatientDOB	Patient Date of Birth	Patient Date of Birth		RE
QPD7:PatientSex	Patient Sex	Patient Sex		RE
QPD8.1:PatientStreetAddress	Patient Address	Street Address		RE
QPD8.3:PatientCity	Patient Address	City		RE
QPD8.4:PatientState	Patient Address	State		RE
QPD8.5:PatientZip	Patient Address	Zip		RE
QPD8.7:PatientAddressType	Patient Address	Address Type		RE
QPD9.6:PatientHomeCountryCode	Patient Home Phone	Country Code		RE
QPD9.7:PatientHomeLocalNumber	Patient Home Phone	Local Number		RE
QPD10:MultipleBirthIndicator	Multiple Birth Indicator	Multiple Birth Indicator		RE
QPD11:PatientBirthOrder	Patient Birth Order	Patient Birth Order		RE
PID-1: Set ID	Set ID	Set ID	1	R
PID-5.1	Patient Name	Given Name		R
PID-5.2	Patient Name	Family Name		R
PID-5.3	Patient Name	Second and Further Given Names		RE
PID-5.7	Patient Name	Name Type Code	"L"	R
PID-7.1	Date/Time of Birth	Time		R
PID-8	Administrative Sex			R
PID-3.1	Patient Identifier List	ID Number		R
PID-3.4	Patient Identifier List	Assigning Authority		C R
PID-3.5	Patient Identifier List	Identifier Type Code	For HashedEntity_uid => "SR" for MRN => "MR"	R
PID-11.1	Patient Address	Street Address		RE
PID-11.3	Patient Address	City		RE
PID-11.4	Patient Address	State of Province		RE
PID-11.5	Patient Address	Zip or Postal Code		RE
PID-11.7	Patient Address	Address Type		CR (required if sending address)
PID-13.6	Phone Number - Home (Can Repeat)	Area/City Code		RE
PID-13.7	Phone Number - Home	Local Number		RE
PID-13.4	Phone Number - Home	Email Address		RE
PID-13.2	Phone Number - Home	Telecommunication Use Code	"PRN" for phone "NET" for email	CR (required if sending phone or email)
PID-6.1	Mother's Maiden Name	Family Name		RE
PID-15	Primary Language			O
PID-10.1	Race	Identifier		RE

<b>Z32-- Return Complete Immunization History</b>				
<b>Segment Field Component</b>	<b>Field Name</b>	<b>Component Name</b>	<b>Constant Value</b>	<b>Usage</b>
PID-22.1	Ethnic Group	Identifier		RE
ORC-1:Order Control	Order Control	OrderControl	"RE"	R
ORC-3:Filler Order Number				R
ORC_3.2:Filler Order Namespace	Filler Order Number	Namespace ID	"VDH"	RE
RXA-1:Sub-id counter	Sub-id Counter	Sub-id Counter	0	R
RXA-2:Administration Sub-id counter	Administration Sub-id counter	Administration Sub-id counter	1	R
RXA-3:Date/Time Start of Administration	Date/Time Start of Administration	Date/Time Start of Administration		R
RXA-5:Administered Code	Administered Code	Administered Code		R
RXA-5.2: Administered Vaccine Name	Administered Vaccine Name	Administered Vaccine Name		RE
RXA-5.3:Administered Code Coding System	Administered Code	Coding System	"CVX"	
RXA-6.1:Administered Amount Quantity	Administered Amount	Quantity	999	R
RXA-9:Administration Notes	Administration Notes	Administration Notes	"01"	R
RXA-9.3 Administration Notes Name of Coding System	Administration Notes	Name of Coding System	"NIP001"	
RXA-15:Substance Lot Number	Substance Lot	Substance Lot		C (RE/O)
RXA-16:Substance Expiration Date				C (RE/O)
RXA-17:Substance Manufacturer Name				C (R/O)
RXA-17.3 Substance Manufacturer Name Coding System	Substance Manufacturer Name	Name of Coding System	"MVX"	C (R/O)
RXA-20 Completion Status	Completion Status	Completion Status	"CP"	We can only indicate if the event was historic if we also send this
RXR-1:Route	Route	Route		RE
RXR-1.3:Route Coding System	Route	Coding System	"NCIT"	C (R/O)
RXR-2:Administration Site	Administration Site	Administration Site		RE
RXR-2:Administration Site Coding System	Administration Site	Coding System	"HL70163"	C (R/O)
OBX-1: Set ID - OBX	Set ID – OBX	Set ID – OBX	1	(Required if sending OBX)
OBX-2: Value Type	Value Type	Value Type	CE	(Required if sending OBX)
OBX-3.1:Observation Identifier	Observation Identifier	Identifier	We should default the mule object value to this: 59784-9	(Required if sending OBX)
OBX-3.2:Observation Identifier Text	Observation Identifier	Text	'Disease with presumed immunity'	(Required if sending OBX)
OBX-3.2:Observation Identifier Coding System	Observation Identifier	Coding System	We should default the mule object value to this: LN	(Required if sending OBX)

<b>Z32– Return Complete Immunization History</b>				
Segment Field Component	Field Name	Component Name	Constant Value	Usage
OBX-4:Observation Sub ID	Observation Sub ID	Observation Sub ID	1	(Required if sending OBX)
OBX-11:Observation Result Status	Observation Result Status	Observation Result Status	"F"	(Required if sending OBX)
OBX-5.1:Observation Identifier Value	Observation Value	Value	38907003	(Required if sending OBX)
OBX-5.2:Observation Identifier Text	Observation Text	Text	'HISTORY VARICELLA INFECTION '	(Required if sending OBX)
OBX-5.1:Observation Identifier Coding system	Observation Coding System	Coding System	"SCT"	(Required if sending OBX)

#### 4.4.2 **Z42 – Complete Immunization History and Forecast**

A returned Z42 fulfills the request for an individual's complete evaluated immunization history and immunization forecast. In the event an error occurs and the system is unable to retrieve a forecast, VDH will return the patient's retrieved immunization history (similar to a Z32) with an blank history and forecast section.

##### 4.4.2.1 **OBX Segments for Z42 Profile**

In a Z42 RSP message, OBX segments are used to carry information about vaccine evaluations and forecast information. Some OBX segments (bulleted below) are consistent throughout the message.

- **OBX-1: Set ID** – Identifier of the OBX for the entire message.
- **OBX-4: Observation Sub ID** – This value is used to group related observations by setting the value to the same number.
  - The first segment will always be “1”
  - If VDH has a disease history for Varicella, this information will be captured in this first segment.
- **OBX-11: Observation Result Status** – VDH will always send “F” in this OBX field.

The basic format for the evaluation and forecast observation segments is question (OBX-3) and answer (OBX-5).

<b>Series Information and Evaluation: OBX-3 and OBX-5</b>						
Seq	Element Name	Usage	Vaccine Type	Dose Validity	Reason for Validity	Schedule Used
<b>OBX-2: Value Type (ID)</b>						
2	Value Type	R	CE	ID	CE	CE
<b>OBX-3: Observation Identifier (CE)</b>						
3.1	Identifier	R	30956-7	39781-5	30982-3	59779-9
3.2	Text	RE	Vaccine Type	Dose Validity	Reason for Validity	Immunization Schedule Used
3.3	Name of Coding System	R	LN	LN	LN	LN
<b>OBX-5 Observation Values</b>						
5.1	Identifier Value	R	A CVX code (see <a href="#">CVX to Vaccine Group</a> ) has	“Y” or “N” mapped from <i>Dose Validity</i> <a href="#">ICE to HL7 Mapping</a>	From REASON_CODE returned by ICE. See “Reason for validity “ in <a href="#">ICE to HL7 Mapping for Forecast</a>	"VXC16"

			been mapped from numeric group code returned by ICE Evaluator	<a href="#">for Forecast and Evaluations guide</a>	<a href="#">and Evaluations guide</a> and 5.11 Evaluation Reason - Code System 2.16.840.1.113883.3.795.12.100.3 <a href="#">ICE Implementation Guide</a>	
5.2	Identifier Text	CE	Text (see <a href="#">CVX to Vaccine Group</a> ) for mapping from numeric group code returned by ICE Evaluator	Not Used	From Description (Returned by ICE) See "Reason for validity " in <a href="#">ICE to HL7 Mapping for Forecast and Evaluations guide</a> and 5.11 Evaluation Reason - Code System 2.16.840.1.113883.3.795.12.100.3 <a href="#">ICE Implementation Guide</a>	"ACIP Schedule"
5.3	Identifier Coding System	C	"CVX"	Not Used	"99103"	"CDCPHINVS"

VDH precedes Forecast with the ORC and RXA below. Forecast information is always found in a separate ORC from the Evaluation, and it will always be the last ORC in the message.

Segment Field Component	Field Name	Component Name	Constant Value	Usage
ORC-1:Order Control	Order Control	OrderControl	"RE"	R
ORC-3:Filler Order Number			9999	R
ORC_3.2:Filler Order Namespace	Filler Order Number	Namespace ID	"VDH"	R
RXA-1:Sub-id counter	Sub-id Counter	Sub-id Counter	0	R
RXA-2:Administratio Sub-id counter	Administration Sub-id counter	Administration Sub-id counter	1	R
RXA-3:Date/Time Start of Administration	Date/Time Start of Administration	Date/Time Start of Administration	Calculated - Today's date	R
RXA-5:Administered Code	Administered Code	Administered Code	998	R
RXA-5.2:Administered Code Text	Administered Code Text	Administered Code Text	"no vaccine admin"	
RXA-5.3:Administered Code Coding System	Administered Code	Coding System	"CVX"	
RXA-6.1:Administered Amount Quantity	Administered Amount	Quantity	999	R
RXA-6.1:Administered Amount Units	Administered Amount	Units	RD	R
RXA-9:Administration Notes	Administration Notes	Administration Notes	"01"	R

**The following business rules apply to forecast OBX segments/groups:**

- When the Series Status is *Not Recommended*, VDH will not return an OBX segment for *Earliest Date* or *Recommended Date* for that vaccine group.
- VDH is required to send a Reason for Recommendation for vaccine groups with the status *Not Recommended*.
- VDH will NOT return forecast information for vaccine groups that are *Conditionally Recommended*.

Forecast Information: OBX-3 and OBX-5									
Seq	Element Name	Usage	Disease History	Vaccine Type	Earliest Date	Recommend d Date	Series Status	Reason for Recommendation	Schedule Used
<b>OBX-2: Value Type (ID)</b>									
2	Value Type	R	CE	CE	DT	DT	CE	CE	CE
<b>OBX-3: Observation Identifier (CE)</b>									
3.1	Identifier	R	59784-9	30956-7	30981-5	30980-7	59783-1	30982-3	59779-9
3.2	Text	RE	"Disease with	"Vaccine Next Due"	"Earliest Date to	"Date Vaccine Due"	"Vaccine Group Recommendation	"Reason applied by forecast logic to	"Immunizati on Schedule

			presumed immunity"		Give"		Status"	project this vaccine"	used"
3.3	Name of Coding System	R	LN	LN	LN	LN	LN	LN	LN
<b>OBX-5: Observation Values</b>									
5.1	Identifier Value	R	38907003	Same as (OBX "Vaccine Type") OBX-5.1:Observation Identifier Value	yyyMMdd (earliest date) <b>See Constraints /Rules row at end of table.</b>	yyyMMdd (due date) <b>See Constraints/Rules row at end of table.</b>	<b>See Constraints/Rules row at end of table.</b>	Source is ICE RECOMMENDATION_REASON_CODE. See <a href="#">ICE to HL7 Mapping for Forecast and Evaluations guide</a> for OBX mapping and <a href="#">ICE guide for code values</a>  <b>See Constraints/Rules row at end of table.</b>	"VXC16" (See HLN ICE to HL7 Mapping Guide)
5.2	Identifier Text	CE	"History of Varicella infection"	Same as (OBX "Vaccine Type") OBX-5.2:Observation Identifier Text In Evaluation	Not Used	Not Used	Description from LOINC	From ICE RECOMMENDATION_REASON_CODE See <a href="#">ICE to HL7 Mapping for Forecast and Evaluations guide</a> for OBX mapping and <a href="#">ICE guide for code values.</a>	"ACIP Schedule"
5.3	Identifier Coding System	C	"SCT"s	"CVX"	Not Used	Not Used	"LN"	"99106"	"CDCPHINVS"
<b>Constraints/ Rules</b>									

OBX						<p><i>Earliest Date will NOT be returned if Status in Series is Not Recommended</i></p> <p><i>Recommended Date will NOT be returned if Status in Series is Not Recommended</i></p> <p>If more than one reason code pair is returned from ICE, the first code is used to determine the LOINC code.</p> <p>Only sent if VDH has mapped from ICE REASON_CODE and ICE RECOMMENDATION CODE to LOINC code. If unmapped, all related forecast OBX segments for the vaccine group will be omitted from the returned response.</p> <p>See <a href="#">ICE Implementation Guide</a></p>	Entire segment repeated if more than one Reason for Recommendation
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#### 4.4.3 Z31 – Multiple Matches – Return a List of Candidates

A Z31 message will be returned when multiple individuals match the original query parameters. The returned results will include a *HashedEntityID* for any potential matches. The provider must identify the appropriate individual and submit another Z34/Z44, including the selected individual's *HashedEntityID* value.

<b>Z31 – Multiple Matches – Return a List of Candidates</b>				
Segment Field Component	Field Name	Component Name	Constant Value	Usage
MSH-3:Sending Application	Sending Application	Sending Application		RE
MSH-4:SendingFacility	Sending Facility	Sending Facility		RE
MSH-5:ReceivingApplication	Receiving Application	Receiving Application		RE
MSH-6:Receiving Facility	Receiving Facility	Receiving Facility		RE
MSH-7:DateTimeOfMessage	Date Time Of Message	Date Time Of Message	(current time)	R
MSH-9.1:Message Type Message Code	Message Type	Message Code	RSP	R
MSH-9.2:Message Type Trigger Event	Message Type	Trigger Event	K11	R
MSH-9.3:Message Type Message Structure	Message Type	Message Structure	RSP_K11	R
MSH-10:Message Control ID	Message Control ID	Message Control ID		R
MSH-11:Processing ID	Processing ID	Processing ID	Defaults to "P"	R
MSH-12:VersionID	Version ID	Version ID	2.5.1	R
MSH-15:Accept Acknowledgement Type	Accept Acknowledgement Type	Accept Acknowledgement Type	"NE"	R
MSH-16:Application Acknowledgement Type	Application Acknowledgement Type	Application Acknowledgement Type	"NE"	R
MSH-21.1:Message Profile Identifier Entity identifier	Message Profile Identifier	Entity identifier	Z31	R
MSH-21.2:Message Profile Identifier Namespace ID	Message Profile Identifier	Namespace ID	CDCPHINVS	R
MSH-22:Sending Responsible Organization	Sending Responsible Organization	Sending Responsible Organization	Defaults to "VDH"	RE

<b><i>231 – Multiple Matches – Return a List of Candidates</i></b>				
<b>Segment Field Component</b>	<b>Field Name</b>	<b>Component Name</b>	<b>Constant Value</b>	<b>Usage</b>
MSH-23:ReceivingResponsibleOrganization	Receiving Responsible Organization	Receiving Responsible Organization	Defaults to "VDH"	RE
MSH-23.6:AssigningAuthority	Receiving Responsible Organization	Assigning Authority		
MSH-23.7:IdType	Receiving Responsible Organization	Id Type		
MSH-23.10:AssigningAuthority	Receiving Responsible Organization	Receiving Responsible Organization		
MSA-1:Acknowledgement Code	Acknowledgement Code	Acknowledgement Code		R
MSA-2:Message Control ID	Message Control ID	Message Control ID		R
ERR-2.1:Error Segment ID	Error Location	Error Segment ID		RE
ERR-2.2:Error Segment Sequence	Error Location	Error Segment Sequence		RE
ERR-2.3:Error Field Position	Error Location	Error Field Position		RE
ERR-3.1:Error Code	HL7 Error Code	Error Code		R
ERR-4:Error Severity	Severity	Error Severity		R
ERR-5.1:Application Error Code	Application Error Code	Application Error Code		RE
ERR-8:User Message	User Message	User Message		RE
QAK-1:Query Tag	Query Tag	Query Tag		R
QAK-2:Query Response Status	Query Response Status	Query Response Status		RE
QAK3.1:MessageQueryNameIdentifier	Message Query Name	Identifier		R
QAK3.2:MessageQueryNameText	Message Query Name	Text		R
QAK3.3:MessageQueryNameNameofCodingSystem	Message Query Name	Name of Coding System	CDCPHINVS	R
QPD1.1:Message Query Name Identifier	Message Query Name	Identifier		R
QPD1.2:MessageQueryNameText	Message Query Name	Text		RE
QPD1.3:MessageQueryNameNameofCodingSystem	Message Query Name	Name of Coding System	CDCPHINVS	R
QPD2:QueryTag	Query Tag	Query Tag		R
QPD3:PatientListId	Patient List (Can repeat)	ID		RE
QPD3:PatientListIdentifierTypeCode	Patient List (Can repeat)	Identifier Type		RE
QPD3:PatientListAssigningFacility	Patient List (Can repeat)	Assigning Facility		RE
QPD4.1:PatientFamilyName	PatientName	Family Name		RE
QPD4.2:PatientGivenName	PatientName	Given Name		RE
QPD4.3:PatientFurtherName	PatientName	Second or Further Given Names		RE
QPD4.4:PatientSuffix	PatientName	Suffix		RE
QPD.4.7:Name Type Code	Patient Name	Name Type Code	"L"	RE
QPD5.1:MotherMaidenFamilyName	MotherMaidenName	Family Name		RE
QPD5.2:MotherMaidenGivenName	MotherMaidenName	Given Name		RE
QPD5.7:MotherMaidenNameType	MotherMaidenName	Name Type		RE
QPD6:PatientDOB	Patient Date of Birth	Patient Date of Birth		RE
QPD7:PatientSex	Patient Sex	Patient Sex		RE
QPD8.1:PatientStreetAddress	Patient Address	Street Address		RE
QPD8.3:PatientCity	Patient Address	City		RE
QPD8.4:PatientState	Patient Address	State		RE
QPD8.5:PatientZip	Patient Address	Zip		RE
QPD8.7:PatientAddressType	Patient Address	Address Type		RE
QPD9.6:PatientHomeCountryCode	Patient Home Phone	Country Code		RE

<b>Z31 – Multiple Matches – Return a List of Candidates</b>				
Segment Field Component	Field Name	Component Name	Constant Value	Usage
QPD9.6:PatientHomeAreaCode	Patient Home Phone	Area Code		RE
QPD9.7:PatientHomeLocalNumber	Patient Home Phone	Local Number		RE
QPD10:MultipleBirthIndicator	Multiple Birth Indicator	Multiple Birth Indicator		RE
QPD11:PatientBirthOrder	Patient Birth Order	Patient Birth Order		RE
PID-1: Set ID	Set ID	Set ID	n where n is the ordinality of this patient result starting at 1	R
PID-5.1	Patient Name	Given Name		R
PID-5.1	Patient Name	Family Name		R
PID-5.3	Patient Name	Second and Further Given Names		RE
PID-5.7	Patient Name	Name Type Code	"L"	
PID-7.1	Date/Time of Birth	Time		R
PID-8	Administrative Sex			R
PID-3.1	Patient Identifier List	ID Number		R
PID-3.4	Patient Identifier List	Assigning Authority	For HashedEntity_uid => "VDH" for MRN => patientSearchResult. PatientList[n].MRNReporter	C R
PID-3.5	Patient Identifier List	Identifier Type Code		R
PID-11.1	Patient Address	Street Address		RE
PID-11.3	Patient Address	City		RE
PID-11.4	Patient Address	State of Province		RE
PID-11.5	Patient Address	Zip or Postal Code		RE
PID-11.7	Patient Address	Address Type	"M" for mailing	R
PID-13.6	Phone Number – Home (Can Repeat)	Area/City Code		RE
PID-13.7	Phone Number – Home	Local Number		RE
PID-13.4	Phone Number – Home	Email Address		RE
PID-13.2	Phone Number – Home	Telecommunication Use Code	"PRN" for phone "NET" for email	R

#### 4.4.4 **Z33 – Error – Return an Acknowledgement with No Person Records**

A Z33 message will be returned when a Z32 or Z42 cannot be generated because the search yielded zero matching patients or more matches than allowed by the response control parameters.

<b>Z33 – Multiple Matches – Return an Acknowledgement with No Person Records, Too Many Records</b>				
Segment Field Component	Field Name	Component Name	Constant Value	Usage
MSH-3:Sending Application	Sending Application	Sending Application		RE
MSH-4:SendingFacility	Sending Facility	Sending Facility		RE
MSH-5:ReceivingApplication	Receiving Application	Receiving Application		RE
MSH-6:Receiving Facility	Receiving Facility	Receiving Facility		RE
MSH-7:DateTimeOfMessage	Date Time Of Message	Date Time Of Message	Current DateTime when HL7 message is created	R
MSH-9.1:Message Type Message Code	Message Type	Message Code	RSP	R

<b>Z33 – Multiple Matches – Return an Acknowledgement with No Person Records, Too Many Records</b>				
<b>Segment Field Component</b>	<b>Field Name</b>	<b>Component Name</b>	<b>Constant Value</b>	<b>Usage</b>
MSH-9.2:Message Type Trigger Event	Message Type	Trigger Event	K11	R
MSH-9.3:Message Type Message Structure	Message Type	Message Structure	RSP_K11	R
MSH-10:Message Control ID	Message Control ID	Message Control ID		R
MSH-11:Processing ID	Processing ID	Processing ID	“p”	R
MSH-12:VersionID	Version ID	Version ID	2.5.1	R
MSH-15:Accept Acknowledgement Type	Accept Acknowledgement Type	Accept Acknowledgement Type	NE	R
MSH-16:Application Acknowledgement Type	Application Acknowledgement Type	Application Acknowledgement Type	NE	R
MSH-21.1:Message Profile Identifier Entity identifier	Message Profile Identifier	Entity identifier	Z33	R
MSH-21.2:Message Profile Identifier Namespace ID	Message Profile Identifier	Namespace ID	CDCPHINVS	R
MSH-22:Sending Responsible Organization	Sending Responsible Organization	Sending Responsible Organization		RE
MSH-23:Receiving Responsible Organization	Receiving Responsible Organization	Receiving Responsible Organization		RE
MSH-23.6:AssigningAuthority	Receiving Responsible Organization	Assigning Authority		RE
MSH-23.7:IdType	Receiving Responsible Organization	Id Type		RE
MSH-23.10:AssigningAuthority	Receiving Responsible Organization	Receiving Responsible Organization		RE
MSA-1:Acknowledgement Code	Acknowledgement Code	Acknowledgement Code		R
MSA-2:Message Control ID	Message Control ID	Message Control ID		R
ERR-2.1:Error Segment ID	Error Location	Error Segment ID		RE
ERR-2.2:Error Segment Sequence	Error Location	Error Segment Sequence		RE
ERR-2.3:Error Field Position	Error Location	Error Field Position		RE
ERR-3.1:Error Code	HL7 Error Code	Error Code		R
ERR-4:Error Severity	Severity	Error Severity		R
ERR-5.1:Application Error Code	Application Error Code	Application Error Code		RE
ERR-8:User Message	User Message	User Message		RE
QAK-1:Query Tag	Query Tag	Query Tag		R
QAK-2:Query Response Status	Query Response Status	Query Response Status		RE
QAK3.1:MessageQueryNameIdentifier	Message Query Name	Identifier		R
QAK3.2:MessageQueryNameText	Message Query Name	Text		R
QAK3.3:MessageQueryNameNameofCodingSystem	Message Query Name	Name of Coding System	CDCPHINVS	R
QPD1.1:Message Query Name Identifier	Message Query Name	Identifier		R
QPD1.2:MessageQueryNameText	Message Query Name	Text		RE
QPD1.3:MessageQueryNameNameofCodingSystem	Message Query Name	Name of Coding System	CDCPHINVS	R
QPD2:QueryTag	Query Tag	Query Tag		R
QPD3:PatientListId	Patient List (Can repeat)	ID		RE
QPD3:PatientListIdentifierTypeCode	Patient List (Can repeat)	Identifier Type		RE
QPD3:PatientListAssigningFacility	Patient List (Can repeat)	Assigning Facility		RE
QPD4.1:PatientFamilyName	PatientName	Family Name		RE

<b>Z33 – Multiple Matches – Return an Acknowledgement with No Person Records, Too Many Records</b>				
Segment Field Component	Field Name	Component Name	Constant Value	Usage
QPD4.2:PatientGivenName	PatientName	Given Name		RE
QPD4.3:PatientFurtherName	PatientName	Second or Further Given Names		RE
QPD4.4:PatientSuffix	PatientName	Suffix		RE
QPD.4.7:Name Type Code	Patient Name	Name Type Code	"L"	RE
QPD5.1:MotherMaidenFamilyName	MotherMaidenName	Family Name		RE
QPD5.2:MotherMaidenGivenName	MotherMaidenName	Given Name		RE
QPD5.7:MotherMaidenNameType	MotherMaidenName	Name Type		RE
QPD6:PatientDOB	Patient Date of Birth	Patient Date of Birth		RE
QPD7:PatientSex	Patient Sex	Patient Sex		RE
QPD8.1:PatientStreetAddress	Patient Address	Street Address		RE
QPD8.3:PatientCity	Patient Address	City		RE
QPD8.4:PatientState	Patient Address	State		RE
QPD8.5:PatientZip	Patient Address	Zip		RE
QPD8.7:PatientAddressType	Patient Address	Address Type		RE
QPD9.6:PatientHomeCountryCode	Patient Home Phone	Country Code		RE
QPD9.6:PatientHomeAreaCode	Patient Home Phone	Area Code		RE
QPD9.7:PatientHomeLocalNumber	Patient Home Phone	Local Number		RE
QPD10:MultipleBirthIndicator	Multiple Birth Indicator	Multiple Birth Indicator		RE
QPD11:PatientBirthOrder	Patient Birth Order	Patient Birth Order		RE

#### 4.4.5 **Z23 – Error – Return an Acknowledgement with Errors**

A Z23 message will be returned when the received HL7 message cannot be parsed because the HL7 message type and/or profile type is unsupported or improperly formatted, or if there is an application error.

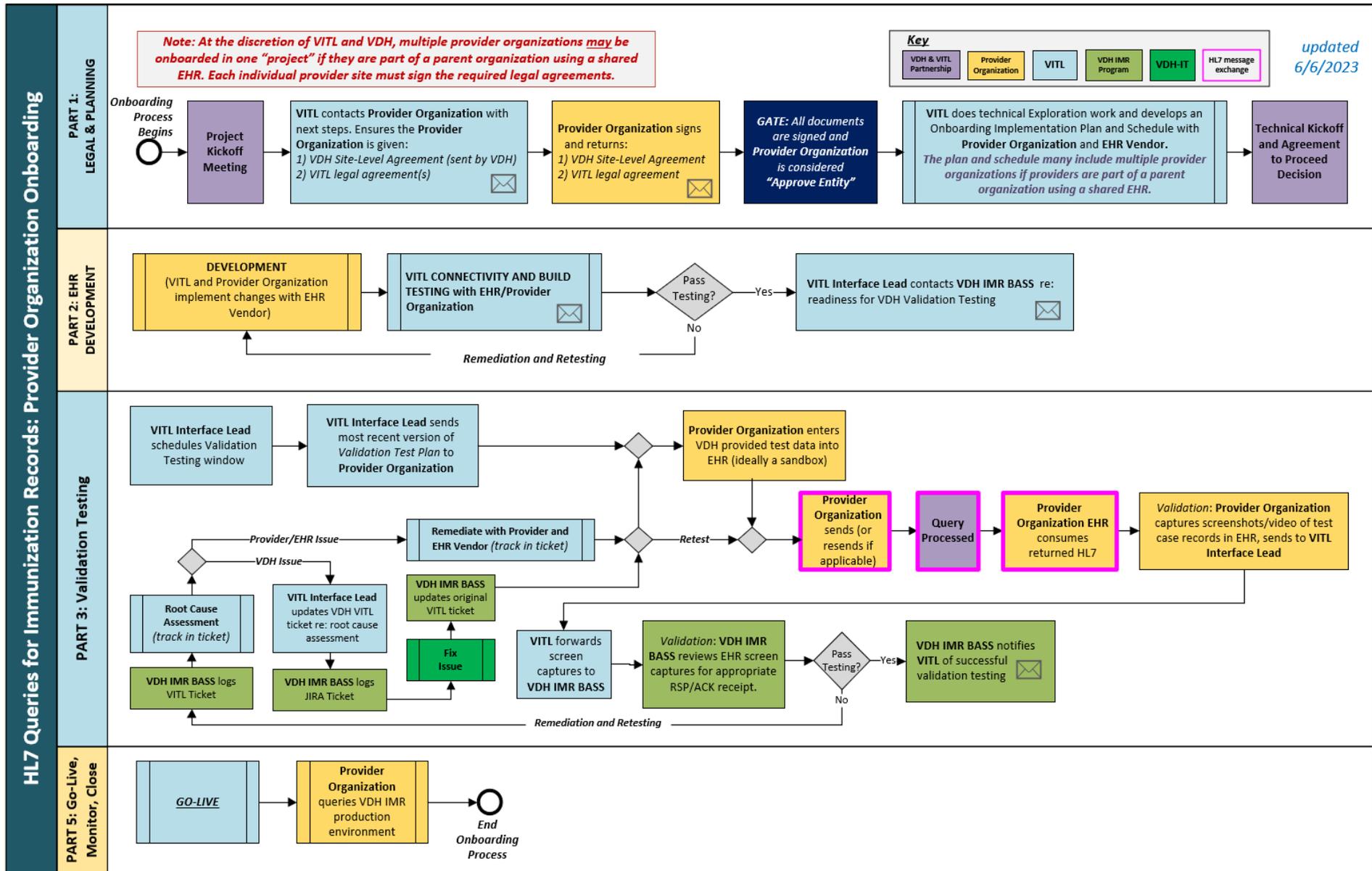
If a message is parsed but fatal errors are found, the HL7 message will contain information about the error encountered using a 100 or 200-series rejection status code defined in the CDC's [HL7 Version 2.5.1 Implementation Guide: Immunization Messaging](#).

<b>HL7-defined Table 0357- Message Error Status Codes</b>		
Status Code	Status Text	Description/Comment
<i>Success</i>		
0	Message accepted	Success. Optional, as the AA conveys this. Used for systems that must always return a status code
<i>Error Status Codes</i>		
100	Segment sequence error	The message segments were not in the proper order or required segments are missing.
101	Required field missing	A required field is missing from the segment.
102	Data type error	The field contained data of the wrong data type, e.g., a NM 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.
<i>Rejection Status Codes</i>		
200	Unsupported message type	The Message type is not supported
207	Application internal error	A catchall for internal error not explicitly covered by other codes.

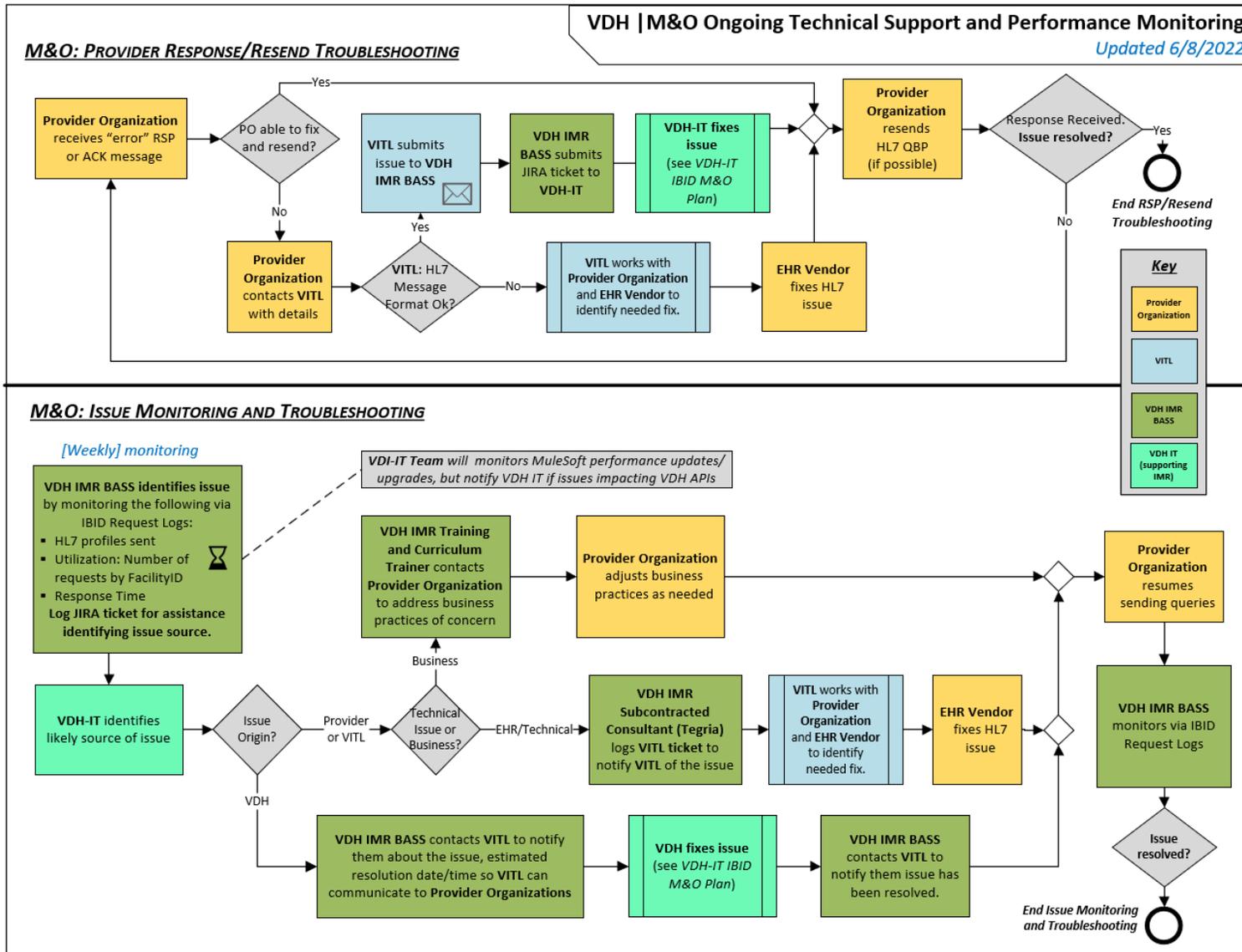
<b>Z23 – Error – Return an Acknowledgement with Errors</b>				
Segment Field Component	Field Name	Component Name	Constant Value	Usage
MSH-3:Sending Application	Sending Application	Sending Application		RE
MSH-4:SendingFacility	Sending Facility	Sending Facility		RE
MSH-5:ReceivingApplication	Receiving Application	Receiving Application		RE

<b>Z23 – Error – Return an Acknowledgement with Errors</b>				
<b>Segment Field Component</b>	<b>Field Name</b>	<b>Component Name</b>	<b>Constant Value</b>	<b>Usage</b>
MSH-6:Receiving Facility	Receiving Facility	Receiving Facility		RE
Date Time Of Message	Date Time Of Message	Current DateTime when HL7 message is created	(current time)	R
MSH-9.1:Message Type Message Code	Message Type	Message Code	ACK	R
MSH-9.2:Message Type Trigger Event	Message Type	Trigger Event	V04	R
MSH-9.3:Message Type Message Structure	Message Type	Message Structure	ACK	R
MSH-10:Message Control ID	Message Control ID	Message Control ID		R
MSH-11:Processing ID	Processing ID	Processing ID	Defaults to "P"	R
MSH-12:VersionID	Version ID	Version ID	2.5.1	R
MSH-15:Accept Acknowledgement Type	Accept Acknowledgement Type	Accept Acknowledgement Type	NE	R
MSH-16:Application Acknowledgement Type	Application Acknowledgement Type	Application Acknowledgement Type	NE	O
MSH-21.1:Message Profile Identifier Entity identifier	Message Profile Identifier	Entity identifier		R
MSH-21.2:Message Profile Identifier Namespace ID	Message Profile Identifier	Namespace ID	CDCPHINVS	R
MSH-22:Sending Responsible Organization	Sending Responsible Organization	Sending Responsible Organization	Defaults to "VDH"	RE
MSH-23:ReceivingResponsibleOrganization	Receiving Responsible Organization	Receiving Responsible Organization	Defaults to "VDH"	RE
MSH-23.6:AssigningAuthority	Receiving Responsible Organization	Assigning Authority		
MSH-23.7:IdType	Receiving Responsible Organization	Id Type		
MSH-23.10:AssigningAuthority	Receiving Responsible Organization	Receiving Responsible Organization		
MSA-1:Acknowledgement Code	Acknowledgement Code	Acknowledgement Code		R
MSA-2:Message Control ID	Message Control ID	Message Control ID		R
ERR-2.1:Error Segment ID	Error Location	Error Segment ID		RE
ERR-2.2:Error Segment Sequence	Error Location	Error Segment Sequence		RE
ERR-2.3:Error Field Position	Error Location	Error Field Position		RE
ERR-3.1:Error Code	HL7 Error Code	Identifier		R
ERR-3.2:Error Code	HL7 Error Code	Text		RE
ERR-4:Error Severity	Severity	Error Severity		R
ERR-5.1:Application Error Code	Application Error Code	Application Error Code		RE
ERR-8:User Message	User Message	User Message		RE

## Appendix A: HL7 Queries for Immunization Records Onboarding Workflow



## Appendix B: M&O: Ongoing Technical Support and Performance Monitoring



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## Appendix C: Sample Z34 QBP Message (including SOAP envelope)

```
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope" xmlns:urn="urn:cdc:iisb:2011">
<soap:Header>
</soap:Header>
<soap:Body>
<urn:submitSingleMessage>
<urn:username>aira</urn:username>
<urn:password>pass</urn:password>
<urn:facilityID>12345</urn:facilityID>
<urn:hl7Message>MSH|^~\&#38;||||20140515001020-
0500||QBP^Q11^QBP_Q11|793543|P|2.5.1|||ER|AL|||Z34^CDCPHINVS
QPD|Z34^Request Immunization
History^CDCPHINVS|37374859|123456^^^MYEHR^MR|Child^Bobbie^Q^^^^L|Que^Suzy^^^^^M|20050512|M|10 East
Main St^^Myfaircity^GA^^^L
RCP|I|5^RD&#38;records&#38;HL70126</urn:hl7Message>
</urn:submitSingleMessage>
</soap:Body>
</soap:Envelope>
```

## Appendix D: Sample Z44 QBP Message

```
MSH|^~\&||||201405150010- 0500||QBP^Q11^QBP_Q11|793543|P|2.5.1|||Z44^CDCPHINVS
QPD| Z44^ Request Evaluated History and Forecast^CDCPHINVS
|37374859|123456^^^MYEHR^MR|Child^Bobbie^Q^^^^L|Que^Suzy^^^^^M|20050 512|M|10 East Main
St^^Myfaircity^GA^^^L
RCP|I|5^RD&records&HL70126
```

## Appendix E: Sample Z32 RSP Message

```
MSH|^~\&|VDH|VDH|||CurrentDate/Time||RSP^K11^RSP_K11|MessageControlID|P|2.5.1|||NE|NE|||Z32^CDCPH
INVS|VDH
MSA|AA|MessageControlID
QAK|QueryTag|OK|Z34^Request Immunization History^CDCPHINVS
QPD|Z34^Request Immunization
History^CDCPHINVS|QueryTag01|30F3CBAAF7BC771F5269B2AAEABFA488F6958D31D70ABEE9D14F70F20E9FDCFB^^^VDH
^SR|Killington^Amarylis^^^^L||19810101|F|10 Patient Street^^Burlington^VT^^^M
PID|1||30F3CBAAF7BC771F5269B2AAEABFA488F6958D31D70ABEE9D14F70F20E9FDCFB^^^VDH^SR||Amarylis^Killingt
on^^^^L||19810101|F||10 Patient Street^^Burlington^VT^05401^^M|||
ORC|RE||416485^VDH
ORC|RE||416486^VDH
RXA|0|1|20220225||21^varicella^CVX|999||01^^NIP001|||U020240|20230628|MSD^^MVX|||CP
RXA|0|1|20220315||208^COVID-19, mRNA LNP-S, PF,
Pfizer^CVX|999||01^^NIP001|||98765F|20220729|PFR^^MVX|||CP
RXR|C28161^^NCIT|LA^^HL70163
RXR|C28161^^NCIT|RA^^HL70163
```

## Appendix F: Sample Z42 RSP Message

```
MSH|^~\&|VDH|VDH|||20230515154652-
0400||RSP^K11^RSP_K11|MessageControlID3967890161|T|2.5.1|||NE|NE|||Z42^CDCPHINVS|VDH
MSA|AA|MessageControlID3967890161
QAK|Query01|OK|Z44^Request Evaluated History and Forecast^CDCPHINVS
QPD|Z44^Request Evaluated History and
Forecast^CDCPHINVS|Query01|73AAF1B1B417C14CB956A3824A33EE65F3DA27E150B9D09D5CBED5CBB69CDE64^^^VDH^S
R|Washington^Bill^^^^L||19790728|F|^^M^^M|||
```

```

PID|1||73AAF1B1B417C14CB956A3824A33EE65F3DA27E150B9D09D5CBED5CBB69CDE64^^^VDH^SR||Washington^Bill^^
^^L||19790728|U||1250 Patient Street^^South Burlington^VT^05403^M|||||||||
ORC|RE||420881^VDH
RXA|0|1|20050205||21^varicella^CVX|999||01^^NIP001|||||||||CP
OBX|1|CE|30956-7^Vaccine Type^LN|1|21^Varicella Vaccine Group^CVX|||||F
OBX|2|ID|59781-5^Dose Validity^LN|1|Y|||||F
OBX|3|CE|59779-9^Immunization Schedule Used^LN|1|VXC16^ACIP Schedule^CDCPHINVS|||||F
ORC|RE||417335^VDH
RXA|0|1|20211219||207^COVID-19, mRNA LNP-S, PF,
Moderna^CVX|999||01^^NIP001||||5A321F|20220927|MOD^^MVX|||CP
OBX|4|CE|30956-7^Vaccine Type^LN|2|213^COVID-19 Vaccine Group^CVX|||||F
OBX|5|ID|59781-5^Dose Validity^LN|2|Y|||||F
OBX|6|CE|59779-9^Immunization Schedule Used^LN|2|VXC16^ACIP Schedule^CDCPHINVS|||||F
ORC|RE||417340^VDH
RXA|0|1|20220121||207^COVID-19, mRNA LNP-S, PF,
Moderna^CVX|999||01^^NIP001||||5A321F|20220927|MOD^^MVX|||CP
RXR|C28161^^NCIT|LA^^HL70163
OBX|7|CE|30956-7^Vaccine Type^LN|3|213^COVID-19 Vaccine Group^CVX|||||F
OBX|8|ID|59781-5^Dose Validity^LN|3|Y|||||F
OBX|9|CE|59779-9^Immunization Schedule Used^LN|3|VXC16^ACIP Schedule^CDCPHINVS|||||F
ORC|RE||9999^VDH
RXA|0|1|20230515||998^no vaccine admin^CVX|999
OBX|10|CE|59784-9^Disease with presumed immunity^LN|1|38907003^History of Varicella
infection^SCT|||||F
OBX|11|CE|30956-7^Vaccine Due Next^LN|4|122^Rotavirus Vaccine Group^CVX|||||F
OBX|12|CE|59783-1^Vaccine Group Recommendation Status^LN|4|LA13424-9^Too old - cannot complete the
series because the latest age for receiving dose has passed. ^LN|||||F
OBX|13|CE|30982-3^Reason applied by forecast logic to project this
vaccine^LN|4|TOO_OLD_TO_INITIATE^Vaccine not recommended at this age; too old to
initiate.^99106|||||F
OBX|14|CE|59779-9^Immunization Schedule Used^LN|4|VXC16^ACIP Schedule^CDCPHINVS|||||F
OBX|15|CE|30956-7^Vaccine Due Next^LN|5|213^COVID-19 Vaccine Group^CVX|||||F
OBX|16|DT|30980-7^Date Vaccine Due^LN|5|20220902|||||F
OBX|17|CE|59783-1^Vaccine Group Recommendation Status^LN|5|LA13423-1^Overdue - person is late
getting the next dose in the series^LN|||||F
OBX|18|CE|30982-3^Reason applied by forecast logic to project this vaccine^LN|5|DUE_NOW^Due
now.^99106|||||F
OBX|19|CE|30982-3^Reason applied by forecast logic to project this vaccine^LN|5| BOOSTER_DOSE^
Booster dose.^99106|||||F
OBX|20|CE|59779-9^Immunization Schedule Used^LN|5|VXC16^ACIP Schedule^CDCPHINVS|||||F
OBX|21|CE|30956-7^Vaccine Due Next^LN|6|188^Zoster Vaccine Group^CVX|||||F
OBX|22|DT|30981-5^Earliest Date to Give^LN|6|20290728|||||F
OBX|23|DT|30980-7^Date Vaccine Due^LN|6|20290728|||||F
OBX|24|CE|59783-1^Vaccine Group Recommendation Status^LN|6|LA13422-3^On schedule - person is not
overdue for a given dose in the series. Includes a person too young to start the series. ^LN|||||F
OBX|25|CE|30982-3^Reason applied by forecast logic to project this vaccine^LN|6|DUE_IN_FUTURE^Due
in the future.^99106|||||F
OBX|26|CE|59779-9^Immunization Schedule Used^LN|6|VXC16^ACIP Schedule^CDCPHINVS|||||F
OBX|27|CE|30956-7^Vaccine Due Next^LN|7|107^DTP Vaccine Group^CVX|||||F
OBX|28|DT|30981-5^Earliest Date to Give^LN|7|19860728|||||F
OBX|29|DT|30980-7^Date Vaccine Due^LN|7|19860728|||||F
OBX|30|CE|59783-1^Vaccine Group Recommendation Status^LN|7|LA13423-1^Overdue - person is late
getting the next dose in the series^LN|||||F
OBX|31|CE|30982-3^Reason applied by forecast logic to project this vaccine^LN|7|DUE_NOW^Due
now.^99106|||||F
OBX|32|CE|59779-9^Immunization Schedule Used^LN|7|VXC16^ACIP Schedule^CDCPHINVS|||||F
OBX|33|CE|30956-7^Vaccine Due Next^LN|8|45^Hep B Vaccine Group^CVX|||||F

```

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```

OBX|34|DT|30981-5^Earliest Date to Give^LN|8|19980728|||||F
OBX|35|DT|30980-7^Date Vaccine Due^LN|8|19980728|||||F
OBX|36|CE|59783-1^Vaccine Group Recommendation Status^LN|8|LA13423-1^Overdue - person is late
getting the next dose in the series^LN|||||F
OBX|37|CE|30982-3^Reason applied by forecast logic to project this vaccine^LN|8|DUE_NOW^Due
now.^99106|||||F
OBX|38|CE|59779-9^Immunization Schedule Used^LN|8|VXC16^ACIP Schedule^CDCPHINVS|||||F
OBX|39|CE|30956-7^Vaccine Due Next^LN|9|03^MMR Vaccine Group^CVX|||||F
OBX|40|DT|30981-5^Earliest Date to Give^LN|9|20050305|||||F
OBX|41|DT|30980-7^Date Vaccine Due^LN|9|20050305|||||F
OBX|42|CE|59783-1^Vaccine Group Recommendation Status^LN|9|LA13423-1^Overdue - person is late
getting the next dose in the series^LN|||||F
OBX|43|CE|30982-3^Reason applied by forecast logic to project this vaccine^LN|9|DUE_NOW^Due
now.^99106|||||F
OBX|44|CE|59779-9^Immunization Schedule Used^LN|9|VXC16^ACIP Schedule^CDCPHINVS|||||F
OBX|45|CE|30956-7^Vaccine Due Next^LN|10|88^Influenza^CVX|||||F
OBX|46|DT|30981-5^Earliest Date to Give^LN|10|20220701|||||F
OBX|47|DT|30980-7^Date Vaccine Due^LN|10|20220701|||||F
OBX|48|CE|59783-1^Vaccine Group Recommendation Status^LN|10|LA13423-1^Overdue - person is late
getting the next dose in the series^LN|||||F
OBX|49|CE|30982-3^Reason applied by forecast logic to project this vaccine^LN|10|DUE_NOW^Due
now.^99106|||||F
OBX|50|CE|59779-9^Immunization Schedule Used^LN|10|VXC16^ACIP Schedule^CDCPHINVS|||||F
OBX|51|CE|30956-7^Vaccine Due Next^LN|11|109^Pneumococcal Vaccine Group^CVX|||||F
OBX|52|DT|30980-7^Date Vaccine Due^LN|11|20440728|||||F
OBX|53|CE|59783-1^Vaccine Group Recommendation Status^LN|11|LA13422-3^On schedule - person is not
overdue for a given dose in the series. Includes a person too young to start the series.^LN|||||F
OBX|54|CE|30982-3^Reason applied by forecast logic to project this vaccine^LN|11|DUE_IN_FUTURE^Due
in the future.^99106|||||F
OBX|55|CE|30982-3^Reason applied by forecast logic to project this vaccine^LN|11|
ADMINISTER_PCV15_OR_PCV20^ Administer either the PCV15 or PCV20 vaccine.^99106|||||F
OBX|56|CE|59779-9^Immunization Schedule Used^LN|11|VXC16^ACIP Schedule^CDCPHINVS|||||F

```

### Appendix G: Sample Z31 RSP Message

```

MSH|^~\&|VDH|VDH|||CurrentDate/Time||RSP^K11^RSP_K11|MessageControlID|T|2.5.1|||NE|NE|||||Z31^CDCPH
INVS|VDH
MSA|AA|MessageControlID
QAK|QueryTag|OK|Z44^Request Evaluated History and Forecast^CDCPHINVS
QPD|Z44^Request Evaluated History and
Forecast^CDCPHINVS|QueryTag05||Washington^Bill^^^^^L||19790628||||
PID|1||73AAF1B1B417C14CB956A3824A33EE65F3DA27E150B9D09D5CBED5CBB69CDE64101258^^^VDH^SR||Washington^
Bill^^^^^L||19790728|U|||1250 Patient Street^^South Burlington^VT^05403^^M|||||
PID|2||9E8E4BF71DD11B811CC75F4D27A4AC334B687E0981463852FE60B1AAABC7C4A8^^^VDH^SR||Washington^Willia
m^^^^^L||19790628|M|||275 Patient Street^^Burlington^VT^05401^^M|||||

```

### Appendix H: Sample Z33 RSP Message (zero matches returned)

```

MSH|^~\&||IIS Sandbox v0.5.4|||20220413063351-
0600||RSP^K11^RSP_K11|1649853231035195|P|2.5.1|||NE|NE|||||Z33^CDCPHINVS
MSA|AA|3Bqq-QA.4.1.1
QAK|37374859|NF|Z34^Request a Complete Immunization History^CDCPHINVS
QPD|Z34^Request Immunization
History^CDCPHINVS|37374859|R50D2114^^^AIRA^MR|MurrayAIRA^CarlAIRA^Kean^^^^^L||20211016|M|

```

### Appendix I: Sample Z23 ACK (caused by internal server error at VDH)

```

MSH|^~\&|VTA|VTA|VTA|VTA|20220820194446-
0400||ACK^Q11^ACK|MessageControlId1690612320|P|2.5.1|||NE|NE|||||Z23^CDCPHINVS
MSA|AR|MessageControlId1690612320

```

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ERR||MSH^1^9|207^Application internal error^HL70357|E|||HTTP:INTERNAL\_SERVER\_ERROR

## Appendix J: Sample SOAP Fault Message (caused by unauthorized FacilityID)

```
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope" xmlns:urn="urn:cdc:iisb:2011">
  <soap:Header>
  </soap:Header>
  <soap:Body>
    <urn:submitSingleMessage>
      <urn:username>{{client_id}}</urn:username>
      <urn:password>{{client_secret}}</urn:password>
      <urn:facilityID>12345</urn:facilityID>
      <urn:hl7Message>MSH|^~\&|||20220722||QBP^Q11^QBP_Q11|MessageControlID12345|T|2.5.1|||AL|||
      Z34^CDCPHINVS
      QPD|Z34^Request Immunization History^CDCPHINVS|querytag||Philo^Poppy^^^^^L||20000220||
      RCP|I|5^RD&records&HL70126
    </urn:hl7Message>
  </urn:submitSingleMessage>
</soap:Body>
</soap:Envelope>
```

## Appendix K: Sample SOAP Fault Message (caused by VHIE to VDH connectivity issue)

```
<soapenv:Fault xmlns:soapenv="http://www.w3.org/2003/05/soap-envelope">
  <soapenv:Code>
  <soapenv:Value>soapenv:Sender</soapenv:Value>
  <soapenv:Subcode>
  <soapenv:Value>400</soapenv:Value>
</soapenv:Subcode>
</soapenv:Code>
  <soapenv:Reason>
  <soapenv:Text>VITL is experiencing connectivity issues with VDH</soapenv:Text>
</soapenv:Reason>
  <soapenv:Node>node uri</soapenv:Node>
  <soapenv:Detail>
    <urn:fault xmlns:urn="urn:cdc:iisb:2011">
      <urn:Code>100</urn:Code>
      <urn:Reason>Retry after few Minutes</urn:Reason>
      <urn:Detail />
    </urn:fault>
  </soapenv:Detail>
</soapenv:Fault>
```