



NHIIS

Query-Response

Technical Specifications Guide

NH Department of Health and Human Services
Division of Public Health Services: Immunization Section

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Change Log

The following table captures the progression of this document over time.

Version	Date	Description	Author
1.0	06/20/2021	Created the specification guidance document for NHIS	Alok Patra
2.0	9/15/2021	Clarified and updated the guidance in the section titled <i>Suggested Testing Protocol</i>	Danielle Reader-Jolley

Table of Contents

Contents

Introduction	4
QBP Segment Usage in Proper Sequence	6
Required and Optional HL7 Message Segments in Proper Sequence	7
Message Header (MSH) Field Segments	7
Query Parameter Definition (QPD) Field Segments.....	8
Response Control Parameter (RCP) Field Segments.....	10
Message 1: Query for Vaccination Record (QBP)	11
Exact Match	11
No Match/Too Many Matches.....	12
Message 2: Response to a Query (RSP)	13
Message 3: Update to a Vaccination Record (VXU).....	15
Message 4: Acknowledgment to an Update (ACK).....	16
Suggested Testing Protocol.....	16
Exact Match/Single Match Testing	16
Multi-Match Testing Scenarios	17
Too Many Match Testing Scenario	19
Appendix A: Example QBP Message	21
Example Z34: Request Complete Immunization History	21
Example Z44: Request Evaluated History and Forecast.....	21
Appendix B: Example Response (RSP) Messages.....	21
Exact Match Found, no Forecasting.....	21
Exact Match Found, includes Forecasting.....	23
Multiple Patients Returned.....	25
Too Many Matches Found	25
Opted Out Patient.....	26
Deceased Patient	26

Introduction

Transmission of immunization records between NHIIS and the provider organization will be based on the **CDC/AIRA HL7 Version 2.5.1 Implementation Guide for Immunization Messaging, Release 1.5, 10/1/2014, Updated October 2018**¹ (national HL7 2.5.1 IG) and the **NHIIS Local Delta Implementation Guide for HL7 2.5.1 Release 1.5**².

An ideal transaction would consist of 4 messages, each of which are further outlined in this document:

1. Query from the provider organization (QBP) to NHIIS
2. Response (RSP) from NHIIS to the provider organization
3. Update (VXU) from the provider organization to NHIIS
4. Acknowledgement (AA or AE) from NHIIS to the provider organization

Disclaimer: Immunization records returned from NHIIS may not be complete. The records represent only the data that has been reported to and/or entered into the system.

Important Notes:

- **Data Types:** Refer to the national HL7 2.5.1 IG for the data type specifications for each field.
- **QBP Prior to VXU:** The provider organization must attempt to query NHIIS before submitting an update in a VXU message.
- **QBP Field Definitions:** The likelihood of finding a particular person in NHIIS is improved when all known parameters are populated. The provider organization should strive to include values for each query parameter.
- **Response from NHIIS:** NHIIS will send responses as specified in the national HL7 2.5.1 IG. Responses will be sent when the provider organization queries immunization records for individuals for whom a record exists (or may exist) in NHIIS.

Optional Fields: If the provider organization sends optional fields, they must be properly formatted and must not contain any errors. Providers should consider sending optional fields as null values.

Return Vaccination Forecasts: If forecasting is desired, the provider organization can submit a Message Profile Identifier (MSH-21) and Message Query Code (QPD-1.1) of Z44. This will be recognized in NHIIS as a request for evaluated history and forecast, and will result in a Z33 or Z42 response (RSP) message.

¹ <https://repository.immregistries.org/resource/hl7-version-2-5-1-implementation-guide-for-immunization-messaging-release-1-5-1/>

² <https://www.dhhs.nh.gov/dphs/immunization/documents/nhiis-delta-guide-hl7.pdf>

Clinic Profile	Recommended QBP Type	
	Z34 (history only)	Z44 (history & forecast)
Your EHR <u>has a forecaster</u> , and <u>full patient histories have been sent</u>	✓	
Your EHR <u>has a forecaster</u> , and <u>full patient histories have not been sent</u>	✓	
Your EHR <u>has no forecaster</u> , and <u>full patient histories have been sent</u>		✓
Your EHR <u>has no forecaster</u> , and <u>full patient histories have not been sent</u>	✓	✓ *

*Note that vaccine recommendations returned may be inaccurate if the patient's full immunization history has not been reported to NHIIS.

IIS Response for Exact Patient Match: When a query finds an exact patient match, NHIIS response will return the following fields:

- **Medical Record Number and NHIIS Patient ID**
- **Patient Name, Gender, Date of Birth, and Multiple Birth Indicator**
- **Patient Contact Information (Address and Phone Number)**
- **Parent or Guardian Name(s) and Primary Contact Information (Phone Number and/or Email Address)**
- **Race, Ethnicity, and Language**
- **Vaccination History, Contraindications, and Vaccine Forecast (for Z44 query)**

QBP Segment Usage in Proper Sequence

Segment	Usage	Comments
Message Header (MSH)	Required	Every message must begin with an MSH.
Query Parameter Definition (QPD)	Required	Every QBP must have one QPD segment. This segment is used to uniquely identify the requested patient.
Response Control Parameter (RCP)	Required	Every QBP must have one RCP segment. This segment is used to restrict the number of candidate records that should be returned in response to a query.

Required and Optional HL7 Message Segments in Proper Sequence

Message Header (MSH) Field Segments

Required Field		Comments	Value	Usage
MSH-1	Field Separator			R
MSH-2	Encoding Characters		^~\&	R
MSH-3	Sending Application	Supplied by Provider organization		RE
MSH-4	Sending Facility	Supplied by NHIS	NH9999	R
MSH-5	Receiving Application		NHIS	RE
MSH-6	Receiving Facility		NHIS	R
MSH-7	Date and Time of Message	Precision must be at least to the minute. If time zone is not included, it is presumed to be the time zone of the sender.		R
MSH-9	Message Type		QBP^Q11^QBP_Q11	R
MSH-10	Message Control ID	This value is generated by the sending application. It will be echoed back in the response message from the IIS.		R
MSH-11	Processing ID	Use P for Production	P	R
MSH-12	Version ID		2.5.1	R
MSH-15	Accept Acknowledgement Type		ER	RE
MSH-16	Application Acknowledgement Type		AL	RE
MSH-21	Message Profile Identifier	NHIS uses Z34 to indicate a request for a complete immunization history and Z44 to request an evaluated immunization history and forecast.	Z34^CDCPHINVS Z44^CDCPHINVS	R

Required Field		Comments	Value	Usage
MSH-22	Responsible Sending Organization	Contact NHIIS staff for assistance and permission to send/receive data on behalf of other facilities.		O
MSH-23	Responsible Receiving Organization			O

Query Parameter Definition (QPD) Field Segments

Required Field		Comments	Value	Usage
QPD-1	Message Query Name			R
	QPD-1.1	Message Query Code	Z34 Z44	
	QPD-1.2	Message Query Description	Request Immunization History Request Evaluated History and Forecast	
	QPD-1.3	Message Query Coding System	HL70471	
QPD-2	Query Tag	Valued by the sending system to identify the query, this value is unique to each query message instance and may be used to match response messages to the origination query. It will be echoed back as the first field in the query acknowledgment segment (QAK) of the response.		R
QPD-3	Patient Identifier List		The first repetition must be the Medical Record Number or NHIIS Patient ID (if stored from a previous query/update). Subsequent repetitions may include a Medical Record Number or NHIIS Patient ID.	RE
	QPD-3.1	Internal Patient Identifier		

Required Field		Comments	Value	Usage
	QPD-3.5	Identifier Type	MR = Medical Record Number SR = NHIIS Patient ID	
QPD-4	Patient Name		Legal name of the patient	R
	QPD-4.1	Patient Last Name		
	QPD-4.2	Patient First Name		
	QPD-4.3	Patient Middle Name or Initial	Used to distinguish between patients with the same first and last name in NHIIS.	
	QPD-4.7	Patient Name Type Code	L	
QPD-5	Mother's Maiden Name		Used to distinguish between patients with the same last name in NHIIS.	RE
	QPD-5.1	Mother's Maiden Last Name		
	QPD-5.2	Mother's Maiden First Name		
	QPD-5.7	Mother's Maiden Name Type Code	M	
QPD-6	Date of Birth	Format: YYYYMMDD		RE
QPD-7	Administrative Sex	Refer to Table 0001 in the NHIIS Local Delta IG for a listing of acceptable values.		RE
QPD-8	Patient Address		Primary address of the patient.	RE
	QPD-8.1	Patient Street Address 1		
	QPD-8.2	Patient Street Address 2		
	QPD-8.3	Patient City		

Required Field		Comments	Value	Usage
	QPD-8.4	Patient State	Only states with the USA are allowable values.	
	QPD-8.5	Patient Postal Zip Code		
	QPD-8.6	Patient Country Code		
	QPD-8.7	Patient Address Type Code	Refer to Table 0190 in the NHIS Local Delta IG for a listing of acceptable values. If not valued, it will default to "L".	
QPD-9	Phone Number		Primary phone number of the patient.	RE
	QPD-9.2	Telecommunication Use Code	Refer to Table 0201 in the national HL7 2.5.1 IG for a listing of acceptable values.	
	QPD-9.3	Telecommunication Equipment Type	Refer to Table 0202 in the national HL7 2.5.1 IG for a listing of acceptable values.	
	QPD-9.6	Area Code		
	QPD-9.7	Phone Number		
QPD-10	Multiple Birth Indicator		Acceptable values are "Y" and "N". If status is undetermined, the field should be empty.	RE
QPD-11	Birth Order		Populated if QPD-10 (Multiple Birth Indicator) is valued "Y".	RE

Response Control Parameter (RCP) Field Segments

Required Field		Comments	Value	Usage
RCP-1	Query Priority	May be empty or "I" to indicate immediate priority is expected. Note that "I" is the "i" capitalized.	I	RE
RCP-2	Quantity Limited Request	This field contains a maximum number of patient candidates that may be returned in response to the query.		RE

Required Field		Comments	Value	Usage
RCP-2.1	Quantity Limited Number	Number of records that may be returned. Maximum is 10.		
RCP-2.2	Quantity Limited Code	Any value without a unit of 'RD' will be treated as invalid.	RD	

Message 1: Query for Vaccination Record (QBP)

NHIS should first be queried using demographic information and/or other identifiers using a Query ID of Z34 or Z44 in order to:

- a. request and receive a patient's complete immunization history (Z34)

OR

- b. request and receive an evaluated immunization history and forecast of next vaccine doses due (Z44)

It is up to the provider's organization to specify whether or not they want to request and receive the patient's complete immunization history or the patient's evaluated immunization history and forecast of next doses. If forecasting is desired, NHIS will be configured to return forecasting information on all queried patients.

NOTE: If no matches are found or if there are errors, no patients will be returned.

Exact Match

1. The IIS will attempt to locate an exact match by applying the following criteria:

- a. First and Last Name supplied match the patient's name, the patient's alias name, or the patient's birth record name in the IIS.
- b. The Date of Birth matches the patient's DOB in the IIS.

Data Element	Location in QBP Message
Patient Last Name	QPD-4.1
Patient First Name	QPD-4.2
Date of Birth	QPD-6

2. If step 1 resulted in a single match, then the search is completed and the result is returned via the RSP message.
3. If step 1 resulted in multiple matches, the following filters will be applied in the order presented until either a single record remains or until applying the filter would result in no matches remaining:

Data Element	Location in QBP Message	Notes
NHIS Patient ID	QPD-3.1	Value in QPD-3.5 (SR)
Medical Record Number	QPD-3.1	Value in QPD-3.5 (MR)
Gender	QPD-7	
Mother's Maiden Name	QPD-5.1	
Cell Phone	QPD-9	Value in QPD-9 (ORN)
Email Address	QPD-9	Value in QPD-9 (NET)
Physical Address	QPD-8	Value in QPD-8 (H, P)
Mailing Address	QPD-8	Value in QPD-8 (M, L, C)

4. If one or more records remain in the result set after step 3, results are returned via the RSP message as appropriate.

No Match/Too Many Matches

1. If the initial search resulted in no matches found, the IIS will attempt a less restrictive search by applying all of the following criteria:
 - a. One of the following is true:
 - i. The Last name supplied matches the patient's last name or alias last name and the First name supplied is similar to the patient's first name or alias first name.
 - ii. The First name supplied matches the patient's first name or alias first name and the Last name supplied is similar to the patient's last name or alias last name.
 - iii. The Last name supplied matches the patient's birth record last name and the First name supplied is similar to the patient's birth record first name.
 - iv. The First name supplied matches the patient's birth record first name and the Last name supplied is similar to the patient's birth record last name.
 - b. The Middle name supplied (if any) is similar to the patient's middle name, patient's first middle initial, alias middle name, or birth record middle name or the patient's middle name field is empty in the IIS.
 - c. The DOB supplied matches the patient's DOB or the patient's DOB is empty in the IIS.

2. If step 1 results in no records or a single record matching, the IIS will respond with an RSP message indicating no records were found. (Because a looser matching algorithm was applied, a single record match cannot be assumed to be an exact match without human intervention. Therefore, matching records will not be returned unless at least two potential matches are found.)
3. If step 1 results in multiple matches being found, all of the following filters will be applied. If the filter is a patient identifier (a, b, g or h), the filter can reduce the match to a single record. If the filter is not a patient identifier (c, d, e, f, i or j), the filter can reduce until either only two records remain or until applying the filter would result in less than two matches remaining:
 - a. NHIIS Patient ID
 - b. Requesting Application's Medical Record Number
 - c. Gender
 - d. Mother's Maiden Name
 - e. Birth State
 - f. Mother's First/Last Name
 - g. Cell phone
 - h. Email
 - i. Physical address
 - j. Mailing address

Message 2: Response to a Query (RSP)

The **MSA (Message Acknowledgement Segment)** portion of the RSP message will be used to acknowledge receipt of the QBP message and provide an assessment of the message condition (AA, AE, or AR). *Note: NHIIS will not include optional or "X" fields in the MSA segment (MSA-3 through MSA-6). These fields will be blank when returned from NHIIS.*

The **QAK (Query Acknowledgement Segment)** portion of the RSP message will be used to communicate the outcome of a query message. The IIS will always respond with an appropriate message type in the QAK-2 response segment:

- If no matching records are found, an RSP message with query response status code of **NF** (Not Found) message will be returned.
- If a single matching record is found, an RSP message with a query response status code of **OK** message will be returned.
- If multiple matching records are found, an RSP message with a query response status code of **OK** message will be returned.
- If too many matches are found, an RSP message with a query response status code of **TM** message will be returned.
- The **TM** (too many) message will also be returned if the value in RCP-2, (QuantityLimitedRequest) is less than the number of matches found.

- If a significant issue is found in the incoming message that would prevent an effective search from being accomplished, an RSP message with a query response status code of **AE** or **AR** message will be returned with additional details about the error encountered.

NOTE: For any search, if there is a matching record that is marked for deletion in the IIS or the patient has **opted out**, a record will not be returned as part of the search results.

Possible QAK outcomes (QAK-3) are noted in the table below. *Note: NHIIS will not include optional fields in the QAK segment (QAK-4 through QAK-6). These fields will be blank when returned from NHIIS.*

Query Outcome	Profile	Response Message	Comments
Multiple candidate patients found	Z31	At least one lower confidence match is found. The number of candidates returned will be less than or equal to the maximum number allowed per RCP-2.1 or 10, whichever value is lowest (for example, if there are 6 candidates and RCP-2.1 is valued at 5, only 5 of the 6 candidates will be returned). One Patient Identifier (PID) segment, one Patient Demographic (PD1) segment, any applicable Next of Kin (NK1) segments, and one Patient Visit Segment (PV1) segment for each potential match is returned. NOTE: If a Z31 profile response is returned with a single candidate, the IIS converts it into a Z32 profile response.	The initiator of the QBP message will be able to review the patient list returned and use the information to inform a re-query.
Exact match found	Z32	Exactly one high confidence match is found and the patient's complete immunization history is returned. The response is very similar to a VXU message in content.	This will support transferring a person's immunization records from one information system to another.
No match found	Z33	Message was successfully processed but no patients matched the criteria sent in the query, therefore no demographic or immunization history is returned. QAK-2 is valued NF to indicate no data found.	

Query Outcome	Profile	Response Message	Comments
Too many matches found	Z33	Message was successfully processed but the number of candidates identified exceeds 10 or the RCP-2.1 value, therefore no demographic or immunization history is returned. QAK-2 is valued NF to indicate no data found.	
Evaluated History and Forecast	Z42	Exactly one high confidence match is found and the patient's evaluated history and vaccine forecast is returned.	
Application Reject (AR)		The IIS was unable to process the query. The message was rejected and an acknowledgment (ACK) describing issues with the submitted query is returned in the form of an application reject (AR).	Information returned in the AR will assist with correcting the query.

The full response to a query will contain the following HL7 message segments: MSH, MSA, QAK, QPD, PID (may be multiple), PD1 (one per patient), NK1 (one or more per patient), PV1 (one per patient), ORC (may be multiple), RXA (one per ORC), OBX (multiple per each ORC/RXA combination), RXR (one per RXA). See examples in **Appendix B**.

Message 3: Update to a Vaccination Record (VXU)

Once the EHR receives a response from NHIIS that results in the selection of a desired patient, providers will follow routine clinic workflows for vaccinating and reporting new doses to NHIIS via VXU.

- Immunization update messages should follow the requirements established in the NHIIS Local Delta Implementation Guide for HL7 2.5.1 Release 1.5 and the CDC/AIRA HL7 2.5.1 Implementation Guide.
- The provider organization may attempt to find an individual's NHIIS Patient ID using a QBP prior to sending a VXU. If the individual is found in NHIIS, the VXU can include the individual's registry number in the Patient Identifier List (PID-3).

Message 4: Acknowledgment to an Update (ACK)

After a new VXU is received by NHIIS, an ACK message will be issued to acknowledge receipt of the newly submitted messages.

- Refer to the NHIIS Local Delta Implementation Guide for HL7 2.5.1 Release 1.5 and the CDC/AIRA HL7 2.5.1 Implementation Guide for acknowledgment details and examples.

Suggested Testing Protocol

Testing for QBP/RSP is typically composed of the following elements:

1. Query NHIIS for the vaccination record of a patient that exists in the EHR
2. The EHR will receive a response from NHIIS that will reflect one the following scenarios
 - a. Exact patient match (proceed to next step)
 - b. Multiple match candidates (select patient of interest and re-query for the specified patient)
 - c. No match (patient does not exist in NHIIS or does not exist with the specified parameters)
 - d. Too many match candidates (increase RCP value or re-query with more specific patient detail)
3. Review the response (patient record) returned from NHIIS and determine which elements to incorporate into the EHR record
4. Record new vaccine administrations for the patient and generate a new VXU report to the IIS.
5. Provider/EHR will receive an acknowledgement (ACK) of receipt from NHIIS for the new message.

Providers should apply multiple layers of testing:

- Submit 25-50 records via VXU to query against for a guaranteed response (exact match and forecast)
- Query using NHIIS engineered test scenarios (multi-match or too many matches)
- Query NHIIS for real patients that present for vaccinations (match/no match, VXU update after vaccination)

Exact Match/Single Match Testing

Exact match QBP/RSP is easiest to test after a handful of records have been submitted via VXU from your EHR to NHIIS. Once records have been sent to NHIIS, a query can be issued from the EHR to NHIIS for a specific patient of interest. Providers/vendors will then confirm that the

patient returned by NHIIS was the desired patient. Repeat this process several times to confirm that queries and returns are performing as intended.

Multi-Match Testing Scenarios

Testing for multiple match candidates can be difficult, so NHIIS has engineered the following test cases for testing these scenarios. **NOTE: do NOT alter these test patients by administering vaccinations. This exercise is intended to test match returns ONLY.** To begin, providers will need to create the following test patients in their EHR and then query NHIIS to demonstrate the match return. **If a record accidentally gets altered, please notify NHIIS staff immediately so the test patient data can be restored (nhiis.support@dhhs.nh.gov).**

Step #1 - Test Patients: Create the following patients in your EHR

Create the two patients below exactly as presented in the table. Consult with your vendor before entering these test patients into your EHR. You may have to turn off any processes that would automatically send new patients/vaccines to NHIIS. Enter patient vaccinations as historical.

Patient		
1.	Name	David R. Daniels
	Date of Birth	05/05/2005
	Mother	Susanne Stephens
	Address	101 Main St, Concord, NH 03301
	Immunizations	Hep B 05/05/2005
2.	Name	Fiona Watson
	Date of Birth	02/05/2011
	Mother	Mary Cooper
	Address	303 Hills St, Concord, NH 03301
	Immunizations	

Step #2 – Patient Query: Issue an individual query from your EHR to NHIIS for each test patient, respectively.

Step #3 - Patient Key: Verify that your system can accurately identify and select the following patients from the list of match candidates returned by NHIIS to the EHR.

Patient	Returned Patient Data		Test Scenario
1.	Name	David Randel Daniels	Since two patients match, return will depend on QBP settings in RCP-2.
	Date of Birth	05/05/2005	
	Mother	Susanne Stephens	Determine how your EHR is configured. If

Patient	Returned Patient Data		Test Scenario
	Address	101 Main St Concord, NH 03301	set to single match return, no record will be returned. If set to '2' (or more), two matched patients will be returned, but with no vaccination info. In order to identify the correct patient, your EHR should allow you to re-query each individual matching patient and retrieve their vaccination history. If more than one patient is returned, how will clinic resolve who is the correct patient?
	Immunizations	Hep B 05/05/2005	
2.	Name	Fiona Watson	Since there are two patients that match, return will depend on settings in RCP-2. Determine how your EHR is configured. If set to single return, duplicate patients will not be returned. If set to '2' or more, more than one patient may be returned. If more than one patient is returned, how will clinic resolve who is the correct patient?
	Date of Birth	02/05/2011	
	Mother	Mary Cooper	
	Address	303 Hills St Concord, NH 03301	
	Immunizations	Pediarix 04/05/2011 and 06/05/2011	
		MMR 03/05/2012	

Sample RSP for Multiple Patient Match Returns:

NOTE: PID and PD1 will repeat for all match candidates, up to the number of candidates specified in RCP-2 or a maximum of 10, based on information available in NHIS. Each new match candidate will be labeled as PID|1|, PID|2|, etc.

MSH|^~\&|WebIZ.19.2.20190329|NHIS|EHR Test|NH9999|20190702092201-0400||RSP^K11^RSP_K11|NHIS20190702220166|T|2.5.1|||NE|NE|||Z31^CDCPHINVS

MSA|AA|NH999938854000000232

QAK|querytag|OK|Z34^Request Immunization History^HL70471

QPD|Z34^Request Immunization

History^HL70471|querytag|496300^^^MR|JACKSON^PHIL^^^L|RACHEL^BELL^^^M|20030219|M

PID|1| |907240^^^NHIS^SR~494521^^^NH9999^MR| |JACKSON^PHIL^EVERETT^^^L|RACHEL^BELL^^^M|20030219|M| |2054-5^Black or African-American^CDCREC|9208 EMERALD FOREST^^Concord^NH^03301^USA^M^^09001~9208 EMERALD FOREST^^Concord^NH^03301^USA^P^^09001| |^PRN^PH^^^603^2136724|^WPN^PH^^^603^2136724|ENG^English^ISO6392||| |2186-5^Not Hispanic or Latino^CDCREC| |N||| |20190701 PD1||| |A|20190626

PID|2| |907241^^^NHIS^SR~5004^^^NH9999^MR| |JACKSON^PHIL^STEVE^^^L|RACHEL^BELL^^^M|20030219|M| |2054-5^Black or African-American^CDCREC|9208 EMERALD FOREST^^Concord^NH^03301^USA^M^^09001~9208 EMERALD

FOREST^^Concord^NH^03301^USA^P^^09001|||||||2186-5^Not Hispanic or
 Latino^CDCREC|N|||||||20190626
 PD1|||||||A|20190614

Too Many Match Testing Scenario

Testing for too many matches can be difficult, so NHIIS has engineered the following test case for testing this scenario. **NOTE: do NOT alter these test patients by administering vaccinations. This exercise is intended to test match returns ONLY** To begin, providers will need to create the following test patients in their EHR and then query NHIIS to demonstrate the match return. **If a record accidentally gets altered, please notify NHIIS staff immediately so the test patient data can be restored (nhiis.support@dhhs.nh.gov).**

Step #1 - Test Patients: Create the following patient in your EHR

Create the patient below exactly as presented in the table. Consult with your vendor before entering the test patient into your EHR. You may have to turn off any processes that would automatically send new patients/vaccines to NHIIS.

Patient		
3.	Name	Phil Jackson
	Date of Birth	02/19/2003
	Mother	
	Address	
	Immunizations	

Step #2 – Patient Query: Issue an individual query from your EHR to NHIIS for the specified test patient.

Step #3 - Patient Key: Verify the receipt of a too many match/not found response OR that you can accurately identify and select the following patient from the list of match candidates returned by NHIIS to the EHR. Note: the behavior will depend on the value specified in RCP-2.

Patient	Returned Patient Data		Test Scenario
3.	Name	Phil Everett Jackson	Since there are multiple patients that will match on Phil Jackson with DOB 02/19/2003, the number of returns will depend on settings in RCP-2. If set to '2', a response of "too many matches" will be returned. If set to '10', an array of Phil
	Date of Birth	02/19/2003	
	Mother	Rachel Bell	
	Address	9208 Emerald Forest Concord, NH 03301	

Patient	Returned Patient Data		Test Scenario
	Immunizations	Hep A, Ped/Adol 2 dose, 4/15/2011	Jackson options will be returned. If more than one patient is returned, how will your clinic resolve who is the correct patient? If "too many matches" is returned, what options does your system offer to narrow the search criteria?
		HPV9 1/10/2016	

Sample RSP for Too Many Match Returns:

A query outcome of no match found (Z33) is returned with no demographic or immunization history. QAK-2 is valued **NF** to indicate no data found.

QAK|querytag|**NF**|Z34^Request Immunization History^HL70471

Appendix A: Example QBP Message

Example Z34: Request Complete Immunization History

Below is a full Z34 QBP message example. The organization sent the query to the registry on June 20, 2019 at 19:57. The query is requesting a complete immunization history for the patient STEVE TYLER SMITH born on Feb 19th, 2003 with a medical record number of 896301 and a mother whose maiden name is RACHEL HODGES. Response to the query should be immediately returned with no more than 10 records.

```
MSH|^~\&|EHR Test|NH9999|NHIIS|NHIIS|20190620195749.905-  
0400||QBP^Q11^QBP_Q11|NH999938854000000232|T|2.5.1|||ER|AL|||Z34^CDCPHINVS  
  
QPD|Z34^Request Immunization  
History^HL70471|querytag|896301^^^^MR|SMITH^STEVE^TYLER^^^^L|HODGES^  
RACHEL^^^^M|20030219|M|9208 EMERALD  
FOREST^^CONCORD^NH^03301^US^H|^PRN^CP^^^603^4444444|||  
  
RCP|||10^RD
```

Example Z44: Request Evaluated History and Forecast

Below is a full Z44 QBP message example. The organization sent the query to the registry on June 20, 2019 at 19:57. The query is requesting an evaluated immunization history and forecast for the patient STEVE TYLER SMITH born on Feb 19th, 2003 with a medical record number of 896301 and a mother whose maiden name is RACHEL HODGES.

```
MSH|^~\&|EHR Test|NH9999|NHIIS|NHIIS|20190620195749.905-  
0400||QBP^Q11^QBP_Q11|NH999938854000000233|T|2.5.1|||ER|AL|||Z44^CDCPHINVS  
  
QPD|Z44^Request Evaluated History and  
Forecast^HL70471|querytag|896301^^^^MR|SMITH^STEVE^TYLER^^^^L|HODGES^  
RACHEL^^^^M|20030219|M|9208 EMERALD  
FOREST^^CONCORD^NH^03301^US^H|^PRN^CP^^^603^4444444|||  
  
RCP|||10^RD
```

Appendix B: Example Response (RSP) Messages

Exact Match Found, no Forecasting

The example QBP message (Z34) from Appendix A was submitted to request the patient's complete immunization history. Exactly one high confidence match was found. The response is

very similar to a VXU message in content and includes demographic information and immunization history.

MSH|^~\&|WebIZ.19.2.20190531|NHIIS|EHR Test|NH9999|20190801110514-0400||RSP^K11^RSP_K11|NHIIS20190801051434|T|2.5.1|||NE|NE|||Z32^CDCPHINVS

MSA|AA|NH999938854000000232

QAK|querytag|OK|Z34^Request Immunization History^HL70471

QPD|Z34^Request Immunization

History^HL70471|querytag|896301^^^^MR|SMITH^STEVE^TYLER^^^^L|HODGES^RACHEL^^^^M|20030219|M|9208 EMERALD FOREST^^CONCORD^NH^03301^US^H|^PRN^CP^^^603^4444444

PID|1||907245^^^NHIIS^SR~496300^^^NH9999^MR||SMITH^STEVE^TYLER^^^^L|CARPIO^FRANCISCO^^^^M|20030219|M||2106-3^White^CDCREC|9208 EMERALD FOREST^^Concord^NH^03301^USA^M^^09001~9208 EMERALD FOREST^^Concord^NH^03301^USA^P^^09001|^PRN^PH^^^603^7946801|^WPN^PH^^^603^7946801|ENG^English^ISO6392|S^Single^HL70002|||2135-2^Hispanic or Latino^CDCREC||N|||20190703|Y||20190801

PD1|||||||||||||P|20190703

PV1|1|R|||||||||||||V02

ORC|RE||14515672^NHIIS

RXA|0|1|20110415|20110415|83^Hep A, ped/adol, 2D^CVX|0.5|mL^MilliLiter^UCUM||01^Historical Information - Source Unspecified^NIP001||HL7_UNIT_TST^^^NH9999|||X34HF|20201210|SKB^GlaxoSmithKline (formerly SmithKline Beecham)^MVX||CP|A|20190627

OBX|1|CE|64994-7^Vaccine funding program eligibility category^LN|1|V02^VFC Eligible - Medicaid/Medicaid Managed Care^HL70064|||F||20110415||VXC40^Vaccine Level^CDCPHINVS

OBX|2|CE|69764-9^Vaccine Information Statement Document Type^LN|2|253088698300004211160720^Hep A, ped/adol, 2D^cdcgs1vis|||F||20110415

OBX|3|DT|29769-7^Date Vaccine Information Statement Presented^LN|2|20110415|||F||20110415

ORC|RE||14515673^NHIIS

RXA|0|1|20160110|20160110|165^HPV9^CVX|0.5|mL^MilliLiter^UCUM||01^Historical Information - Source Unspecified^NIP001||HL7_UNIT_TST^^^NH9999|||R016971|20210508|MSD^Merck \T\ Co, Inc.^MVX||CP|A|20190627

RXR|C28161^Intramuscular^NCIT^IM^Intramuscular^HL70162|RD^Right Deltoid^HL70163

OBX|1|CE|64994-7^Vaccine funding program eligibility category^LN|1|V02^VFC Eligible - Medicaid/Medicaid Managed Care^HL70064|||||F|||20160110||VXC40^Vaccine Level^CDCPHINVS

OBX|2|CE|69764-9^Vaccine Information Statement Document Type^LN|2|253088698300029511161202^HPV9^cdcgs1vis|||||F|||20160110

OBX|3|DT|29769-7^Date Vaccine Information Statement Presented^LN|2|20160110|||||F|||20160110

ZSA|AA^Application Accept - Good message with no problems^ENV0008|230138^^^NHIIS^HL7LogIdIncomming~621556^^^NHIIS^WebServiceLogIdIncomming~NH99993885400000232^^^NH9999^MessageControlId|907245^^^NHIIS^SR

Exact Match Found, includes Forecasting

The example QBP message (Z44) from Appendix A was submitted to request the patient's evaluated history and forecast. The organization HL7 UNIT TEST CLINIC receives a response message containing a single patient match with an evaluated immunization history and forecast for STEVE TYLER SMITH born Feb 19, 2003. The patient previously received 2 immunizations and is forecasted for 9 additional immunizations. **NOTE: Patient immunization forecast is bolded in the example Z42 message.**

MSH|^~\&|WebIZ.19.2.20190329|NHIIS|EHR Test|NH9999|20190708115144-0400||RSP^K11^RSP_K11|NHIIS20190708514417|T|2.5.1|||NE|NE|||||Z42^CDCPHINVS

MSA|AA|NH99993885400000232

QAK|querytag|OK|Z44^Request Evaluated History and Forecast^HL70471

QPD|Z44^Request Evaluated History and Forecast^HL70471|querytag|896301^^^MR|SMITH^STEVE^TYLER^^^L|HODGES^RACHEL^^^M|20030219|M|9208 EMERALD FOREST^^CONCORD^NH^03301^US^H|^PRN^CP^^^603^4444444

PID|1||907240^^^NHIIS^SR~494521^^^NH9999^MR||SMITH^STEVE^TYLER^^^L|HODGES^RACHEL^^^M|20030219|M||2054-5^Black or African-American^CDCREC|9208 EMERALD FOREST^^Concord^NH^03301^USA^M^^09001~9208 EMERALD FOREST^^Concord^NH^03301^USA^P^^09001|^PRN^PH^^^603^2136724|^WPN^PH^^^603^2136724|ENG^English^ISO6392|||||2186-5^Not Hispanic or Latino^CDCREC||N|||||||20190708

ORC|RE||14515661^NHIIS

RXA|0|1|20110415|20110415|83^Hep A, ped/adol, 2D^CVX|999|||01^Historical Information - Source Unspecified^NIP001||HL7_UNIT_TST^^^NH9999|||X34HF||SKB^GlaxoSmithKline (formerly SmithKline Beecham)^MVX|||CP|A|20190627

OBX|1|CE|30956-7^Vaccine Type^LN|1|85^Hep A, UF^CVX|||||F|||20110415

OBX|2|ID|59781-5^Dose Validity^LN|1|Y|||||F|||20110415

OBX|3|NM|30973-2^Dose Number in Series^LN|1|1|NA^Not Applicable^HL70353||||F|||20110415
 OBX|4|CE|59779-9^Immunization Schedule Used^LN|1|VXC16^ACIP^CDCPHINVS||||F|||20110415
 OBX|5|CE|64994-7^Vaccine funding program eligibility category^LN|2|V02^VFC Eligible -
 Medicaid/Medicaid Managed Care^HL70064||||F|||20110415||VXC40^Vaccine Level^CDCPHINVS
 OBX|6|CE|69764-9^Vaccine Information Statement Document
 Type^LN|3|253088698300004211160720^Hep A, ped/adol, 2D^cdcgs1vis||||F|||20110415
 OBX|7|DT|29769-7^Date Vaccine Information Statement
 Presented^LN|3|20110415||||F|||20110415

ORC|RE||14515662^NHIIS

RXA|0|1|20160110|20160110|165^HPV9^CVX|999|||01^Historical Information - Source
 Unspecified^NIP001||HL7_UNIT_TST^^^NH9999|||R016971|MSD^Merck \T\ Co,
 Inc.^MVX||CP|A|20190627

OBX|1|CE|30956-7^Vaccine Type^LN|1|137^HPV, UF^CVX||||F|||20160110
 OBX|2|ID|59781-5^Dose Validity^LN|1|Y||||F|||20160110
 OBX|3|NM|30973-2^Dose Number in Series^LN|1|1|NA^Not Applicable^HL70353||||F|||20160110
 OBX|4|CE|59779-9^Immunization Schedule Used^LN|1|VXC16^ACIP^CDCPHINVS||||F|||20160110
 OBX|5|CE|64994-7^Vaccine funding program eligibility category^LN|2|V02^VFC Eligible -
 Medicaid/Medicaid Managed Care^HL70064||||F|||20160110||VXC40^Vaccine Level^CDCPHINVS
 OBX|6|CE|69764-9^Vaccine Information Statement Document
 Type^LN|3|253088698300029511161202^HPV9^cdcgs1vis||||F|||20160110
 OBX|7|DT|29769-7^Date Vaccine Information Statement
 Presented^LN|3|20160110||||F|||20160110

ORC|RE||9999^NHIIS

RXA|0|1|20190708|20190708|998^No Vaccine Administered^CVX|999|||||||||||NA
 OBX|1|CE|30956-7^Vaccine Type^LN|1|08^Hep B, ped/adol^CVX||||F|||20190708
 OBX|2|DT|30981-5^Earliest date dose should be given^LN|1|20030219||||F|||20190708
 OBX|3|DT|30980-7^Date Vaccine Due^LN|1|20030219||||F|||20190708
 OBX|4|DT|59777-3^Latest date next dose should be given^LN|1|20220218||||F|||20190708
 OBX|5|DT|59778-1^Date dose is overdue^LN|1|20030318||||F|||20190708
 OBX|6|CE|59783-1^Series Status^LN|1|LA13423-1^Overdue^LN||||F|||20190708
 OBX|7|CE|59779-9^Immunization Schedule
 Used^LN|1|VXC16^ACIP^CDCPHINVS||||F|||20190708

NOTE: OBX|1| through OBX|7| will repeat for all forecasted doses, for all vaccine types, based on a patient's record. Numbering continues as OBX|8|, OBX|9|, etc. In this example, the patient would be forecasted for eight additional vaccinations and the numbering would continue up to OBX|61|.

Multiple Patients Returned

The example QBP message from Appendix A was edited to only include the patient's first name (QPD-4.2), last name (QPD-4.1), and date of birth (QPD-6). There were seven patients in NHIIS with the same first name, last name, and date of birth. As a result, a list of candidate patients was returned (Z31). The response returned one Patient Identifier (PID) segment and one Patient Demographic (PD1) segment for each potential match. No immunization history was returned.

```
MSH|^~\&|WebIZ.19.2.20190329|NHIIS|EHR Test|NH9999|20190702092201-0400||RSP^K11^RSP_K11|NHIIS20190702220166|T|2.5.1|||NE|NE|||Z31^CDCPHINVS
MSA|AA|NH999938854000000232
QAK|querytag|OK|Z34^Request Immunization History^HL70471
QPD|Z34^Request Immunization
History^HL70471|querytag|496300^^^^MR|JACKSON^PHIL^^^^L|RACHEL^BELL^^^^M|20030219|
M
PID|1||907240^^^^NHIIS^SR~494521^^^NH9999^MR||JACKSON^PHIL^EVERETT^^^^L|RACHEL^BELL^^
^^M|20030219|M||2054-5^Black or African-American^CDCREC|9208 EMERALD
FOREST^^Concord^NH^03301^USA^M^^09001~9208 EMERALD
FOREST^^Concord^NH^03301^USA^P^^09001|^PRN^PH^^^603^2136724|^WPN^PH^^^603^213672
4|ENG^English^ISO6392|||||2186-5^Not Hispanic or Latino^CDCREC||N|||||||20190701
PD1|||||||||||||A|20190626
PID|2||907241^^^^NHIIS^SR~5004^^^NH9999^MR||JACKSON^PHIL^STEVE^^^^L|RACHEL^BELL^^^^M
|20030219|M||2054-5^Black or African-American^CDCREC|9208 EMERALD
FOREST^^Concord^NH^03301^USA^M^^09001~9208 EMERALD
FOREST^^Concord^NH^03301^USA^P^^09001|||||||2186-5^Not Hispanic or
Latino^CDCREC||N|||||||20190626
PD1|||||||||||||A|20190614
```

NOTE: PID and PD1 will repeat for all match candidates, up to the number of candidates specified in RCP-2 or a maximum of 10, based on information available in NHIIS. Each new match candidate will be labeled as PID|3|, PID|4|, etc.

Too Many Matches Found

The example QBP message only included the patient's first name (QPD-4.2), last name (QPD-4.1), and date of birth (QPD-6). In this case, there are too many matches found in NHIIS with the same first name, last name, and date of birth. As a result, a query outcome of no match found (Z33) was returned, and no demographic or immunization history was returned. **NOTE:** QAK-2 is valued **NF** to indicate no data found.

```
QAK|querytag|NF|Z34^Request Immunization History^HL70471
```

Opted Out Patient

The example QBP message only included the patient's first name (QPD-4.2), last name (QPD-4.1), and date of birth (QPD-6). Any matches found in NHIIS would have the same first name, last name, and date of birth. In this case, a query outcome of no match found (Z33) was returned, and no demographic or immunization history was returned. **NOTE:** QAK-2 is valued **NF** to indicate no data found.

```
QAK|querytag|NF|Z34^Request Immunization History^HL70471
```

Deceased Patient

The example QBP message only included the patient's first name (QPD-4.2), last name (QPD-4.1), and date of birth (QPD-6). The match found in NHIIS has the same first name, last name, and date of birth. **NOTE:** PID-30 indicates Patient Death Indicator as **Y**. Demographic and immunization history will be returned in response to the query.

```
PID|1||907245^^^NHIIS^SR||SMITH^PHIL^MICHAEL^^^L|RACHEL^BELL^^^M|20030219|M|||920  
8 EMERALD FOREST^^Concord^NH^03301^USA^M^^09001~9208 EMERALD  
FOREST^^Concord^NH^03301^USA^P^^09001|||||||N|||||20190703|Y|||20190614
```