Tennessee Immunization Program
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2.5.1 VXU and ACK Technical Specifications for the Tennessee Department of Health (TDH) Immunization Information System (TennIIS)

Contents

Introduction

Required fields and select components outlined in the Centers for Disease Control and Prevention (CDC) Health Level Seven (HL7) Version 2.5.1 Implementation Guide for Immunization Messaging Release 1.5, 10/01/2014 (CDC IG) and the HL7 Version 2.5.1 Implementation Guide for Immunization Messaging Release 1.5 - Addendum, 07/2015 (Addendum) as well as constraints placed on the CDC IG and Addendum are listed in this document by message segment for update (VXU) messages.

- If a field is not listed within this document, then it is not a required field.
- Fields that have specific literal value requirements are documented in the Value column where applicable.
- If a field is required but may be empty and the Trading Partner (TP) is submitting an empty field, the empty field should be indicated by two vertical bars with nothing in between unless that field is at the end of the segment.
    - The empty field means that the existing state should remain unchanged in the Tennessee Immunization Information System (TennIIS). However, if the TP collects the data, it is the expectation that the TP will send the data.
    - For example, if the TP collects patient race, it is expected that the patient race will be sent to TennIIS, not an empty field to indicate a race of unknown/undetermined.

For standards and specifications not defined in this document, refer to the CDC IG and Addendum.

Important Notes

Data Types: Refer to the CDC IG and Addendum for the data type specifications of each field.

Optional Segments/Fields: Sending optional segments and/or fields will not cause an error and will be processed if sent. If the Trading Partner sends optional segments and/or fields, they must be properly formatted and must not contain any errors. If an optional segment is submitted with errors, it may cause the entire message to fail.

Batch Message Processing (for Secure File Transport Protocol (SFTP) only): A folder will be assigned for the uploading of HL7 messages. Messages should be uploaded to the "in" folder and acknowledgements will be placed in the "out" folder once the messages are processed. To delineate the batch, the following segments are required for batch processing:

- File Header Segment (FHS) – Used to group one or more batches of messages.
- Batch Header Segment (BHS) – Precedes a group of one or more messages.
- Batch Trailer Segment (BTS) – Follows and defines the end of a batch of messages that began with a BHS segment.
- File Trailer Segment (FTS) – Defines the end of a file of batches; used only when FHS is used.

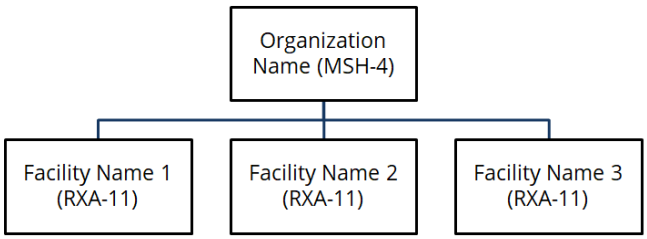
Control Line Feed Termination of Batch Message Processing: For every message submitted via SFTP, individual segments within the message are terminated by a 1-byte carriage return <CR> (hex 0d, decimal 13). The message itself is terminated with a 2-byte carriage return/line feed <CR><LF> (hex 0d * 0a, decimal 13 and 10). Using binary mode will prevent the SFTP server from automatically substituting <CR><LF> for <CR> and vice versa. TDH does not provide scripting development services or support for the automated scripting. The SFTP option is to use FIPS 140-2 compliant encryption and hashing. The end of

each message segment must be terminated by <CR> and the last segment of each complete message must be terminated by <CR><LF>.

Simple Object Access Protocol (SOAP) Web Services Definition Language (WSDL) Transport: TennIIS supports message transport via both secure file transport protocol (SFTP) and real-time SOAP WSDL. For querying TPs, the use of a real-time, synchronous WSDL transport is highly recommended. The WSDL implemented in Tennessee is a nationally-recommended WSDL for immunization messaging. For implementation resources, see the CDC IIS Technical Guidance page and for education resources, see the American Immunization Registry Association's Technical Assistance training videos.

Patient IIS Opt Out Status: Electronic notification that a patient has opted out of the registry will not be recognized by TennIIS (Protection Indicator in PD1-12 and Protection Indicator Effective Date in PD1-13). Patients who wish to opt out of the registry must contact the TennIIS Help Desk at (844) 206 – 9927.

Definition of Organization and Facility: TennIIS supports a 2-tier hierarchy of immunizing locations. Organizations are the top tier and typically identify the legal entity. Facilities are the bottom tier and typically identify physical locations of each provider office or practice. Patients, vaccinations, and the Vaccines for Children (VFC) Provider Identification Number, if applicable, should be at the facility level. An organization may have one or more facilities but a facility may only be a member of one organization. This is an important distinction to make when populating certain fields such as Sending Organization (MSH-4), Entering Facility (ORC-17), and Administered-at-Location (RXA-11). The TP must make the TennIIS team aware of their hierarchical structure when onboarding and must notify the TennIIS team when this structure changes (for example, when new facilities are added or removed from an organization or when facility merges occur) by emailing TennIIS.MU@tn.gov.



Sending Organization (MSH-4), Sending Responsible Organization (MSH-22), Entering Facility (ORC-17), and Administered-at-Location (RXA-11): It is the responsibility of the TP to notify the TennIIS team of the values that will be submitted in MSH-4 and RXA-11 because these values must be mapped within TennIIS.

- If the MSH-4 value identifying the organization is not mapped, messages will error and not enter TennIIS.
- MSH-22 should remain empty or mirror the value in MSH-4. If the MSH-22 value is populated with a different value than the MSH-4 value, messages will error and not enter TennIIS.
- If the RXA-11 value identifying the facility is not mapped, patients and vaccinations will be associated at the organization-level rather than the facility-level which could have negative impacts on reporting.

- For administered vaccinations, ORC-17 should be the same as RXA-11 as the facility both administers and enters the vaccination into the electronic health record (EHR) system.
- For historical vaccinations, ORC-17 should be the facility name or facility NPI and RXA-11 should be empty.

RXA-11 values and mapping are described in more detail in Appendix B.

Data Elements not Editable if Supplied by Vital Records: TennIIS will not accept changes or additions to the following data elements if the information has been supplied by Vital Records:

- Patient Date of Birth
- Birth Certificate Number
- Birth Certificate State

Required Observation (OBX) Segments When Reporting an Administered Vaccine: The following OBX segments are required when reporting an administered vaccine to ensure accurate dose-level accountability:

Option A:

1. Patient Eligibility Category
2. Vaccine Funding Source
3. Vaccination Information Statement (VIS) Vaccine Type
4. VIS Presentation Date
5. VIS Publication Date

Option B:

1. Patient Eligibility Category
2. Vaccine Funding Source
3. Bar-Coded VIS (Document/Vaccine Type and Publication Date)
4. VIS Presentation Date

Refer to the Application Conformance Statements on pages 95-98 of the CDC IG or updates to the User-defined Table 0064 – Financial Class and codes for Immunization Funding Source on pages 24-25 of the Addendum for further clarification on reporting vaccine funding program eligibility status and VIS documentation. Refer to Appendix C for TDH specific associations between vaccine funding program eligibility status and vaccine funding source with examples for both VFC and non-VFC patients.

Other non-required OBX segments to make note of: Adverse Reactions, contraindications, and presumed immunities (such as immunity to chickenpox due to history of disease) should be sent to TennIIS when applicable.

Acknowledgement Messages: TennIIS operates in original acknowledgement mode, meaning that it only returns a single processing acknowledgement (ACK) indicating whether the patient demographic or vaccination information was successfully added to TennIIS; it does not return a communication ACK indicating if a message was successfully received by TennIIS. When a message receives an ACK indication successful application acceptance (AA), it does not necessarily mean that TennIIS has been updated immediately. Other factors involved in the processing of patient records

could prevent TennIIS from immediately updating patient information. Refer to the CDC IG and Appendix E for additional details on ACK messages.

For TPs utilizing the WSDL, there will be an additional communication ACK per message submitted.

Delays in Record Updates: Although a message may generate a successful Acknowledgement Code of "AA", it does not necessarily indicate that TennIIS has been updated immediately. Other factors involved in the processing of patient records could prevent TennIIS from instantaneously updating patient information. The main cause for such a delay is the creation of potential duplicate records. TennIIS de-duplicates patient records based on demographic information prior to accepting the record into the registry. Although most of these records are automatically de-duplicated, some incoming records have patient information so similar to an already existing patient that they require manual review to determine whether or not the records need to be merged into one or remain separated as two different patients. This process can take several hours depending on the number of records requiring manual review.

Baby Names: If submitting data on a newborn that has yet to be given a legal first name at a birthing hospital, then submitting a first name of "BABYGIRL" or "BABYBOY" will be accepted as a temporary legal first name; do not include the mother's name as part of the newborn's first name (i.e. "GirlSarah" or "Jennysboy") as it may cause issues with the deduplication process; the mother's maiden name should be included in the demographic information of the newborn as it will increase the likelihood of patient matches with future updates. It is the expectation of the Tennessee Immunization Program that if the administering provider is notified of the legal name at a later date, they update the name in TennIIS to reflect the change. Providers can submit a demographic update with the legal name to update the record at any time with or without a vaccination update.

Unknown or Abbreviated Addresses: If submitting data on a patient with an unknown address, do not submit an empty address field as the message will error; submitting a street address of "UNK" or "NKA" will be accepted as a temporary street address. The city, state, and zip code should reflect the location of the administering facility. While this may cause a delay due to deduplication issues, the patients and vaccinations will still enter TennIIS rather than erroring because of missing data. It is the expectation of the Tennessee Immunization Program that if the administering provider is notified of an address update at a later date, they update the address in TennIIS to reflect the change. Providers can submit a demographic update with the address to update the record at any time with or without a vaccination update.

If an address is submitted with an abbreviated city name (i.e. "Nash" for Nashville, "M'boro" for Murfreesboro), there will be issues with patient matching and deduplication. Providers and EHR vendors should submit full city names to increase the likelihood of updating the correct patient.

VXU Message Segment Usage in Proper Sequence

Key: R = Required**;** O = Optional**;** C = Conditional

Segment	Usage	Expectation
Message Header (MSH)	R	Every message must begin with an MSH segment.
Patient Identification (PID)	R	Every VXU message must have one PID segment.
Patient Demographic (PD1)	O	The PID segment in a VXU message may have one PD1 segment.
Next of Kin (NK1)	O	The PID segment in a VXU message may have NK1 segments.
Common Order (ORC)	C	Required for each Pharmacy/Treatment Administration (RXA) Segment. Each VXU message may have more than one order group.
Pharmacy/Treatment Administration (RXA)	R	Each ORC segment in a VXU message must have one RXA segment; every RXA segment requires an ORC segment.
Pharmacy/Treatment Route (RXR)	O	Every RXA segment in a VXU message may have one RXR segment.
Observation/Result (OBX)	C	Four or five OBX segments are required when reporting an administered vaccine (see Appendix C).
Note (NTE)	O	Every OBX segment in a VXU message may have one NTE segment.

Required and Optional VXU Message Segments in Proper Sequence

Message Header (MSH) Segment – Required

Field			Description/Comments		Value
MSH-1	Field Separator				|
MSH-2	Encoding Characters				^~\&
MSH-3	Sending Application		Supplied by TP		
MSH-4	Sending Organization				
	MSH-4.1	Namespace ID	Supplied by TennIIS		
	MSH-4.2	Universal ID	Must uniquely identify the organization; NPI is preferred.		
	MSH-4.3	Universal ID Type	If MSH-4.2 is populated, this value should be "NPI".		
	Examples of acceptable MSH-4 fields:		**MSH-4.1, 4.2 and 4.3**	DRJOESMITHORG^1234567890^NPI	
			MSH-4.2 and 4.3	^123456789^NPI	
			MSH-4.1	DRJOESMITHORG	
MSH-5	Receiving Application				SIIS
MSH-6	Receiving Facility				TDH^2.16.840.1.113883.3.773^ISO
MSH-7	Date and Time of Message		Must be to the second; if time zone is not included, it is presumed to be the time zone of the reporting health care facility. Format without time zone: YYYYMMDDHHMMSS Format with time zone: YYYYMMDDHHMMSS+/-ZZZZ		
MSH-9	Message Type				VXU^V04^VXU_V04
MSH-10	Message Control ID		Must uniquely identify a message instance within the scope of sending facility (MSH-4), sending application (MSH-3), and YYYYMMDD (MSH-7).		
MSH-11	Processing ID		Acceptable values: • T for Training (used when testing) • P for Production		
MSH-12	Version ID				2.5.1
MSH-15	Accept Acknowledgement Type				NE
MSH-16	Application Acknowledgement Type				AL
MSH-21	Message Profiler Identifier				Z22^CDCPHINVS

Field		Description/Comments	Value
MSH-22	Sending Responsible Organization	Should be empty; if populated, should contain the same exact value as MSH-4.	
MSH-23	Receiving Responsible Organization	May be empty	

Example MSH segment from the organization Dr. Joe Smith Org sent to TennIIS on January 13, 2019 at 9:50am:

MSH|^~\&|EHR|DRJOESMITHORG^1234567890^NPI|SIIS|TDH^2.16.840.1.113883.3.773^ISO|20190113095019||VXU^V04^VXU_V04|45646ug|P|2.5.1|||NE|AL|||||Z22^CDCPHINVS||

Patient Identification (PID) Segment – Required

Field			Description/Comments	Value
PID-1	Set ID			1
PID-3	Patient Identifier List		The first repetition must be the Medical Record Number (MR) or the System Registry ID (SR; if stored from a previous QBP/VXU). Subsequent repetitions may include a Patient Internal Identifier, Birth File Number, Medicaid Number, and Social Security Number.	
	PID-3.1	Internal Patient Identifier		
	PID-3.5	Identifier Type	Acceptable values: • SR for System Registry ID • MR for Medical Record Number • PI for Patient Internal Identifier • BR for Birth File Number • MA for Medicaid Number • SS for Social Security Number	
PID-5	Patient Name		Legal name of the patient	
	PID-5.1	Last Name		
	PID-5.2	First Name		
	PID-5.3	Middle Name or Initial	May be empty; used to distinguish between patients with the same first and last name in the deduplication process in TennIIS.	
	PID-5.4	Suffix		
	PID-5.7	Name Type Code		L
PID-6	Mother's Maiden Name		May be empty; used to distinguish between patients with the same last name in the deduplication process in TennIIS.	
	PID-6.1	Mother's Maiden Last Name		
	PID-6.2	Mother's Maiden First Name		
	PID-6.3	Mother's Maiden Name Type Code		M
PID-7	Date of Birth		Format: YYYYMMDD	
PID-8	Administrative Sex		Refer to Table 0001 in the CDC IG for a listing of acceptable values.	
PID-10	Race			
	PID-10.1	Race Code	Refer to Table 0005 in the CDC IG for a listing of acceptable values.	

Field			Description/Comments	Value
	PID-10.2	Race Description		
	PID-10.3	Race Coding System		HL70005
PID-11	Patient Address		Primary address of the patient	
	PID-11.1	Street Address 1		
	PID-11.2	Street Address 2		
	PID-11.3	City		
	PID-11.4	State		
	PID-11.5	Postal Zip Code		
	PID-11.6	Country Code	May be empty if the address is in the USA; per HL7 Table 0399 – Country Code in Section 2.15.9.17 of the HL7 Messaging Standard Version 2.5.1, the standard vocabulary is the 3-character (alphabetic) codes as defined by ISO 3166. A listing of acceptable 3-character (alphabetic) country codes are available from ISO at: http://www.iso.org/obp/ui/search	
	PID-11.8	Address Type Code	Refer to Table 0190 in the CDC IG for a listing of acceptable values.	
PID-13	Phone Number		May be empty; first repetition must be the primary residence phone number. If a different telecommunication is being sent other than the primary residence phone number, then the repetition separator must be sent in the first repetition.	
	PID-13.2	Telecommunication Use Code	Refer to Table 0201 in the CDC IG for a listing of acceptable values.	
	PID-13.3	Telecommunication Equipment Type	Refer to Table 0202 in the CDC IG for a listing of acceptable values.	
	PID-13.6	Area Code		
	PID-13.7	Phone Number		
PID-19	Social Security Number (SSN)		Do not populate; if the TP wishes to send SSN, it may be sent in PID-3, but not as the first repetition.	
PID-22	Ethnic Group			
	PID-22.1	Ethnic Code	Refer to the CDCREC table in the CDC IG for a listing of acceptable values.	
	PID-22.2	Ethnic Description		
	PID-22.3	Ethnic Coding	Refer to the CDCREC table in the CDC IG	CDCREC

Field			Description/Comments	Value
		System	for a listing of US ethnicity codes.	
PID-24	Multiple Birth Indicator		Acceptable values are “Y” and “N”. Do not populate this field universally with “N” as it will overwrite existing data in TennIIS. If status is undetermined, field should be empty.	
PID-25	Birth Order		Populated with a numeric value of 1 or more if PID-24 is valued “Y”.	
PID-29	Patient Death Date		Populated if PID-30 is valued “Y”. Format: YYYYMMDD	
PID-30	Patient Death Indicator		Acceptable values are “Y” and “N”. If status is undetermined, field may be empty.	

Example PID segment for a the patient William Wesley Wilson born on April 11, 2011 with a medical record number of 432155 and a mother whose maiden name is Wilma Wilde:

PID|1||432155^^^^MR||Wilson^William^Wesley^^^^L|Wilde^Wilma^^^^^M|20110411|M||1002-5^Native American^HL70005|123 Any Street^^Nashville^TN^37204^^L||^PRN^PH^^^615^5555555|||||||||2186-5^Not Hispanic or Latino^CDCREC

Patient Demographic (PD1) Segment – Optional

Field			Description/Comments	Value
PD1-11	Publicity Code		May be empty; refers to how a person wishes to be contacted in a reminder or recall situation.	
	PD1-11.1	Publicity Code	Refer to Table 0215 in the CDC IG for a listing of acceptable values.	
	PD1-11.2	Publicity Code Description		
	PD1-11.3	Publicity Coding System		HL70215
PD1-16	Immunization Registry Status		May be empty; refer to Table 0441 in the CDC IG for a listing of acceptable values.	
PD1-17	Immunization Registry Status Effective Date		May be empty; populated if PD1-16 is populated. Format: YYYYMMDD	
PD1-18	Publicity Code Effective Date		May be empty; populated if PD1-11 is populated. Format: YYYYMMDD	

Example PD1 segment for a patient who wishes to be notified that vaccinations are due (reminder) or late (recall) via any method effective January 13, 2012 and is an active patient in the registry on January 13, 2012:

PD1||||||||||||02^Reminder/recall-anymethod^HL70215|Y|20120113|||A|20120113|20120113

Next of Kin (NK1) Segment – Optional

Field			Description/Comments	Value
NK1-1	Set ID		Multiple NK1 segments can be sent per patient; therefore this field contains the number that identifies the transaction. The first occurrence of the segment should be the number 1, the second should be number 2, etc.	
NK1-2	Next of Kin Name		Legal name of the next of kin	
	NK1-2.1	Last Name		
	NK1-2.2	First Name		
	NK1-2.3	Middle Name or Initial	May be empty	
	NK1-2.7	Name Type Code		L
NK1-3	Relationship			
	NK1-3.1	Relationship Code	Refer to Table 0063 in the CDC IG for a listing of acceptable values.	
	NK1-3.2	Relationship Description		
	NK1-3.3	Relationship Coding System		HL70063
NK1-4	Address		May be empty	
	NK1-4.1	Street Address 1		
	NK1-4.2	Street Address 2		
	NK1-4.3	City		
	NK1-4.4	State		
	NK1-4.5	Postal Zip Code		
	NK1-4.6	Country Code	May be empty if the address is in the USA; per HL7 Table 0399 – Country Code in Section 2.15.9.17 of the HL7 Messaging Standard Version 2.5.1, the standard vocabulary is the 3-character (alphabetic) codes as defined by ISO 3166. A listing of acceptable 3-character (alphabetic) country codes available from ISO can be found here.	
	NK1-4.7	Address Type Code	Refer to Table 0190 in the CDC IG for a listing of acceptable values.	
NK1-5	Phone Number		May be empty; first repetition must be the primary residence phone number. If a different telecommunication is being sent other than the primary residence phone number, then the repetition separator	

Field			Description/Comments	Value
			must be sent in the first repetition.	
	NK1-5.2	Telecommunication Use Code	Refer to Table 0201 in the CDC IG for a listing of acceptable values.	
	NK1-5.3	Telecommunication Equipment Type	Refer to Table 0202 in the CDC IG for a listing of acceptable values.	
	NK1-5.6	Area Code		
	NK1-5.7	Phone Number		

Example NK1 segment of a patient whose next of kin is his mother, Wilma Wilson:

NK1|1|Wilson^Wilma^^^^^L|MTH^Mom^HL70063|123 Any Street^^Nashville^TN^37204^^L

Common Order (ORC) Segment – Conditional

- Required for each Pharmacy/Treatment Administration (RXA) segment

Field			Description/Comments	Value
ORC-1	Order Control			RE
ORC-2	Placer Order Number		May be empty; the unique immunization ID where an order was placed.	
ORC-3	Filler Order Number		The unique immunization ID where the order was filled; if RXA is conveying information about an immunization that was not given, the filler order number should be 9999.	
ORC-10	Entered By		May be empty; the person that entered the order into the EHR system.	
	ORC-10.1	Entered By Identifier		
	ORC-10.2	Last Name		
	ORC-10.3	First Name		
	ORC-10.4	Middle Name or Initial	May be empty	
ORC-12	Ordering Provider		Populated if RXA-9.1 is valued "00" (administered vaccine). Must be empty if RXA-9.1 is valued "01"-"08" (historical vaccine).	
	ORC-12.1	Ordering Provider Identifier	Must be the ordering provider's NPI.	
	ORC-12.2	Last Name		
	ORC-12.3	First Name		
	ORC-12.4	Middle Name or Initial	May be empty	
	ORC-12.13	Ordering Provider Identifier Type		NPI
ORC-17	Entering Facility		The facility that entered the record	
	ORC-17.1	Entering Facility Name/Identifier	This value must uniquely identify a specific facility within an organization; although facility name is preferred, the facility's NPI will also be accepted. This value should not be the organization found in MSH-4.2 if there is more than one facility under the organization. For administered vaccinations, this value can be the same as RXA-11.	

Field	Description/Comments	Value
Example ORC segment of a patient at the facility Dr. Joe Smith Clinic whose vaccination was ordered by a provider with an NPI of 9876543210 and the immunization record was entered into the organization's HER by Chris Clerk: ORC|RE||65929|||||||^Clerk^Chris||9876543210^^^^^^^^^^^^NPI|||||Dr. Joe Smith Clinic *Example ORC segment of a patient at the facility Dr. Joe Smith Clinic who did not receive a vaccine and the immunization record was entered into the organization's EHR by Chris Clerk:* ORC|RE||9999|||||||^Clerk^Chris||9876543210^^^^^^^^^^^^NPI |||||Dr. Joe Smith Clinic		

Pharmacy/Treatment Administration (RXA) Segment – Conditional

- Required for each Common Order (ORC) segment

Field			Description/Comments		Value
RXA-1	Give Sub-ID Counter		Note that "0" is the number zero.		0
RXA-2	Administration Sub-ID Counter		Since each ORC segment has only one RXA segment, constrain to 1.		1
RXA-3	Start Date of Administration		This field is used to indicate the date the vaccination occurred; in the case of a refusal, this field is used to indicate the date the refusal was recorded. Format: YYYYMMDD		
RXA-5	Administered Code		Valid CVX codes are accepted alone and with valid NDC codes in an additional triplet; valid NDC codes are accepted alone and with valid CVX codes in an additional triplet. Order of triplets does not matter; NDC codes take preference. If an invalid CVX or NDC code is submitted, the vaccine will error and not enter TennIIS. Codes must be active if RXA-9.1 is valued "00" (administered vaccine). See Appendix A for vaccine CVX codes that are blocked and will not enter TennIIS.		
	RXA-5.1	Vaccine Code			
	RXA-5.2	Vaccine Name			
	RXA-5.3	Vaccine Coding System			
	Examples:		**CVX Code**	106^INFANRIX, DTAP^CVX	
			NDC Code	58160-0810-11^INFANRIX, DTAP^NDC	
			CVX and NDC Codes	106^INFANRIX, DTAP^CVX^58160-0810-11^INFANRIX, DTAP^NDC	
RXA-6	Administered Amount		RXA-6 must be valued "999" if any of the following are true: • RXA-20 is valued "RE" (refusal). • RXA-5.1 is valued "998" (no vaccine administered). • RXA-9.1 is not valued "00" (an administered vaccine).		
RXA-7	Administered Units		Populated if RXA-6 is not valued "999".		

Field			Description/Comments		Value
			Must be empty if RXA-6 is valued “999”.		
	RXA-7.1	Administered Units Code			
	RXA-7.2	Administered Units Coding System			UCUM
RXA-9	Administration Notes		Must be used to indicate whether the immunization is based on a historical record or was administered by the reporting provider. Populated if RXA-20 is valued “CP” (complete) or “PA” (partially administered). Must be empty if RXA-20 is not valued “CP” or “PA”.		
	RXA-9.1	Administration Code	Refer to the CDC-defined NIP001 Table in the CDC IG for a listing of acceptable values.		
	RXA-9.2	Administration Text			
	RXA-9.3	Administration Coding System			NIP001
	Examples:		**Historical**	01^Historical^NIP001	
			Administered	00^New^NIP001	
RXA-10	Administering Provider		Indicates the person that administered the vaccine, not the ordering clinician. Populated if RXA-9.1 is valued “00” (administered vaccine). Must be empty if RXA-9.1 is valued “01”-“08” (historical vaccine).		
	RXA-10.1	Administering Provider Identifier	This value must uniquely identify an administering provider within the facility (NPI is preferred where applicable); if the administering provider does not have a unique ID, then this field may be empty.		
	RXA-10.2	Last Name			
	RXA-10.3	First Name			
	RXA-10.4	Middle Name or Initial			
	RXA-10.13	Administering Provider Identifier Type	Populated if RXA-10.1 is populated. Must be empty if RXA-10.1 is not populated. Refer to Table 0203 in the CDC IG for a listing of acceptable values.		

Field			Description/Comments	Value
RXA-11	Administered-at-Location		The facility where the vaccine was administered. See Appendix B. Populated if RXA-9.1 is valued "00" (administered vaccine). Must be empty if RXA-9.1 is valued "01"-"08" (historical vaccine).	
	RXA-11.1	Point of Care	May be empty; this value must uniquely identify a specific facility within the organization. This value should not be the organization NPI found in MSH-4.2 if there is more than one facility under the organization.	
	RXA-11.4	Facility Name/Identifier	This value must uniquely identify a specific facility within the organization; although facility name is preferred, the facility's NPI will also be accepted. This value should not be the organization NPI found in MSH-4.2 if there is more than one facility under the organization.	
RXA-15	Substance Lot Number		Populated if RXA-9.1 is valued "00" (administered vaccine) and RXA-20 is valued "CP" (complete) or "PA" (partially administered).	
RXA-16	Substance Expiration Date		Populated if RXA-9.1 is valued "00" (administered vaccine) and RXA-20 is valued "CP" (complete) or "PA" (partially administered). Format: YYYYMMDD	
RXA-17	Substance Manufacturer Name		Populated if RXA-9.1 is valued "00" (administered vaccine) and RXA-20 is valued "CP" (complete) or "PA" (partially administered). Must use MVX code system.	
	RXA-17.1	Substance Manufacturer Code		
	RXA-17.2	Substance Manufacturer Text		
	RXA-17.3	Substance Manufacturer Coding System		MVX
RXA-18	Substance/Treatment Refusal Reason		Populated if RXA-20 is valued "RE" (refusal).	
	RXA-18.1	Reason Code	Refer to the CDC-defined NIP002 Table in	

Field			Description/Comments	Value
			the CDC IG for a listing of acceptable values.	
	RXA-18.2	Reason Text		
	RXA-18.3	Reason Coding System		NIP002
RXA-20	Completion Status		May be empty; refer to Table 0322 in the CDC IG for a listing of acceptable values. If empty, the value is assumed to be "CP" for complete. If RXA-5.1 has a value of "998" (no vaccine administered) then RXA-20 must be valued "NA" (not administered); if RXA-18 is populated, then RXA-20 must be valued "RE" (refusal).	
RXA-21	Action Code		Must be populated if RXA-20 is valued "CP" (complete), "PA" (partially administered), or empty. May be empty if RXA-5.1 is not valued "998" (no vaccine administered) and/or RXA-20 is valued "NA" (not administered) or "RE" (refusal); refer to Table 0323 in the CDC IG for a listing of acceptable values.	

Example RXA segment of a patient who was giving DTaP-Hep B-IPV (Pediarix) vaccine the day of their office visit on January 13, 2012 by Nurse Nancy at the facility Dr. Joe Smith Clinic:

RXA|0|1|20120113||110^DTaP HIB IPV^CVX|0.5|mL^^UCUM||00^New^NIP001|^Nancy^Nurse^^^^^^^^^^^^^^^^^^RN|^^^Dr. Joe Smith Clinic||||XY3939|20141212|SKB^GlaxoSmithKline^MVX|||CP|A

Example RXA segment of a patient who has a presumed immunity (such as immunity to chickenpox due to a history of disease); this RXA segment would be accompanied by an OBX segment that would provide additional details:

RXA|0|1|20120113||998^no vaccine administered^CVX|999||||||||||||NA|A

Pharmacy/Treatment Route (RXR) Segment – Optional

Field			Description/Comments	Value
RXR-1	Route		This field is used to indicate the route of vaccine administration.	
	RXR-1.1	Route Code	Refer to the NCIT table in the CDC IG for a listing of acceptable values.	
	RXR-1.2	Route Text		
	RXR-1.3	Route Coding System		NCIT
	Example:		C38276^INTRAVENOUS^NCIT	
RXR-2	Administration Site		May be empty; used to indicate the site of vaccine administration.	
	RXR-2.1	Site Code	Refer to Table 0163 in the CDC IG for a listing of acceptable values.	
	RXR-2.2	Site Text		
	RXR-2.3	Site Code Table		HL70163

Example RXR segment of a patient who was given a vaccine intramuscularly in their right thigh:

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

Observation (OBX) Segment – Conditional

- Required when reporting an administered vaccine and is used to report patient eligibility category, vaccine funding source, Vaccination Information Statement (VIS) documentation (see Appendix C) and, where applicable, an adverse reaction, contraindication, and presumed immunities.

Field			Description/Comments	Value
OBX-1	Set ID		Multiple OBX segments can be sent per patient; therefore this field contains the number that identifies the transaction. The first occurrence of the segment should be the number 1, the second number 2, etc.	
OBX-2	Value Type			
OBX-3	Observation Identifier		This field indicates what the observation refers to (i.e. the question).	
	OBX-3.1	Observation Identifier Code	Refer to the CDC-defined NIP003 table in the CDC IG for a listing of acceptable values. If RXA-9.1 is valued "00" (administered vaccine) and RXA-20 is valued "CP" (complete) or "PA" (partially administered), then 4-5 OBX segments must be included (see Appendix C).	
	OBX-3.2	Observation Identifier Text		
	OBX-3.3	Observation Identifier Coding System		
OBX-4	Observation Sub-ID		This field is used to group related observations by setting the value to the same number; numbers must be positive integers.	
OBX-5	Observation Value		This field indicates what the observation is (i.e. the answer to the question in OBX-3). See Appendix C.	
	OBX-5.1	Observation Value Code		
	OBX-5.2	Observation Value Text		
	OBX-5.3	Observation Value Coding System		
OBX-6	Units		Populated if OBX-2 is valued "NM" (numeric data type).	
	OBX-6.1	Units Code	The value must be from the UCUM list of units; if no unit of measure is available,	

Field			Description/Comments	Value
			then use the value “NA”.	
	OBX-6.3	Units Coding System		UCUM if OBX-6.1 is not valued “NA” HL70353 if OBX-6.1 is valued “NA”
OBX-11	Observation Result Status			F
OBX-14	Date of Observation		May be empty. Format: YYYYMMDD	
OBX-17	Observation Method		Populated if OBX-3.1 is valued “64994-7” for patient eligibility category.	
	OBX-17.1	Observation Method Code		
	OBX-17.2	Observation Method Text		
	OBX-17.3	Observation Method Coding System		CDCPHINVS

See Appendix C for examples of OBX segments for both VFC-eligible and non-VFC-eligible vaccinations.

Example OBX segment of a patient who has a history of chickenpox disease:

OBX|1|CE|59784-9^Disease with presumed immunity^LN|1|38907003^History of Varicella infection^SCT|||||F

Note (NTE) Segment – Optional

Field		Description/Comments	Value
NTE-3	Comment	This field contains the comment contained in the segment.	

Example NTE segment:

NTE|||The patient is healthy enough to receive this vaccine

ACK Message Segment Usage in Proper Sequence

Segment	Expectation
Message Header (MSH)	Every message must begin with an MSH segment.
Message Acknowledgement (MSA)	Every ACK message must have one MSA segment. The MSA segment includes information to identify context of the prior message.
Error (ERR)	The ERR segment in an ACK message reports information about errors in processing the message. The segment may repeat in an ACK message; each error will have its own ERR segment.

See Appendix E for ACK message examples.

Returned ACK Message Segments in Proper Sequence

Message Header (MSH) Segment

Field		Description/Comments	Value
MSH-1	Field Separator		|
MSH-2	Encoding Characters		^~\&
MSH-3	Sending Application		SIIS^^
MSH-4	Sending Organization		TDH^2.16.840.1.113883.3.773^ISO
MSH-5	Receiving Application	Echoes value sent in MSH-3 by the initiating system.	
MSH-6	Receiving Facility	Echoes value sent in MSH-4 by the initiating system.	
MSH-7	Date and Time of Message	Must be to the second; if time zone is not included, it is presumed to be the time zone of the reporting health care facility. Format without time zone: YYYYMMDDHHMMSS Format with time zone: YYYYMMDDHHMMSS+/-ZZZZ	
MSH-9	Message Type		ACK^V04^ACK
MSH-10	Message Control ID	Must uniquely identify a message instance within the scope of sending facility (MSH-4), sending application (MSH-3), and YYYYMMDD (MSH-7).	
MSH-11	Processing ID	Acceptable values: • P for Production	
MSH-12	Version ID		2.5.1
MSH-15	Accept Acknowledgement Type		NE
MSH-16	Application Acknowledgement Type		NE
MSH-21	Message Profiler Identifier		Z22^CDCPHINVS
MSH-22	Sending Responsible Organization	May be empty	
MSH-23	Receiving Responsible Organization	May be empty	

Example MSH segment sent from TennIIS to the organization Dr. Joe Smith Org on January 13, 2019 at 9:50am:

MSH|^~\&|SIIS^^|TDH^2.16.840.1.113883.3.773^ISO |EHR|

Field	Description/Comments	Value
DRJOESMITHORG^1234567890^NPI|20191218123203-0600||ACK^V04^ACK|45646ug|P|2.5.1|||NE|NE||||Z22^CDCPHINVS||		

Message Acknowledgement (MSA) Segment

Field		Description/Comments	Value
MSA-1	Acknowledgement Code	AA = Application Accept AE = Application Error AR = Application Reject	HL70008
MSA-2	Message Control ID	Contains the message control ID of the message sent by the sending system for matching purposes; echoes the value in MSH-10 from the initiating system.	

Example MSA segment sent from TennIIS to the organization Dr. Joe Smith Org:

MSA|AA|165161651|
MSA|AE|212245544|
MSA|AR|886623246|

Error (ERR) Segment

Field		Description/Comments	Value
ERR-2	Error Location	Identifies the location in the message where the error, warning, or information is applicable. Examples: • RXA^^10 • OBX 69764-9 • PID^^	
ERR-3	HL7 Error Code	Examples: • 0^Message accepted^HL70357 • 101^Required field missing^HL70357 • 999^Application Error^HL70357	HL70357
ERR-4	Severity	E = Error W = Warning I = Informational	HL70516
ERR-8	User Message	Vendor-defined informative text about the error, warning, or information. Examples: • Patient 464651651 "JOHN SMITH" with 1 vaccination accepted into vaccination staging table • Vaccination person that vaccinated id is missing • VIS barcode is missing • Patient is eligible for vfc but no guardian	

Example ERR segments sent from TennIIS to the organization Dr. Joe Smith Org:

ERR|||0^Message accepted^HL70357|I||||Patient 464651651 "JOHN SMITH" with 1 vaccination accepted into vaccination staging table|

ERR||RXA^^10|101^Required field missing^HL70357|W||||vaccination person that vaccinated id is missing|
ERR||OBX 69764-9|101^Required field missing^HL70357|W||||vis barcode is missing|
ERR||PID^^|999^Application Error^HL70357|W||||patient is eligible for vfc but no guardian|

Appendix A: Blocked Vaccines That Will Error at TennIIS

TennIIS will reject the vaccines in the following table due to their "never active" or "non-US" vaccine status with the CDC found here. A "never active" vaccine status includes vaccines that were never available and is not in the pipeline of new vaccines. A "non-US" vaccine status includes vaccines that are only available outside the US.

CVX Code	Vaccine Description
56	Dengue Fever
57	Hantavirus
58	Hep C
59	Hep E
60	Herpes Simplex 2
61	HIV
63	Junin Virus
64	Leishmaniasis
65	Leprosy
67	Malaria
68	Melanoma
69	Parainfluenza-3
70	Q Fever
72	Rheumatic Fever
73	Rift Valley Fever

CVX Code	Vaccine Description
76	Staphylococcus Bacteria Lysate
77	Tick-Borne Encephalitis
78	Tularemia
80	VEE, live
81	VEE, inactivated
82	Adenovirus, unspecified formulation
91	Typhoid, unspecified formulation
92	VEE, unspecified formulation
95	TST-OT Tine Test
96	TST-PPD intradermal
105	Vaccinia (Smallpox), diluted
110	Tetanus toxoids, adsorbed
923	Hep A 2 dose – Ped/Adol 12+ mos.
999	Unknown

Appendix B: RXA-11 Values and Mapping

The RXA segment denotes the Pharmacy/Treatment Administration and is required for each Common Order (ORC) segment. The RXA-11 field is used to assign the incoming vaccine to the appropriate facility under an organization for facility-level message tracking. There are various combinations of facility identification that can be entered into the RXA-11.1 and RXA-11.4 fields for the incoming vaccine to be assigned appropriately. Facilities can be uniquely identified by:

- A facility name
- A facility identifier/NPI that uniquely identifies a facility; if there is more than one facility under the organization this value cannot be the organization NPI.

In order to assign the vaccination appropriately, the provider and EHR vendor need to identify what values to send in both the RXA-11.1 and RXA-11.4 fields. TennIIS will recognize whichever value appears first; for example, if RXA-11.1 is filled then it will be mapped in TennIIS, but if RXA-11.1 is not filled, RXA-11.4 will be mapped in TennIIS.

Example with mapped values **bolded**:

- Organization Name: Tennessee Hospital System
- Facility Name: Tennessee Facility
- Facility NPI: 123891782

Case	Quality	RXA-11.1	RXA-11.4
Case 1	Preferred	**Tennessee Facility**	123891782
Case 2	Preferred	**123891782**	Tennessee Facility
Case 3	Acceptable	**Tennessee Facility**	[left empty]
Case 4	Acceptable	[left empty]	**Tennessee Facility**
Case 5	Acceptable	**123891782**	[left empty]
Case 6	Acceptable	[left empty]	**123891782**

Sample RXA segments with RXA-11 segments highlighted and mapped values **bolded**:

Case 1	RXA|0|1|20180101||110^DTaP HIB IPV^CVX|0.5|mL^^UCUM||00^New Immunization^NIP001||**Tennessee Facility**^^^123891782|||
Case 2	RXA|0|1|20180101||110^DTaP HIB IPV^CVX|0.5|mL^^UCUM||00^New Immunization^NIP001||**123891782**^^^Tennessee Facility|||
Case 3	RXA|0|1|20180101||110^DTaP HIB IPV^CVX|0.5|mL^^UCUM||00^New Immunization^NIP001||**Tennessee Facility**^^^|||
Case 4	RXA|0|1|20180101||110^DTaP HIB IPV^CVX|0.5|mL^^UCUM||00^New Immunization^NIP001||^^^**Tennessee Facility** |||
Case 5	RXA|0|1|20180101||110^DTaP HIB IPV^CVX|0.5|mL^^UCUM||00^New Immunization^NIP001||**123891782**^^^|||
Case 6	RXA|0|1|20180101||110^DTaP HIB IPV^CVX|0.5|mL^^UCUM||00^New Immunization^NIP001|| ^^^**123891782**|||

Appendix C: OBX Segments for Administered Vaccinations

OBX segments are used to identify patient eligibility status, funding source and Vaccine Information Statement (VIS) information. For an administered vaccination (RXA), there should be 4-5 OBX segments. OBX-3 describes the observation being asked for or the "question"; OBX-5 describes the observation or the "answer". For example, the question of OBX-3 could be asking for patient eligibility and the answer of OBX-5 could respond with "VFC-eligible".

The following OBX segments are used as the "question" in OBX-3.

CDC-defined NIP003		
Code	Label	Description
64994-7	Vaccine Funding Program Eligibility Category	Identifies the patient eligibility status; for example, VFC-eligible or not VFC-eligible.
30963-3	Vaccine Funding Source	Identifies the vaccine funding source used to purchase the vaccine; for example, public VFC or private.
30956-7	Vaccine Type	Identifies the vaccine group or family administered using a CVX code.
29768-9	Date Vaccine Information Statement (VIS) Published	Identifies the date the VIS information given to the patient during the encounter was published. See CDC list here.
29769-7	Date Vaccine Information Statement (VIS) Presented	Identifies the date the VIS information was given to the patient. This should be the same as the administration date.
69764-9	Document Type	Barcoded Vaccine Information Source (VIS); encompasses vaccine type and publication/edition date. Use value set code - PHVS_VISBarcodes_IIS in the CDC IG.

The following codes will be used as the "answer" in OBX-5 when the "question" in OBX-3 is asking for Patient Eligibility Status and valued "64994-7".

Table 0064 – Financial Class – Patient Eligibility Status		
Code	Label	Definition
V01	Not VFC Eligible	Client does not qualify for VFC because they do not have one of the statuses below (V02-V05).
V02	VFC eligible – Medicaid / Medicaid Managed Care	All of the following are true: - Client is currently eligible for Medicaid or Medicaid managed care - Client is < 19 years old - The type of vaccine administered is eligible for VFC funding
V03	VFC eligible – Uninsured	All of the following are true: - Client does not have health insurance - Client is < 19 years old - The type of vaccine administered is eligible for VFC funding
V04	VFC eligible – American Indian / Alaska native	All of the following are true: - Client is a member of a federally recognized tribe - Client is < 19 years old - The type of vaccine administered is eligible for VFC funding

V05	VFC eligible – Underinsured at FQHC/RHC/deputized provider	All of the following are true: - Client has insurance but insurance does not cover vaccines, limits the amount of vaccines covered, or caps vaccine coverage at a certain amount - Client is receiving care at an FQHC, RHC, or deputized provider - Client is < 19 years old - The type of vaccine administered is eligible for VFC funding

The following codes will be used as the "answer" in OBX-5 when the "question" in OBX-3 is asking for Vaccine Funding Source and valued "30963-3".

Coding System CDCPHINVS - Immunization Funding Source		
Code	Label	Definition
PHC70	Private	Vaccine stock used was privately funded.
VXC50	Public	Vaccine stock used was publicly funded.
VXC51	Public VFC	Vaccine stock used was publicly funded by the VFC program.
VXC52	Public non-VFC	Vaccine stock used was publicly funded by a non-VFC program.

The following table should be used to match patient eligibility status with vaccine funding source. For example, if the patient is not VFC eligible, the vaccine stock used should be privately funded.

Determine Corresponding Patient Eligibility Status and Vaccine Funding Source		
Patient Eligibility Status Code	Vaccine Funding Source Code	Reason
V01	PHC70; VXC50	If the patient is not VFC eligible, the funding source will be private or state-funded.
V02	VXC51	If the patient is VFC eligible, the funding source will be Public VFC.
V03	VXC51	If the patient is VFC eligible, the funding source will be Public VFC.
V04	VXC51	If the patient is VFC eligible, the funding source will be Public VFC.
V05	VXC51	If the patient is VFC eligible, the funding source will be Public VFC.

Examples of OBX Segment Combinations

Note: patient eligibility status and vaccine funding source OBX-3 values are bolded; OBX segment differences between 4 and 5 OBX segments are highlighted in red.

1. **Patient that is not VFC eligible (V01)**

a. With 5 OBX segments:

OBX|1|CE|64994-7^vaccine fund pgm elig cat^LN|1|**V01^NOT VFC ELIGIBLE**^HL70064|||||F|||||VXC40^vaccine level^CDCPHINVS
OBX|2|CE|30963-3^Vaccine funding source^LN|1|**PHC70^PRIVATE^CDCPHINVS**|||||F
OBX|3|CE|30956-7^Vaccine Type^LN|2|52^Hep A^CVX|||||F
OBX|4|TS|29768-9^VIS Publication Date^LN|2|20150415|||||F
OBX|5|TS|29769-7^VIS Presented Date^LN|2|20160428|||||F

b. With 4 OBX segments:

OBX|1|CE|64994-7^vaccine fund pgm elig cat^LN|1|**V01^NOT VFC ELIGIBLE**^HL70064|||||F|||||VXC40^vaccine level^CDCPHINVS
OBX|2|CE|30963-3^Vaccine funding source^LN|1|**PHC70^PRIVATE^CDCPHINVS**|||||F
OBX|3|CE|69764-9^Document Type^LN|2|25308869830000421111025^Hepititis A VIS^cdcgs1vis|||||F
OBX|4|TS|29769-7^VIS Presented Date^LN|2|20160428|||||F

2. Patient that is VFC eligible (V02-V05)

a. With 5 OBX segments:

OBX|1|CE|64994-7^vaccine fund pgm elig cat^LN|1|**V02VFC ELIGIBLE^HL70064**|||||F|||||VXC40^vaccine level^CDCPHINVS
OBX|2|CE|30963-3^Vaccine funding source^LN|1|**VXC51^PUBLIC VFC^CDCPHINVS**|||||F
OBX|3|CE|30956-7^Vaccine Type^LN|2|52^Hep A^CVX|||||F
OBX|4|TS|29768-9^VIS Publication Date^LN|2|20150415|||||F
OBX|5|TS|29769-7^VIS Presented Date^LN|2|20160428|||||F

b. With 4 OBX segments:

OBX|1|CE|64994-7^vaccine fund pgm elig cat^LN|1|**V02VFC ELIGIBLE^HL70064**|||||F|||||VXC40^vaccine level^CDCPHINVS
OBX|2|CE|30963-3^Vaccine funding source^LN|1|**VXC51^PUBLIC VFC^CDCPHINVS**|||||F
OBX|3|CE|69764-9^Document Type^LN|2|25308869830000421111025^Hepititis A VIS^cdcgs1vis|||||F
OBX|4|TS|29769-7^VIS Presented Date^LN|2|20160428|||||F

Appendix D: Example VXU Message

Below is a full VXU message example from the organization Dr. Joe Smith Org. The organization sent the message to the registry on January 13, 2012 at 9:50am. The message is regarding patient William Wesley Wilson born on April 11, 2011 with a medical record number of 432155 and a mother whose maiden name is Wilma Wilde. Notifications are to be received when vaccinations are due (reminder) or late (recall) via any method effective January 13, 2012 and William is an active patient in the registry on January 13, 2012. His next of kin is his mother Wilma Wilson. William went to the facility Dr. Joe Smith Clinic for an immunization. His immunization was ordered by a provider with an NPI of 9876543210. The immunization record was entered into the organization's EHR by Chris Clerk. He was given a DTAP-Hep B- IPV (Pediarix) vaccine the day of his office visit, January 13, 2012, by Nurse Nancy at the facility Dr. Joe Smith Clinic and he was healthy enough to receive the vaccine. The vaccination was administered intramuscularly in his right thigh. He is eligible for Medicaid and the vaccine was purchased using federal funds. He was given a Pediarix bar coded Vaccine Information Statement (VIS) with a publication date of 11/16/2012 (edition date inferred from the bar code). A history of chickenpox disease is also reported.

MSH|^~\&|EHR|DRJOESMITHORG^1234567890^NPI|SIIS|TDH^2.16.840.1.113883.3.773^ISO|20120113095019||VXU^V04^VXU_V04|4564
6ug|P|2.5.1|||NE|AL|||||Z22^CDCPHINVS||
PID|1||432155^^^^MR||Wilson^William^Wesley^^^^L|Wilde^Wilma^^^^^M|20110411|M||1002-5^NativeAmerican^HL70005|123 Any St^^Nashville^TN^37204^^L||^PRN^PH^^^615^5555555|||||||||2186-5^Not Hispanic^CDCREC
PD1||||||||||02^Reminder/recall - any method^HL70215|Y|20120113|||A|20120113|20120113
NK1|1|Wilson^Wilma^^^^^L|MTH^Mom^HL70063|123 Any St^^Nashville^TN^37204^^L
ORC|RE||65929|||||||^Clerk^Chris||9876543210^^^^^^^^^^^^NPI|||||Dr. Joe Smith Clinic
RXA|0|1|20120113||110^DTaPHIBIPV^CVX|0.5|mL^^UCUM||00^New^NIP001|^Nancy^Nurse^^^^^^^^^^^^^^^^^^RN|^^^Dr. Joe Smith Clinic||||XY3939|20141212|SKB^GlaxoSmithKline^MVX|||CP|A
RXR|C28161^Intramuscular^NCIT|RT^Right Thigh^HL70163
OBX|1|CE|64994-7^vaccine fund pgm elig cat^LN|1|**V02VFC ELIGIBLE^HL70064**||||||F||||||VXC40^vaccine level^CDCPHINVS
OBX|2|CE|30963-3^Vaccine funding source^LN|1|**VXC51^PUBLIC VFC^CDCPHINVS**|||||F
OBX|3|DT|29769-7^VIS presented^LN|2|20120113|||||F
OBX|4|CE|69764-9^Document type^LN|2|25308869830002641112111 6^MultivaccineVIS^cdcgs1vis|||||F NTE|||The patient is healthy enough to receive this vaccine.
ORC|RE||9999|||||||^Clerk^Chris|||||||Dr. Joe Smith Clinic RXA|0|1|20120113||998^No VaccineAdministered^CVX|999||||||||||||||NA|A|
OBX|1|CE|59784-9^Disease with presumed immunity^LN|1|38907003^History of Varicellainfection^SCT|||||F

Appendix E: Acknowledgement Messages and Examples

Acknowledgement (ACK) messages are returned after TennIIS has received and processed or attempted to process a VXU message (occasionally a QBP message if it results in an error). ACK messages can be used to assist both the provider and EHR vendor with understanding whether the patients and vaccinations were successfully accepted by TennIIS or whether they resulted in an error and what type of error occurred.

It is the expectation of the Tennessee Immunization Program that providers and EHR vendors diligently check their ACK messages to ensure immunization files are being transferred to the registry. It is a shared responsibility between the TP and TennIIS to ensure patient immunizations are successfully processing into TennIIS. If the user notices that ACK files have not been returned to the "out" folder or if there have been a significant amount of errors noted in the ACK files, it is the responsibility of the provider to notify TennIIS.MU@tn.gov for further investigation. For more information on the HL7 segments in an ACK message, refer to Returned ACK Message Segments in Proper Sequence.

The MSA segment contains one of the following acknowledgement codes in the MSA-1 field and indicates the processing of the message:

- **AA** for **Application Accept** – indicates the message was accepted into TennIIS with no warnings or errors.
- **AE** for **Application Error** – indicates the message contained either an error or a warning in ERR-4. Messages with warnings will still populate TennIIS. Messages with errors could still populate TennIIS. For example, if an error occurred within the RXA segment – that vaccination would not populate TennIIS, but other vaccinations in the message and demographic information would populate TennIIS.
- **AR** for **Application Reject** – indicates the message was rejected by TennIIS. This could occur when a message is submitted with an unsupported message type, an unsupported event code, or and unsupported processing ID.

Example ACK Message Accepted into TennIIS

MSH|^~\&|SIIS^^|TDH^2.16.840.1.113883.3.773^ISO|EHR^^|DRJOESMITHORG^1234567890^NPI|2016052
7112121||ACK^V04^ACK|9110
448173.100002449|P|2.5.1|||||||||Z22^CDCPHINVS^^|
MSA|**AA**|45646ug|
ERR|||**0^Message accepted^HL70357**|**I**||||Patient 432155 "William Wilson" with 1 vaccination accepted into vaccination staging table|

For a message indicating an error, the location (segment, field) of the error is identified in ERR-2, the type of error is identified in ERR-3, the severity of the error is identified in ERR-4, and the specific error is described in ERR-8.

Error Severity:

- **Error (E)** – the expectation is for the error to be corrected and the message resubmitted.
- **Warning (W)** – the expectation is for the warning to be corrected, but the message does not need to be resubmitted. Messages with warnings will still populate TennIIS.
- **Informational (I)** – the transaction was successful, but information is returned (seen above in the "Example ACK Message Accepted into TennIIS").

Example ACK Message That Contained an Error

MSH|^~\&|SIIS^^|TDH^2.16.840.1.113883.3.773^ISO|EHR^^|DRJOESMITHORG^1234567890^NPI|2016052
7113353||ACK^V04^ACK|7444
229907.100002456|P|2.5.1||||||||Z22^CDCPHINVS^^|
MSA|**AE**|45646ug|
ERR||RXA-5.1, RXA-5.4|103^Table value not found^HL70357|**E**||||vaccination cvx code is unrecognized|

Example ACK Message That Contained Both an Error and a Warning

MSH|^~\&|SIIS^^|TDH^2.16.840.1.113883.3.773^ISO|EHR^^|DRJOESMITHORG^1234567890^NPI|2016052
7113353||ACK^V04^ACK|7444
229907.100002456|P|2.5.1||||||||Z22^CDCPHINVS^^|
MSA|**AE**|752544|
ERR||RXA^^5^^1|103^Table value not found^HL70357|**E**||||vaccination ndc code is unrecognized|
ERR||RXA^^|100^Segment sequence error^HL70357|**E**||||vaccination ndc code is unrecognized - Message Rejected|
ERR||OBX^^|101^Required field missing^HL70357|**W**||||vaccination funding source is missing|
ERR||RXA^^10|101^Required field missing^HL70357|**W**||||vaccination person that vaccinated id is missing|
ERR||OBX 69764-9|101^Required field missing^HL70357|**W**||||vis barcode is missing|

Example ACK Message That Contained Multiple Warnings

MSH|^~\&|SIIS^^|TDH^2.16.840.1.113883.3.773^ISO|EHR^^|DRJOESMITHORG^1234567890^NPI|2016052
7113353||ACK^V04^ACK|7444
229907.100002456|P|2.5.1||||||||Z22^CDCPHINVS^^|
MSA|**AE**|45646ug|
ERR|||0^Message accepted^HL70357|**I**|||| Patient 432155 "William Wilson" with 1 vaccination accepted into vaccination staging table |
ERR||OBX^^|101^Required field missing^HL70357|**W**||||vaccination funding source is missing|
ERR||RXA^^10|101^Required field missing^HL70357|**W**||||vaccination person that vaccinated id is missing|
ERR||OBX 69764-9|101^Required field missing^HL70357|**W**||||vis barcode is missing|
ERR||RXA^^11^^4|103^Table value not found^HL70357|**W**||||vaccination facility id is unrecognized administered|

Example ACK Message Rejected at TennIIS

MSH|^~\&|SIIS^^| TDH^2.16.840.1.113883.3.773^ISO | EHR^^|
DRJOESMITHORG^1234567890^NPI|20190502110402||^|5151948309.100113913|P|2.5.1|
MSA|**AE**|2804098977|
ERR||^^^^|207^Application internal error^HL70357|**E**||||Unable to import, provider Id not recognized. - Message Rejected|

Appendix F: Common Error Generating Scenarios in TennIIS

Field			Options	Error Description
PID-5	Patient Name		is invalid	Contains characters besides A-Z, a-z, hyphens, apostrophes, or contains the values test, testname, noname, name1, name2, data1, data2, new name, old name, fake name.
PID-7	Date of Birth		is invalid	DOB is not in the format YYYYMMDD; checks for invalid characters and the length of date are sent.
			is in the future	DOB is a future date compared to the sent date.
PID-8	Administrative Sex		is missing	Value is missing
			is invalid	Gender sent is marked as invalid in the code mapping table.
			is unrecognized	A value other than M for male, F for female, or U for unknown was sent.
PID-10	Patient Race		is missing	Value is missing.
			is invalid	The code is unrecognized but it is either inactive or marked invalid in the code mapping table.
			is unrecognized	Value sent is an unusual code value (requires mapping in the code mapping table).
PID-11	Patient Address			
	PID-11.1	Street	is missing	Value is missing.
			is invalid	Contains the values anywhere, nowhere, and address.
	PID-11.3	City	is missing	Value is missing.
	PID-11.4	State	is missing	Value is missing
			is invalid	The code is recognized but it is either inactive or marked invalid in the code mapping table.
			is unrecognized	Value sent is an unusual code value (requires mapping in the code mapping table).
	PID-11.5	Zip	is missing	Value is missing.
RXA-3	Start Date of Administration		is invalid	An incoming value is a date that cannot be parsed because it is not in a format that the application understands.
			is before the patient's date of birth	Vaccine was given before the date of birth.
RXA-5	Administered Code		is missing	Value is missing.
			is invalid	The code is recognized but it is either inactive or marked invalid in the code mapping table.
			is unrecognized	Value sent is an unusual code value (requires mapping in the code mapping table).
RXA-9	Administration Notes		is missing	Value is missing.

Appendix G: Common Error Generating Scenarios in the Cloverleaf Interface Engine

For SFTP TPs:

1. **Invalid Control Line Feed Message Termination:** The end of each message segment must be terminated by <CR> and the last segment of each complete message must be terminated by <CR><LF>.
2. **Invalid MSH-4 Values/Organization NPI:** The NPI and/or namespace value submitted in MSH-4 by the TP and EHR vendor must match the value that is listed on the organization detail page in the front end of TennIIS. If the values do not match, the message will error and an acknowledgment message will be returned to the TP/EHR vendor stating that the provider ID was invalid.
3. **Invalid Characters:** If invalid characters are submitted that the Cloverleaf interface engine cannot consume, the message will error. Examples of invalid characters: M and N dashes. If escape characters (&, \) are used out of sequence, the field will be ignored and not processed, but will not cause the message to error.
4. **HL7 Segment Order:** The segments must be submitted in the order described in the VXU Message Segments in Proper Order above. For example, if the RXR segment is submitted after an OBX segment, the messages will error.

For WSDL TPs:

1. **Invalid MSH-4 Values:** The MSH-4 value submitted by the TP and EHR vendor must exactly match the MSH-4 value validated in the Cloverleaf interface engine. If the value is not the same, the messages will error.
2. **Invalid MSH-4 Values/Organization NPI:** The NPI and/or namespace value submitted in MSH-4 by the TP and EHR vendor must match the value that is listed on the organization detail page in the front end of TennIIS. If the values do not match, the message will error and an acknowledgment message will be returned to the TP/EHR vendor stating that the provider ID was invalid.
3. **SOAP Header Errors:** When the SOAP header is not formatted correctly per the WSDL implementation document, the messages will error.
4. **HL7 Segment Order:** The segments must be submitted in the order described in the VXU Message Segments in Proper Order above. For example, if the RXR segment is submitted after an OBX segment, the messages will error.

Appendix H: Technical Specifications Change History Details

Effective Date	Description of Revision
December 2019	The technical specifications document was updated to encompass upgrades that allow for NDC codes to be accepted alone in RXA-5 (previously had to be accompanied by a CVX code) and added more detail pertaining to acknowledgement messages.
May/June 2019	The technical specifications document was updated to encompass upgrades and clarify common issues experienced during data exchange with TennIIS. Content added and/or clarified: • Real-time web services definition language (WSDL) transport • Diagram of organizational structure in TennIIS • Clarification of MSH-4, RXA-11, and ORC-17 • Clarification of OBX segment and Tennessee Immunization Program expectations for both Vaccines for Children (VFC) eligible and not VFC eligible patients • Clarification of baby names being submitted to TennIIS • Clarification of unknown or abbreviated addressed being submitted to TennIIS • Added MSH-4 example for trading partners submitting only a namespace • Removed mention of deferral throughout the document • Updated the language about RXA-5 in regards to CVX codes, NDC codes, order submitted, and system preference • Updated the language about RXA-21 • Added appendices for: o Transport mechanisms (SFTP and WSDL) o Blocked vaccines that will error at TennIIS o RXA-11 guidance and examples o OBX segment guidance and examples o Acknowledgement message description and examples o Error-generating scenarios with the Cloverleaf interface engine o Frequently asked questions
May 2016	Technical specifications have been separated from the Trading Partner Agreement (TPA). This technical specifications document thoroughly highlights required and optional fields expected from our Trading Partners. Although the Trading Partner is still expected to refer to the CDC IG for additional details, this technical specifications document is more robust than the previous document while still being more concise than the CDC IG. This technical specifications document explicitly states that OBX (Observation) segments are required for all administered vaccines in order to report the following: • Vaccine funding program eligibility status • Vaccine funding source • Date the Vaccine Information Statement (VIS) was published • Date the Vaccine Information Statement (VIS) was presented If documenting the VIS as vaccine type, edition date, and presentation date, then each administered vaccine must have a minimum of 5 OBX segments. If documenting a bar coded VIS using document type and presentation date, then the edition date may be inferred from the bar code and each administered vaccine will therefore have a minimum

	of 4 OBX segments. Refer to the Application Conformance Statements on pages 95 – 98 of the CDC IG for further clarification on reporting vaccine funding program eligibility status and VIS documentation.