



# **North Dakota Immunization Information System (NDIIS)**

Real-time HL7 Transfer Specification Version 2.5.1 Release 1.5

Updated: June 2025

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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 1.5 Implementation Guide for Immunization Messaging and its published addendum. Providers who already store and process immunization data in their own electronic health record (EHR) systems will be able to submit and receive patient demographic 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 1.5 messages in accordance with this NDIIS HL7 Real-time transfer specification and complete the associated onboarding process.
- Ability to transport messages securely using approved SOAP web services protocol and the standard CDC WSDL.
- Ability to monitor ACK messages for errors identified by the NDIIS and resend corrected VXU messages.

## Scope of this Document

NDIIS supports VXU/ACK and QBP/RSP HL7 messaging per the CDC Implementation Guide for Immunization Messaging (see References section). Please refer to the CDC guide for message, segment, and field technical details. This document provides implementation 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 EHR 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.

## NDIIS HL7 Messaging Validation



North Dakota's IIS has been fully validated at the complete level by the American Immunization Registry Association (AIRA) independent validation process for:

- HL7 immunization messaging transport
- HL7 immunization submission and acknowledgement messaging
- HL7 immunization query and response messaging

## References

HL7 Version 2.5.1 Implementation Guide for Immunization Messaging, Release 1.5, 10/1/2014 and addendum, are available at the following links.

<https://www.cdc.gov/vaccines/programs/iis/technical-guidance/downloads/hl7guide-1-5-2014-11.pdf>

<https://www.cdc.gov/vaccines/programs/iis/technical-guidance/downloads/hl7guide-addendum-7-2015.pdf>

HL7 Version 2.5.1 Implementation Guide for Immunization Messaging, Release 1.5, 2018 Update. This update combines the original implementation guide and addendum as well as additional guidance published by AIRA.

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

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

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

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

## Interoperability Onboarding with NDIIS

The NDIIS prioritizes immunization site connections based on the readiness of the provider electronic health record (EHR) system to connect based on North Dakota specifications and requirements.

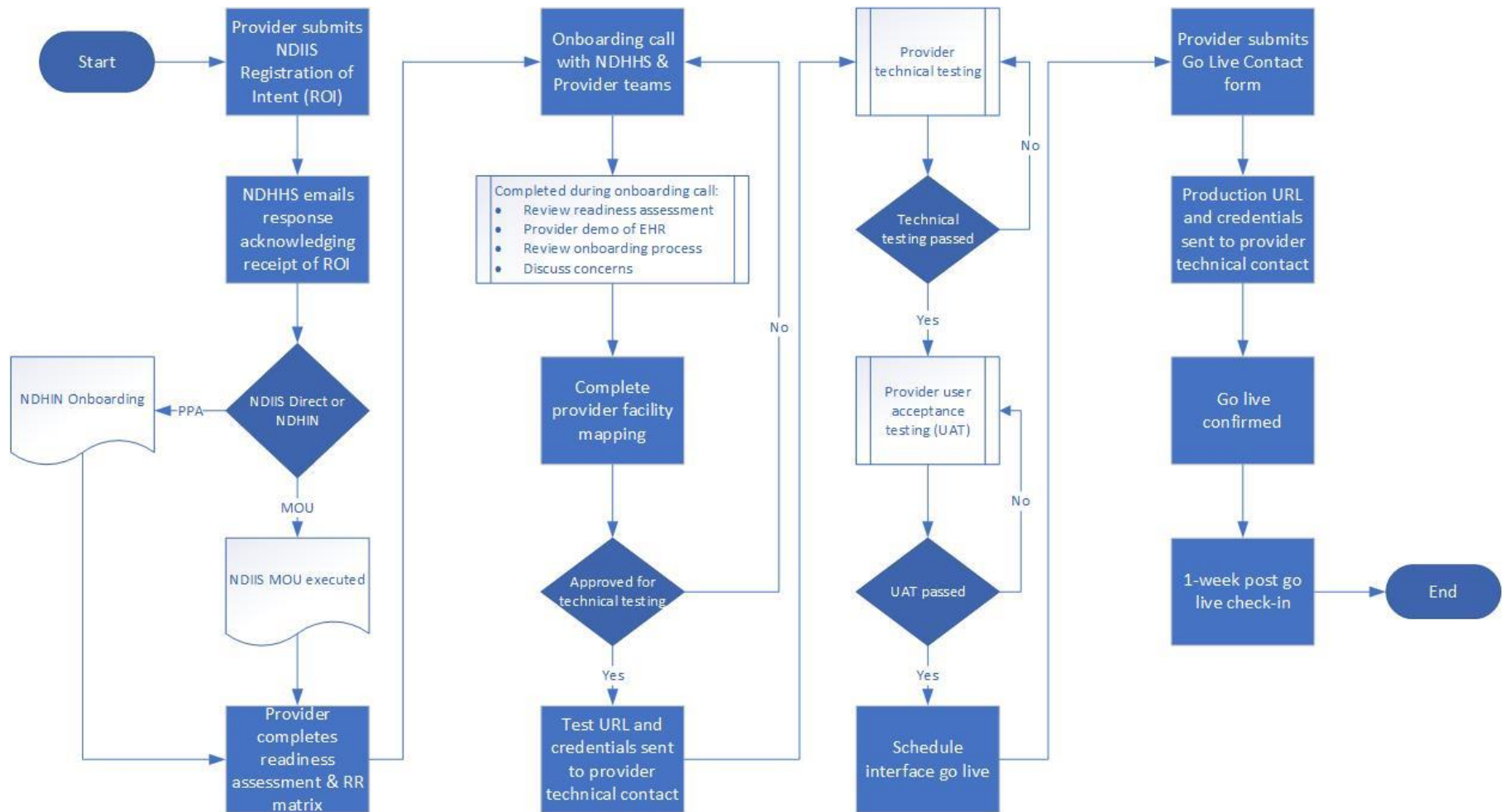
1. Submit the NDIIS Interoperability [Registration of Intent](#) form
2. Determine how you'd like your EHR to connect to the NDIIS for immunization messaging.
  - Direct connection between your EHR and the NDIIS via SOAP web services transport; or
  - Connect via the North Dakota Health Information Network (NDHIN).
    - For this connection, you can choose either a VPN or SOAP web services transport.
    - The NDHIN acts as a simple pass-through, forwarding all immunizations messages to the NDIIS.
3. Complete and submit required forms.
  - For "direct connections" to the NDIIS:
    - [Roles and Responsibilities Matrix](#)
    - [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/>
    - [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.*
4. Complete the NDIIS Readiness Assessment
  - Readiness Assessment will be provided by NDIIS team once required documentation has been submitted
5. Initial onboarding meeting with NDIIS and provider teams
  - review readiness assessment
  - provider demo of EHR immunization documentation workflow
  - review technical testing plan
  - discuss concerns
6. Complete facility mapping template
  - Facility mapping template will be provided after the initial onboarding meeting
7. Testing
  - Being able to utilize production-level data for technical testing is a best practice and allows for a better test of the real user workflow. The NDIIS test environment is regularly de-identified. Any live patient information sent to the NDIIS test environment will not be identifiable beyond the technical testing of this interface.

- User acceptance testing (UAT) should occur with staff who have knowledge of and experience with the provider EHR immunization documentation workflow. If the EHR utilizes the provider's production environment for technical testing, the NDIIS does not require separate UAT.

#### 8. Go-Live

- Complete NDIIS [Post Go Live Interoperability Responsibilities and Contact Information](#)
- Coordinate go live date with the NDIIS team
- Attend go live check-in one-week post-production go live



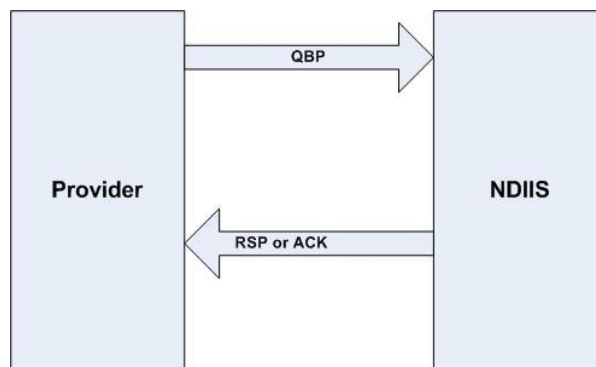
## Real-time HL7 Messages

The supported HL7 messages are listed below.

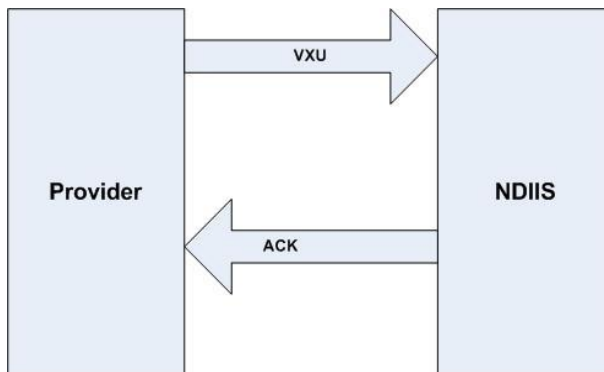
- QBP Query by Parameter
- RSP Response to QBP message
- VXU Unsolicited Vaccination Record Update
- ACK Acknowledgment response to ACK message that the NDIIS received the message. Can indicate successful processing of the ACK by the NDIIS or may return an error or warning.

The data exchanges are illustrated below.

### QBP



### VXU



## Messaging Use Cases

### QBP Messaging

Message Type: **Query**

Use Case: **Request Complete Immunization History**

Profile ID: **Z34**

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

Message Type: **Query**

Use Case: **Request Evaluated Immunization History and Forecast**

Profile ID: **Z44**

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

## RSP Messaging

Message Type: **Response**

Use Case: **Return Complete Immunization History**

Profile ID: **Z32**

Segment	Segment Name	Usage	Comment
MSH	Message Header Segment	R	
MSA	Query Parameter Definition	R	
[ERR]	Response Control Parameter	RE	Populated if errors exist
QAK	Query Acknowledgement Segment	R	
QPD	Query Parameter Definition	R	
PID	Patient Identifier Segment	R	
[PD1]	Patient Demographic Segment	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		R	Pharmacy/Treatment Administration Segment
[RXR]		RE	Pharmacy/Treatment Route Segment
{		RE	Begin Observation
OBX		R	Observational Result Segment
[NTE]		RE	Note Segment
}}			End Observation
}}			

Message Type: **Response**

Use Case: **Return Evaluated Immunization History and Forecast**

Profile ID: **Z42**

Segment	Segment Name	Usage	Comment
MSH	Message Header Segment	R	
MSA	Query Parameter Definition	R	
[ERR]	Response Control Parameter	RE	Populated if errors exist
QAK	Query Acknowledgement Segment	R	
QPD	Query Parameter Definition	R	
PID	Patient Identifier Segment	R	
{		R	
ORC	Order Request Segment	O	Required if client has immunization records in RXA segment. One ORC for each RXA.
RXA		R	Pharmacy/Treatment Administration Segment
[RXR]		RE	Pharmacy/Treatment Route Segment
{		R	Begin Observation
OBX		R	Observational Result Segment
}			End Observation
}}			

Message Type: **Response**  
 Use Case: **Return List of Candidates**  
 Profile ID: **Z31**

Segment	Segment Name	Usage	Comment
MSH	Message Header Segment	R	
MSA	Query Parameter Definition	R	
[ERR]	Response Control Parameter	RE	Populated if errors exist
QAK	Query Acknowledgement Segment	R	
QPD	Query Parameter Definition	R	
{		R	Begin Patient Identifier
PID	Patient Identifier Segment	R	
[PD1]	Patient Demographic Segment	RE	
[[NK1]]	Next of Kin Segment	O	End Patient Identifier
}		R	

Message Type: **Response**  
 Use Case: **Return Response with No Matches**  
 Profile ID: **Z33**

Segment	Segment Name	Usage	Comment
MSH	Message Header Segment	R	
MSA	Query Parameter Definition	R	
[ERR]	Response Control Parameter	RE	Populated if errors exist
QAK	Query Acknowledgement Segment	R	
QPD	Query Parameter Definition	R	

## VXU Messaging

Message Type: **VXU**

Use Case: **Send Unsolicited Immunization Update using a VXU**

Profile ID: **Z22**

Segment	Segment Name	Usage	Comment
MSH	Message Header Segment	R	
PID	Patient Identifier Segment	R	
PD1		RE	
NK1		RE	
PV1		O	
{		RE	
ORC	Order Request Segment	R	The order group in a VXU must have at least one ORC segment.
RXA		R	Pharmacy/Treatment Administration Segment
[RXR]		RE	Pharmacy/Treatment Route Segment
{		R	Begin Observation
OBX		R	Observational Result Segment
}}			End Observation
}}			

*Note: NDIIS requires two OBX segments for every ORC group, one each for [VFC eligibility](#) and [vaccine funding source](#).*

## Acknowledgement Messaging

Message Type: **ACK**

Use Case: **Return an Acknowledgement**

Profile ID: **Z23**

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. Acknowledgement of VXU message with error. Indicates message was rejected. Message must be corrected and resubmitted.*

```
MSH|^~\&|ND0000|NDIIS|EHRsystem|15683013|20250626161417+0000||ACK^V04^ACK|14604526|P|2.5.1|||NE|NE||||Z23^CDCPHINVS
MSA|AE|14604526
ERR||RXA^1^10|101^Required field missing^HL70357|E|4^Invalid value^HL70533|||RXA-10 Administering Provider is required
ERR||RXA^1|100^Segment sequence error^HL70357|E||||RXA is required segment. Segment-group rejected
```

*Example. Acknowledgement of VXU message with warning. Indicates message was processed but dose record will be missing required information.*

```
MSH|^~\&|ND0000|NDIIS|EHRsystem|1044801|20250626160007+0000||ACK^V04^ACK|14604489|P|2.5.1|||NE|NE||||Z23^CDCPHINVS
MSA|AE|14604489
ERR||RXR^1^1|101^Required field missing^HL70357|W||||RXR-1 Route is a required field
```

## Administration Site (RXR-2)

The NDIIS supports the standard HL7 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”

Any unsupported value sent to the NDIIS will result in an [ACK with warning](#).

## Dose Volume Units (RXA-7)

The CDC Implementation Guide indicates the preferred unit of measure for immunization administered dose volume is “mL”.

NDIIS-supported values are listed in the table below.

HL7 unified code for units of measure (UCUM)	Description
mL	milliliter
mg	milligram
mcg	microgram

VXU messages submitted with an unsupported value will result in the NDIIS returning an [ACK with error](#).

## NDC Codes

All HL7 VXU messages for administered (not historical) vaccines must contain a valid NDC code. A CVX code may be sent in addition to the NDC. Messages for administered vaccines sent to the NDIIS with just a CVX will still be processed but will result in the NDIIS returning an [ACK with warning](#). The NDIIS can accept a Unit of Sale or Unit of Use NDC in an 11-digit format (with or without the dashes) or a 10-digit format (with the dashes).

For a complete list of valid NDCs, please visit the [CDC Code Set web site](#).

## VFC accountability

All submitted VXU messages must include dose-level Vaccines for Children (VFC) eligibility and vaccine funding source for every dose of administered vaccine. Immunization providers not enrolled in the North Dakota VFC/VFA program are expected to send values indicating “Not Eligible” for VFC eligibility and “Private” for vaccine funding source for all doses.

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

*Example: Not VFC eligible, Privately funded vaccine*

```
OBX|1|CE|64994-7^Vaccine funding program eligibility category^LN|1|V01^Not VFC eligible^HL70064|||||F|||20250626|||VXC40^per  
immunization^CDCPHINVS|||||||  
OBX|2|CE|30963-3^Vaccine purchased with^LN|2|PHC70^Private Funds^HL70396|||||F|||20250626|||||||
```

*Example: VFC eligible, Publicly funded vaccine*

```
OBX|1|CE|64994-7^Vaccine funding program eligibility category^LN|1|V03^VFC eligible-Uninsured^HL70064|||||F|||20250626|||VXC40^per  
immunization^CDCPHINVS|||||||  
OBX|2|CE|30963-3^Vaccine purchased with^LN|2|VXC50^Public Funds^HL70396|||||F|||20250626|||||||
```

## Vaccine Borrow-Return

Documenting a privately purchased immunization to a VFC eligible patient or a publicly funded immunization to a VFC not-eligible patient will trigger a borrow event in the NDIIIS.

## VFC Eligibility

Dose level Vaccines for Children (VFC) eligibility is a required field for all VXU messages containing administered dose records. VFC eligibility identifies the patient's eligibility to receive a dose of publicly funded vaccine. This is required for all immunization provider sites, regardless of the provider's participation in the North Dakota VFC/VFA Program.

The table below reflects the NDHS-supported VFC Eligibility code set.

Code	Label	Definition
V01	Not VFC eligible	Client does not qualify for VFC because they do not have one of the status below (V02-05)
V02	VFC eligible – Medicaid/Medicaid Managed Care	All of the following are true: <ul style="list-style-type: none"> <li>• Client is currently eligible for Medicaid or Medicaid Managed Care</li> <li>• Client is &lt; 19 years old</li> <li>• The type of vaccine administered is eligible for VFC funding</li> </ul>
V03	VFC eligible – Uninsured	All of the following are true: <ul style="list-style-type: none"> <li>• Client does not have health insurance</li> <li>• Client is &lt; 19 years old</li> <li>• The type of vaccine administered is eligible for VFC funding</li> </ul>
V04	VFC eligible – American Indian/Alaska native	All of the following are true: <ul style="list-style-type: none"> <li>• Client is a member of a federally recognized tribe</li> <li>• Client is &lt; 19 years old</li> <li>• The type of vaccine administered is eligible for VFC funding</li> </ul>
V05	VFC eligible – underinsured at FQHC/RHC/deputized provider	All of the following are true: <ul style="list-style-type: none"> <li>• Client has insurance but insurance does not cover vaccines, limits the vaccines covered or caps vaccine coverage at a certain amount</li> <li>• Client is receiving care at an FQHC, RHC or deputized provider</li> <li>• Client is &lt; 19 years old</li> <li>• The type of vaccine administered is eligible for VFC funding</li> </ul>
V23	317	Client is eligible to receive vaccines under the state/program immunization policy and the vaccine administered is eligible for 317 funding
V25	State program eligibility	Client is eligible for a state vaccine program

\* Unknown VFC eligibility is not allowed.

## Funding Source

Immunization funding source is a required field for all VXU messages containing administered dose records. Funding source identifies the administered immunization as publicly funded or privately purchased and **cannot** be inferred based on VFC eligibility.

The table below reflects the NDIIS-supported funding source code set.

Code	Label	Definition
PHC70	Private	Vaccine stock used was privately purchased
VXC50	Public	Vaccine stock used was publicly funded

\* **Unknown Funding Source is not allowed.**