

North Dakota Immunization Information System (NDIIS)

Real-Time HL7 Transfer Specification Version 2.5.1 Release 1.4

Updated: January 2023

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Introduction

The North Dakota Immunization Information System (NDIIS) provides HL7 real-time bidirectional messaging service using the CDC HL7 version 2.5.1 Release 1.4 Implementation Guide for Immunization Messaging. Providers who already store and process immunization data in their own electronic health record (EHR) systems will be able to submit and receive client and immunization data via HL7 messaging, eliminating the need to enter data into both the NDIIS and the provider's EHR. HL7 real-time data exchange system requirements for providers include the following.

- Ability to create and consume HL7 version 2.5.1 release 1.4 messages in accordance with this NDIIS HL7 Real-time transfer specification, and complete the associated onboarding certification process.
- Ability to transport messages securely using an approved protocol (e.g., SOAP/HTTPS).
- Ability to correct messages with errors and resend the corrected messages.

Scope of this Document

NDIIS supports a specific subset of HL7 messages pertaining to client and vaccination information. The CDC Implementation Guide (see References section) provides technical details. Please refer to this guide for message, segment, and field technical information specific to North Dakota..

Real-time Processing

1. Providers must be able to transmit messages to and receive messages from the NDIIS messaging system. Providers are responsible for obtaining or developing client software for sending and receiving messages.
2. Provider connectivity to the test and production environments will be coordinated during the NDIIS On-boarding process.
3. The NDIIS Technical Staff will work with providers to test message transport and formatting using the NDIIS test environment.

References

The HL7 Version 2.5.1 Implementation Guide for Immunization Messaging, Release 1.4, 8/1/2012, are available at the following links.

<https://www.cdc.gov/vaccines/programs/iis/technical-guidance/downloads/hl7guide-1-4-2012-08.pdf>

NDIIS follows these implementation guides and supports the Centers for Disease Control's (CDC) and American Immunization Registry Association (AIRA) goal of HL7 uniformity.

NDIIS interoperability documentation is available on the North Dakota Department of Health web site.

<https://www.hhs.nd.gov/immunizations/ndiis/interoperability>

Information for the HL7 standard can be found at <http://www.hl7.org>

Interoperability Steps with NDIIS

The NDIIS prioritizes immunization site connections based on volume of immunizations administered and the readiness of the provider Electronic Health Record (EHR) system to connect based on North Dakota specifications and requirements.

1. Review your EHR compliance with the NDIIS messaging system requirements.
 - The full technical specifications for HL7 immunization messaging can be found on our interoperability web site.
2. Determine how you'd like your EHR to connect to the NDIIS for immunization messaging.
 - Direct connection between your EHR and the NDIIS via SOAP web services transport; or
 - Connect to the NDIIS via the North Dakota Health Information Network (NDHIN). For this connection, you can choose either a VPN or SOAP web services connection to the NDHIN which will act as a pass-through forwarding your messages to the NDIIS.
3. Complete and submit required forms.
 - For "direct connections" to the NDIIS:
 - NDIIS Registration of Intent form
 - NDIIS Interoperability Roles and Responsibilities Matrix
 - NDIIS Interoperability Memorandum of Understanding (MOU)
 - For connections via the NDHIN:
 - NDHIN Participation Agreement
 - NDHIN Business Associate Agreement
 - Both of these forms can be found on the NDHIN web site at <http://www.ndhin.org/>
 - NDIIS Registration of Intent form
 - NDIIS Interoperability Roles and Responsibilities Matrix

- ❖ *The NDIIS team works very closely with the NDHIN team and will begin working with providers once their connection with the NDHIN is established.*
 - ❖ *Upon completion of the required documents, providers will be placed in queue for connecting.*
4. Validate the certified EHR captures the required fields.
 - See the Quality Assurance Criteria and the “[Required Fields](#)” table.
 5. Validate the certified EHR contains the required Vaccine Eligibility and Vaccine Funding Source codes.
 - See the [VFC Eligibility Codes](#) table
 - See the [Funding Source Codes](#) table
 6. Content validation – Content validation will need to occur with the NDIIS vendor.
 - Complete Initial On-Boarding Questionnaire
 - Review Connectivity and Security Information
 - Confirm Unsolicited Update/Acknowledgement Message Use and Review Examples
 - Confirm Query/Response Message Use and Review Examples
 - Discuss Required Field Mapping
 - Review Testing Process
 - Confirm CVX Code Usage
 - Verify Defined Fields
 - Map Provider Sites
 7. Testing
 - Being able to utilize aged production data for this testing is a best practice and a lesson learned from previous connections. User acceptance testing should occur with staff who have knowledge of and experience working with the NDIIS (i.e., immunization data entry staff, immunization nurses, etc.)
 8. Go-Live
 - Prior to go-live, the provider site must complete a NDIIS HL7 Responsibilities and Contact Information Form and send to the NDIIS Manager. This form assigns your provider staff to monitor the data feed and correct errors. NDIIS staff use information from this form to coordinate training sessions.

Once you have successfully completed the NDIIS interoperability on-boarding process with 100% of your test messages passing without error, connection can be moved to production.

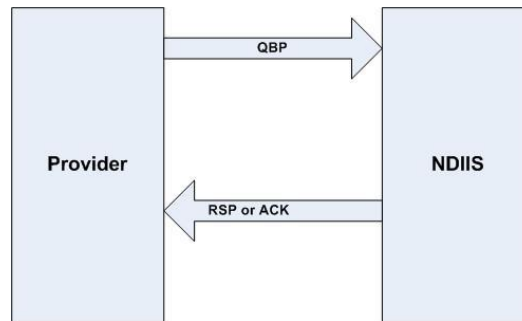
Real-time HL7 Messages

The supported HL7 messages are listed below.

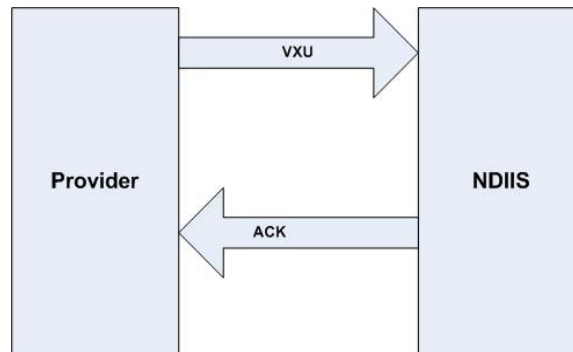
- QBP Query by Parameter.
- RSP Respond to QBP message.
- VXU Unsolicited Vaccination Record Update.
- ACK General Acknowledgment, Indicates NDIIS Received the Message but there was an Error.

The data exchanges are illustrated below.

QBP



VXU



Message Structure

Note: HL7 optional segments are indicated by square brackets, [], and repeatable segments are indicated by curly braces, { }. NDIIS required segment names are bolded.

QBP/RSP Messaging

Message Type: **QBP^Q11**

Message Name: Query for Vaccination Record

Query Grammar			
Segment	Segment Name	Usage	Comment
MSH	Message Header Segment	R	
QPD	Query Parameter Definition	R	
RCP	Response Control Parameter	R	

Example (all examples in this document relate to fictitious patients)

```
MSH|^~\&|PROVIDERX|04999||ND0000|201006091100||QBP^Q11^QBP_Q11|4766546|T|2.5.1|||||Z34^CDCPHINVS<CR>
QPD|Z34^Request Immunization History^HL70471|979696988|3766276^^NDIIS^SR|DOE^JANE^R|DOE^SALLY|19981912|F|2341 West
Main St^Fargo^ND^^L<CR>
RCP||5^RD^HL70126|R^real-time^HL70394<CR>
```

Message Type: **RSP^K11**

Message Name: Respond to QBP message (Single client match, with forecast data).

Response Grammar			
Segment	Segment Name	Usage	Comment
MSH	Message Header Segment	R	
MSA	Message Acknowledgement Segment	R	
[ERR]	Error	RE	Populated if Errors Exist
QAK	Query Acknowledgement Segment	R	
QPD	Query Parameter Definition	R	
PID	Patient Identification Segment	R	
[PID1]	Additional Demographics	RE	
{NK1}	Next of Kin Segment	RE	
[PV1]	Patient Visit Segment	O	
[IN1]	Insurance Segment	O	
{		RE	
ORC	Order Request Segment	R	Required if client has immunization records in RXA segment. One ORC for each RXA.
RXA	Pharmacy/Treatment Administration Segment	R	
[RXR]	Pharmacy/Treatment Route Segment	RE	
{		RE	Begin Observation
OBX	Observational Result Segment	R	
[NTE]	Note Segment	RE	
}			End Observation
}			

Example 1: one client match found

MSH||NDIIS|ND0000|PROVIDERX|04999|201006091102||RSP^K11^RSP_K11|7731029|t|2.5.1|||||||Z32^CDCPHIN
VS<CR> MSA|AA|4766546<CR>
QAK|979696988|OK|Z343^request Immunization history^HL70471<CR>
QPD|Z34^Request Immunization History^HL70471|979696988|3766276^^NDIIS^SR|DOE^JANE^R|DOE^SALLY|19981912|F|2341 West
Main St^^Fargo^ND^^L<CR>
PID|1||37262522^^NDIIS^SR||DOE^JANE|SMITH^JOAN^R|19980629|F|||242 MAIN BLVD^^MINOT^ND^58455^^<CR>
PD1|||||||||N|20100409<CR>
NK1|1|DOE^JOAN^R|MTH^MOTHER^HL70063<CR>
RXA|0|1|20100607112343|20100607112343|20^DTAP^CVX|999|||^04999|||WR50599|20110203|MED^Medimmune, Inc.^MVX<CR>
RXR|SC^HL70162<CR>
OBX|1|TS|30956-7^vaccine type^LN|1|49^HIB (PRP-OMP)^CVX|||||F<CR>
OBX|1|CE|59779-9^Immunization Schedule
used^LN|1|VXC16^ACIP^CDCPHINVS|||||F|||20100609<CR> OBX|1|DT|30980-7^Date
vaccination due^LN|1|20100809|||||F|||20100609<CR>
OBX|1|DT|59777-3^Latest date to give vaccine^LN|1|20110809|||||F|||20100609<CR>

Example 2: multiple matches found

MSH|^~\&|NDIIS|00001||201108240254||RSP^K11^RSP_K11|201108240254|T|2.5.1|||||||Z32^CDCPHHI
NVS<CR> MSA|AA|4766339<CR>
QAK|972227778|AA|<CR>
QPD|Z34^Request Immunization History^HL70471|972227778|0000813314^^NDIIS^SR|NET^DUP^||20110101|F|222 2nd Ave
S^^Fargo^ND^^L<CR> PID|0|0000813437^^NDIIS^SR|NET^DUP^R^^^||20110101|M|||1344 5TH AVE
W^^FARGO^ND^58104^^^|||||||<CR> NK1||Net^Jane|MTH^Mother^HL70063<CR>
PID|0|0000813438^^NDIIS^SR|NET^DUP^C^^^||20110101|M|||9989 55TH AVE N^^GRAND FORKS^ND^58201^^^|||||||<CR>
NK1||Net^Lori|MTH^Mother^HL70063<CR>

Example 3: no match found

MSH|^~\&|NDIIS|00001|||201108240324||RSP^K11^RSP_K11|201108240324|T|2.5.1|||||||Z32^CDCPHHI
NVS<CR> MSA|NF|4766388<CR>
QAK|971227778|NF|Z34^Request Immunization History^HL70471<CR>
QPD|Z34^Request Immunization History^HL70471|971227778|0076813314^^^NDIIS^SR|XLSEREN^XUANNA^<CR>

VXU/ACK Messaging

Message Type: **VXU^V04**

Message Name: Unsolicited Vaccination Update

VXU Grammar			
Segment	Segment Name	Usage	Comment
MSH	Message Header Segment	R	
PID	Patient Identification Segment	R	
[PD1]	Additional Demographics	RE	
[[NK1]]	Next of Kin	RE	
[PV1]	Patient Visit	O	
[[RXA]]	Pharmacy/Treatment Administration Segment	R	
[RXR]	Pharmacy/Treatment Route Segment	RE	
[[OBX	Observation Result Segment	R	
[[NTE]]	Note Segment	RE	
]]			
}}			

Example 1: Financial class V01 Not Eligible, and Private Funding Source

```
MSH|^~\&|SENDAPP|SEDFAC|RECAPP|RECFAC|201410271116||VXU^V04^VXU_V04|269999999|P|2.5.1|||NE|AL|||<CR>
PID|1|50000009|^P||DOE^KIM^J||20131001|M||^UNKNOWN^HL70005|1234 111TH ST^FARGO^ND^58103^USA^M|(701)001-
0001^PRN^^701^0010002||S|||^UNKNOWN^HL70189|||<CR>
PD1|||||||01^No reminder/recall^HL70215|||||20141027<CR>
NK1|1|DOE^MARY^|PAR^HL70063|1234 111TH ST^FARGO^ND^58103|(701)001-
0002^PRN^^701^0010002|||||||19900825|||||||<CR>
ORC|RE|69989898|00998877|||||^SMITH^CHUCK||9999999444^JONES^LILY^^^NDA^L|||||||<CR>
RXA|0|1|201410271116|201410271116|161^Influenza, injectable, quadrivalent, preservative free, pediatric^CVX|.25|mL^mL^ISO+||00^NEW
IMMUNIZATION RECORD^NIP001|^SMITH^CHUCK^|Nodak Clinic, PC^1344 12TH AVE
```

E,FARGO,ND^58103||U5018AA|201506300000|PMC^sanofi pasteur^MVX|^A|<CR>
RXR|IM^HL70162|LT^HL70163||<CR>
OBX|1|CE|64994-7^Vaccine funding program eligibility category^LN|1|V01^Not VFC Eligible^HL70064||||F||20140714||VXC40^Eligibility captured at the immunization level^CDCPHINVS|||||<CR>
OBX|2|CE|30963-3^Vaccine purchased with^LN||PHC70^Private Funds^HL70396||||F||20140714|||||<CR>
OBX|3|TS|29769-7^DATE VACCINE INFORMATION STATEMENT PRESENTED^LN||20141027||||F||20141027|||||<CR> OBX|4|TS|29768-9^DATE VACCINE INFORMATION STATEMENT PUBLISHED^LN||20140819||||F||20141027|||||<CR>

Example 2: Financial Class V02 Medicaid, and State Funding Source

MSH|^~\&|SENDAPP|SENFAC|RECAPP|RECFAC|201410271116||VXU^V04^VXU_V04|26999999|P|2.5.1||NE|AL||||<CR>
PID|1|50000009|^P||DOE^KIM^J||20131001|M|^UNKNOWN^HL70005|1234 111TH ST^FARGO^ND^58103^USA^M|(701)001-0001^PRN^^701^0010002||S||||^UNKNOWN^HL70189|||||<CR>
PD1||||||01^No reminder/recall^HL70215|||||20141027<CR>
NK1|1|DOE^MARY^|PAR^HL70063|1234 111TH ST^FARGO^ND^58103|(701)001-0002^PRN^^701^0010002||||||19900825|||||||<CR>
ORC|RE|69989898|00998877|||||^SMITH^CHUCK||9999999444^JONES^LILY^^^NDA^L|||||||<CR>
RXA|0|1|201410271116|201410271116|161^Influenza, injectable, quadrivalent, preservative free, pediatric^CVX|.25|mL^mL^ISO+||00^NEW IMMUNIZATION RECORD^NIP001|^SMITH^CHUCK^|Nodak Clinic, PC^1344 12TH AVE
E,FARGO,ND^58103||U5018AA|201506300000|PMC^sanofi pasteur^MVX|^A|<CR>
RXR|IM^HL70162|LT^HL70163||<CR>
OBX|1|CE|64994-7^Vaccine funding program eligibility category^LN|1|V02^VFC eligible - Medicaid/Medicaid Managed Care^HL70064||||F||20141027||VXC40^Eligibility captured at the immunization level^CDCPHINVS|||||<CR> OBX|2|CE|30963-3^Vaccine purchased with^LN||VXC2^State Funds^HL70396||||F||20141027|||||<CR>
OBX|3|TS|29769-7^DATE VACCINE INFORMATION STATEMENT PRESENTED^LN||20141027||||F||20141027|||||<CR> OBX|4|TS|29768-9^DATE VACCINE INFORMATION STATEMENT PUBLISHED^LN||20140819||||F||20141027|||||<CR>

Example 3: Multiple vaccinations in VXU message

MSH|^~\&|SENDAPP|SENFAC|RECAPP|RECFAC|201410271116||VXU^V04^VXU_V04|26999999|P|2.5.1|||NE|AL|||<CR>
PID|1|50000009|^PI||DOE^KIM^J||20131001|M|^UNKNOWN^HL70005|1234 111TH ST^FARGO^ND^58103^USA^M|||(701)001-
0001^PRN^^701^0010002||S||||^UNKNOWN^HL70189|||||<CR>
PD1|||||||01^No reminder/recall^HL70215|||||20141027<CR>
NK1|1|DOE^MARY^|PAR^HL70063|1234 111TH ST^FARGO^ND^58103|(701)001-
0002^PRN^^701^0010002|||||||19900825|||||||<CR>
ORC|RE|69989898|00998877|||||^SMITH^CHUCK||9999999444^JONES^LILY^^^NDA^L|||||||<CR>
RXA|0|1|201410271116|201410271116|161^Influenza, injectable, quadrivalent, preservative free, pediatric^CVX|.25|mL^mL^ISO+||00^NEW
IMMUNIZATION RECORD^NIP001|^SMITH^CHUCK^|Nodak Clinic, PC^1344 12TH AVE
E,FARGO,ND^58103|||U5018AA|201506300000|PMC^sanofi pasteur^MVX|^|A|<CR>
RXR|IM^HL70162|LT^HL70163||<CR>
OBX|1|CE|64994-7^Vaccine funding program eligibility category^LN|1|V02^VFC eligible -
Medicaid/Medicaid Managed Care^HL70064|||||F|||20141027|||VXC40^Eligibility captured at the
immunization level^CDCPHINVS|||||<CR> OBX|2|CE|30963-3^Vaccine purchased with^LN||VXC2^State
Funds^HL70396|||||F|||20141027|||||||<CR>
OBX|3|TS|29769-7^DATE VACCINE INFORMATION STATEMENT
PRESENTED^LN||20141027|||||F|||20141027|||||||<CR> OBX|4|TS|29768-9^DATE VACCINE INFORMATION
STATEMENT PUBLISHED^LN||20140819|||||F|||20141027|||||||<CR>
ORC|RE|69989898|00998877|||||^SMITH^CHUCK||9999999444^JONES^LILY^^^NDA^L|||||||<CR>
RXA|0|1|201410271116|201410271116|83^Hep A, ped/adol, 2 dose^CVX|.25|mL^mL^ISO+||00^NEW
IMMUNIZATION RECORD^NIP001|^SMITH^CHUCK^|Nodak Clinic, PC^1344 12TH AVE
E,FARGO,ND^58103|||K8254|201511120000|SKB^GlaxoSmithKline^MV|^|A|<CR>
RXR|IM^HL70162|LT^HL70163||<CR>
OBX|1|CE|64994-7^Vaccine funding program eligibility category^LN|1|V02^VFC eligible -
Medicaid/Medicaid Managed Care^HL70064|||||F|||20141027|||VXC40^Eligibility captured at the
immunization level^CDCPHINVS|||||<CR> OBX|2|CE|30963-3^Vaccine purchased with^LN||VXC2^State
Funds^HL70396|||||F|||20141027|||||||<CR>
OBX|3|TS|29769-7^DATE VACCINE INFORMATION STATEMENT
PRESENTED^LN||20141027|||||F|||20141027|||||||<CR> OBX|4|TS|29768-9^DATE VACCINE INFORMATION
STATEMENT PUBLISHED^LN||20140819|||||F|||20141027|||||||<CR>

Example 4: Historical vaccination

MSH|^~\&|SENDAPP|SENFAC|RECAPP|RECFAC|201410271116||VXU^V04^VXU_V04|26999999|P|2.5.1|||NE|AL|||||<CR>
PID|1|50000009|^P||DOE^KIM^J||20131001|M||^UNKNOWN^HL70005|1234 111TH ST^FARGO^ND^58103^USA^M|(701)001-
0001^PRN^^701^0010002||S||||^UNKNOWN^HL70189|||||||<CR>
PD1|||||||01^No reminder/recall^HL70215||||||20141027<CR>
NK1|1|DOE^MARY^|PAR^HL70063|1234 111TH ST^FARGO^ND^58103|(701)001-
0002^PRN^^701^0010002|||||||19900825|||||||<CR>
ORC|RE|69989898|00998877|||||^SMITH^CHUCK||9999999444^JONES^LILY^^^NDA^L|||||||<CR>
RXA|0|1|201410271116|201410271116|100^PNEUMOCOCCAL CONJUGATE^CVX|999|999|01^Historical^NIP001||Nodak Clinic, PC^1344
12TH AVE
E,FARGO,ND^58103|||||||CP|A<CR>

Message Type: **ACK**

Message Name: General Acknowledgement

Acknowledgement Grammar			
Segment	Segment Name	Usage	Comment
MSH	Message Header Segment	R	
MSA	Query Parameter Definition	R	
[[ERR]]	Error Segment	RE	Included if there are errors.

Example message with no error

```
MSH|^~\&|NDIIS|ND0000||04999|201006091006||ACK^|0000000004|T|2.5.  
1<CR> MSA|AA|0000000004|<CR>
```

Example message with error

```
MSH|^~\&|NDIIS|ND0000||04999|201006091643||ACK^|0000000005|T|2.5.  
1<CR> MSA|AE|0000000005|<CR>  
ERR|PID^22|103^Required Field Missing^HL70357|<CR>
```

Administration Site (RXR-2)

The NDIIS supports the standard HP7 code set for vaccine administration site as defined in the HL7 implementation guide.

HL7-defined table 0163	Description
LT	Left Thigh
LA	Left Arm
LD	Left Deltoid
LG	Left Gluteous Medius
LVL	Left Vastus Lateralis
LLFA	Left Lower Forearm
RA	Right Arm
RT	Right Thigh
RVL	Right Vastus Lateralis
RG	Right Gluteous Medius
RD	Right Deltoid
RLFA	Right Lower Forearm

The NDIIS has two additional local codes to support documenting nose and mouth as an administration site for vaccines with an oral or intranasal administration route.

NDIIS Local Code	Description	Use
MO	Mouth	Value can be sent in RXR-2 when administration route is indicated as "PO"
NO	Nose	Value can be sent in RXR-2 when administration route is indicated as "NS"

CVX Codes

All successful HL7 messages must contain a valid CVX code. A complete list of all CVX codes supported in the NDIIS can be found on the [NDIIS interoperability website](#). Providers will be required to complete a CVX code mapping exercise with the NDIIS interoperability team as part of the on-boarding process.

NDIIS VFC vaccine accountability

All ND providers receiving publicly funded vaccine (i.e., State) through the VFC or other state or federally funded vaccine program must send dose-level VFC eligibility and vaccine funding source for every dose of administered vaccine.

Two OBX segments are utilized to transmit the information as shown in the following examples.

Example 1: Not VFC eligible, Privately funded vaccine.

```
OBX|1|CE|64994-7^Vaccine funding program eligibility category^LN|1|V01^Not VFC
Eligible^HL70064|||||F|||20140714|||VXC40^Eligibility captured at the immunization level^CDCPHINVS|||||||<CR>
OBX|2|CE|30963-3^Vaccine purchased with^LN||PHC70^Private Funds^HL70396|||||F|||20140714|||||||<CR>
```

Example 2: VFC eligible, Publically funded vaccine.

```
OBX|1|CE|64994-7^Vaccine funding program eligibility category^LN|1|V02^VFC eligible -
Medicaid/Medicaid Managed Care^HL70064|||||F|||20141027|||VXC40^Eligibility captured at the
immunization level^CDCPHINVS|||||||<CR> OBX|2|CE|30963-3^Vaccine purchased
with^LN||VXC2^State Funds^HL70396|||||F|||20141027|||||||<CR>
```

Vaccine Borrow-Return (ND only).

Administering a vaccination from a private lot for a VFC eligible patient, or administering a vaccination from a public lot for a VFC not-eligible patient will trigger a borrow event in the NDIIS.

Funding Source

Funding source is a required field for all doses of vaccine submitted to the NDIIS. This will identify the immunization as publicly or privately purchased vaccine. Funding source cannot be inferred based on VFC eligibility. Funding Source code is held in the OBX-5.

The table below reflects the funding source codes to be utilized in the HL7 message.

Concept Code	Concept Name	Definition
PHC70	Private funds	Immunization was funded by private funds, including insurance.
VXC1	Federal funds	Immunization was funded with public funds from the federal government.

VFC Eligibility

Dose level Vaccines for Children (VFC) Eligibility field is a required field for all doses of vaccine submitted to the NDIIS. VFC Eligibility will identify the patient's eligibility to receive a dose of publicly purchased vaccine. This is required for all provider sites, regardless of if the provider participates in the North Dakota VFC Program. The VFC Eligibility code is held in OBX-5.

The table below reflects the VFC Eligibility codes to be utilized in the HL7 message.

VFC Code	Label
V01	Not VFC eligible
V02	VFC eligible-Medicaid/Medicaid Managed Care
V03	VFC eligible- Uninsured
V04	VFC eligible- American Indian/Alaskan Native
V05	VFC eligible-Federally Qualified Health Center Patient (under-insured)
V07	Local-specific eligibility

*** Unknown VFC eligibility is not an accepted value.**