



Best Practices Guide: Optimizing Your HL7 Message

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Introduction

For an HL7 message to meet Vermont’s ‘gold standard’ message, it must contain certain information, outside of what is required in a successfully consumed message. This Best Practices Guide was developed as a tool to assist Provider Practices in sending the highest quality of data within the HL7 message that comes from a Providers Electronic Health Record (EHR) system and is stored in the IMR. As data is stored and viewable from all different practices throughout Vermont, it is imperative that data be as accurate as possible to ensure the best delivery of care.

The guide is broken out into best practices related to Patient Demographics and Immunization Information. Tables reflect how codes should be mapped and standardized within your own system.

This guide was developed in conjunction with the Vermont HL7 Implementation Guide and should be referred to in order to understand and meet all the required and expected fields within a successfully consumed HL7 message.

Important:

If you enter a test record into your production EHR for any reason, it may be imported into the Immunization Registry. This is a serious problem. We work hard to keep our data clean and accurate, and free of duplicate records. Sending test records, or “fake” records into our system inflates the number of individuals – and can lead to lower vaccine coverage rates for your practice.

1. Talk with your EHR vendor about the consequences of entering “test” data into a production EHR.
2. Unless your vendor has designed a way to flag “test” data and prevent it from being included in production reports and HL7 feeds, **test data should never be entered into a production EHR**. Simply naming the person “test” or an agreed upon pseudonym does not suffice.

3. If “test” data in a production EHR cannot be avoided, arrangements will need to be made in advance with VITL and VDH such that “test” data can be identified and captured before it is added to the Vermont Immunization Registry. Please contact the VDH support team at (888) 688-4667 or by email imr@vermont.gov and contact VITL via <http://myvitl.net>.

Patient Demographics

The Health Information Exchange will be sending and receiving information from many different sources, including Vital Records (birth certificate data), hospitals, and provider practices. In order to make it easier to find a patient record, make sure you are entering the correct name into your EHR system. For example, you may know a patient by his nickname of TJ, but if he is in other systems under his birth name of Thomas James, it will be difficult to match up, hence causing a duplicate, incomplete record.

Below are some best practices when entering demographic information into your EHR to ensure that data is matched up correctly and is displayed accurately.

Patient Naming Conventions Best Practices

- ✓ Always use the patient’s **legal** First and Last Name.
 - Examples: A legal name of Nicholas should not be shortened to Nick; a last name of Smith-Jones should not be shortened to Smith.
- ✓ The First Name field should always contain a valid first name.
 - Examples: Avoid using ‘Baby’ Smith, ‘BabyBoy’ Jones, ‘nbjane’ Doe
- ✓ Do not put comments within the First or Last Name field.
 - Examples: putting in ‘duplicate’, ‘transferred’, ‘see other record’.
- ✓ A Middle Initial should be captured in its own separate field and not collapsed into the First Name field of the patient
 - Example: JaneD Smith should be Jane D. Smith
- ✓ A Suffix should be captured in its own separate field and not be collapsed into either the First Name or Last Name field. The following lists valid Suffixes that will process within the message:
 - JR, SR, I, II, III, IV, V, VI, VII, VIII, IX, X

Why will entering this information accurately be helpful for you?

- **Minimize duplicates**
 - Reduce instances where the same patient appears multiple times, but under slightly different variations of a name, making it easier to identify which patient to view and less risk of choosing the wrong patient.
- **Create one comprehensive record**
 - Minimize the chance of records not matching up and creating multiple records with fragmented information, increasing time spent searching each individual record in order to give the correct immunizations.
- **Bi-Directional Flow**
 - Eventually our systems will be able to 'talk' to one another, moving records to another entity with a click of a button. Accurate information will simplify this flow from one office to another making it easier to exchange data amongst one another.

Address/Phone Number Information Best Practices

- ✓ The zip code **MUST** be filled in and be a 5-digit code. It must match the accurate state and city affiliation, or the message will be rejected. If a 9-digit zip is provided the hyphen must be included.
- ✓ The city must be accurately spelled out or the message will get rejected. Avoid using abbreviations in the city field. If an abbreviation needs to be used, it must be a USPS approved one. Use the USPS Look Up Tool for assistance:
https://tools.usps.com/go/ZipLookupAction_input.
- ✓ The area code should be entered into each record and as a 3-digit code.

Other Gold Standard Best Practices

Below reflects additional fields that are not required in the HL7 message, but are extremely helpful in patient matching and additional statistics that may be run.

Entering Mother's Maiden Name

This field can be very helpful for patient matching. Names change as mothers marry and divorce, but including this field gives a helpful constant.

Entering Race

This field can be helpful for statistics and is strongly recommended by CDC on a national level. The table below reflects the codes to be sent within the HL7 message.

Race Description	Race Code
White	2106-3
Black or African American	2054-5
American Indian or Alaska Native	1002-5
Asian	2028-9
Native Hawaiian or Other Pacific Islander	2076-8
Other	2131-1

Entering Ethnicity

This field can be helpful for statistics and is strongly recommended by CDC on a national level. The table below reflects the codes to be sent within the HL7 message.

*NOTE: Codes H, N, U are only accepted for backward compatibility.

Ethnicity Description	Ethnicity Code
Hispanic or Latino	2135-2
Not Hispanic or Latino	2186-5
Unknown	UNK

Immunization Information

Accurate immunization coding and populating within an EHR system will create a successful 'gold standard' HL7 message. The immunization portion of the message is used to enable certain functionality and reporting within the IMR, such as the Vaccine Forecaster, Reminder/Recall and Vaccine Administered Reports.

Below are some best practices when entering immunization information into your EHR to ensure that data is displayed accurately, and the message is successfully consumed.

CVX Codes Best Practices

All successful HL7 messages must contain a valid CVX code. A CVX code is defined as a numeric string, which represents the type of product used in an immunization. Every immunization that uses a given type of product will have the same CVX, regardless of who received it. As such, it is not easy to determine which CVX code to choose when setting up an EHR or when entering an immunization. Hib vaccine, for instance, has 10 different CVX codes.

Below are tables that display the CVX code and current CPT to help with ensuring that the correct CVX code is sent. The titles have been color-coded to reflect the following:

- **Green:** active/current immunizations codes that should be sent in an HL7 message.
- **Orange:** advise caution when sending these inactive codes. These should not be used when sending current immunizations, only historical.
- **Red:** please do not send these codes.

Immunizations Currently Distributed in VT

Below is a list of the vaccines currently distributed in Vermont through the Vaccines for Children (VFC) or Vaccines for Adults (VFA) programs. If you receive subsidized vaccine through these programs, these are the codes to choose.

Immunization Name	CVX Code	CPT Code	Brand Name
COVID-19, mRNA, LNP-S, 100 mcg/0.5mL	207	91301	Moderna COVID-19 Vaccine
COVID-19, mRNA, LNP-S, 30 mcg/0.3mL	208	91300	Pfizer COVID-19 Vaccine
COVID-19, vector-nr, rS-ChAdOx1, 0.5mL	210	91302	AstraZeneca COVID-19 Vaccine
COVID-19, vector-nr, rS-Ad26, 0.5mL	212	91303	Janssen COVID-19 Vaccine
DTaP	20	90700	Infanrix
DTaP, 5 pertussis antigens	106	90700	Daptacel
DTaP-Hep B-IPV	110	90723	Pediarix
DTaP-IPV	130	90696	Kinrix or Quadracel
DTaP-IPV/Hib	120	90698	Pentacel
Hep A, Adult	52	90632	Havrix-Adult or Vaqta-Adult
Hep A, Ped/Adol, 2 dose	83	90633	Havrix-Peds or Vaqta-Peds
Hep A-Hep B, Adult	104	90636	Twinrix
Hep B, Adult	43	90746	Engerix-B-Adult or Recombivax-Adult
Hep B, Ped/Adol	08	90744	Engerix-B-Peds or Recombivax-Peds
HepB (Recombinant) Adjuvanted	189	90739	Hepelisav-B
Hib-OMP	49	90647	PedvaxHib
Hib-PRP-T	48	90648	ActHib or Hiberix
HPV-9	165	90651	Gardasil 9
Influenza, IIV4, p-free	150	90686	Fluarix or Flulaval or Fluzone
Influenza, IIV4, MDCK, p-free	171	90674	Flucelvax
Influenza, LAIV4, Intranasal	149	90672	Flumist
MCV4, Meningococcal conjugate	114	90734	Menactra
MCV40, Meningococcal Oligo	136	90734	Menveo
Meningococcal B, OMV	163	90620	Bexsero
Meningococcal B, recombinant	162	90621	Trumemba
MMR	03	90707	MMR II
MMRV	94	90710	ProQuad
PCV-13, Pneumococcal conjugate	133	90670	Prennar 13
PPV23, Pneumococcal polysaccharide	33	90732	Pneumovax 23
Polio, IPV	10	90713	IPOL
Rotavirus, 2 dose, RV1	119	90681	Rotarix
Rotavirus, 3 dose, RV5	116	90680	Rotateq
Td, Adult, 2 Lftt preservative free	09	90714	TDVAX
Tdap	115	90715	Adacel or Boostrix
Varicella	21	90716	Varivax
Zoster, Shingrix	187	90750	Shingrix

Additional Codes Currently Accepted

Below are additional codes that are currently accepted in Vermont. This table also includes some of the more rarely administered immunizations that are not part of the usual schedule but may have been given to a patient. Your EHR system should accommodate these codes as well.

Immunization Name	CVX Code	CPT Code(s)
Adenovirus types 4 and 7	143	-
Anthrax	24	90581
Anthrax immune globulin	181	-
BCG	19	90585
Botulinum Antitoxin	27	90287
Cholera, live attenuated	174	90625
CMVIG	29	90291
Dengue Fever	56	-
Diphtheria Antitoxin	12	90296
DT (pediatric)	28	90702
DTaP-Hib	50	90721
DtaP,IPV,Hib,HepB	146	90697
HBIG	30	90371
Hep B, adolescent/adult, 2 dose schedule	43	90743
Hep B, dialysis, 3 dose	44	90747
Hep B, dialysis, 4 dose	44	90740
HPV, Quadrivalent	62	90649
IG	86	90281
IGIV	87	90283
Influenza, High Dose, IIV3	135	90662
Influenza, IIV3	141	90657 (.25ml); 90658 (.5ml)
Influenza, IIV3, adjuvanted	168	90653
Influenza, IIV3, p-free	140	90655 (.25ml); 90656 (.5ml)
Influenza, aIIV4, adjuvanted, p-free	205	90694
Influenza, High Dose, IIV4	197	90662
Influenza, IIV4	158	90687 (.25ml); 90688 (.5ml)
Influenza, IIV4 Pediatric, p-free	161	90685
Influenza, IIV4, MDCK	186	90756
Influenza, IIV4, Recombinant, p-free	185	90682
Influenza, IIV4, Southern Hemisphere	202	-
Influenza, IIV4, Southern Hemisphere, p-free	201	-
Influenza, IIV4, Southern Hemisphere, Ped, p-free	200	-
Influenza, Intradermal, IIV3, p-free	144	90654
Influenza, Intradermal, IIV4, p-free	166	90630
Influenza A monovalent (H5N1), ADJUVANTED-2013	160	-
AS03 Adjuvant (for H5N1 vaccine)	801	-
Japanese Encephalitis IM	134	90738
Meningococcal ACWY TT conjugate	203	90619

Meningococcal polysaccharide, MPSV4	32	90733
Rabies – IM Diploid cell culture	175	90675
Rabies – IM fibroblast culture	176	90675
Rho(D)-IG, IM	157	90384, 90385
Rho(D)-IG (IM or IV)	156	90386
RIG	34	90375, 90376
RSV-IGIV	71	90379
RSV-Mab	93	90378
Rubella	06	90706
Rubella-Mumps	38	-
Smallpox monkeypox	206	-
Td, Adult, preservative free (5 Lftt)	113	-
Td, Adult, not adsorbed	138	-
Tetanus toxoid, adsorbed	35	90703
Tetanus toxoid, not absorbed	142	-
TIG	13	90389
Typhoid, oral	25	90690
Typhoid, ViCPs	101	90691
Vaccinia immune globulin	79	90393
Vaccinia, smallpox	75	-
VZIG	36	90396
Yellow Fever	37	90717
Yellow Fever alternative formulation	183	-
Zoster, Zostavax	121	90736

Historical Codes

Below are inactive codes that should only be used when entering a past immunization. They should never be used when entering in an immunization being administered today.

Immunization Name	CVX Code	CPT Code
Adenovirus, type 4	54	90476
Adenovirus, type 7	55	90477
Cholera	26	90725
Cholera, BivWC (non-US)	173	-
Cholera, WC-rBS (non-US)	172	-
DTaP-IPV-Hib-HepB, historical	132	-
DT, IPV absorbed (non-US)	195	-
DTP	01	90701
DTP-hepB-Hib Pentavalent (non-US)	198	-
DTP-Hib	22	90720
DTP-Hib-Hep B (non-US)	102	-
Hep A, ped/adol, 3 dose	84	90634
Hep B, adolescent/high risk infant	42	90745
Hep A-Hep B ped/adol (non-US)	193	-
Hib - HbOC	47	90645

Hib - PRP-D	46	90646
Hib-Hep B	51	90748
HPV, bivalent	118	90650
Influenza, IIV3, MDCK, p-free	153	90661
Influenza, inactive [retired code]	15	-
Influenza, LAIV3, Intranasal	111	90660
Influenza, whole	16	90659
Japanese Encephalitis SC	39	90735
Lyme disease	66	90665
Measles	05	90705
Measles-Rubella, M/R	04	90708
Meningococcal C/Y-HIB PRP	148	90644
Meningococcal A polysaccharide (non-US)	191	-
Meningococcal AC polysaccharide vaccine (non-US)	192	-
Mumps	07	90704
Novel Influenza-H1N1-09	127	90668
Novel Influenza-H1N1-09, all formulations	128	90663
Novel Influenza-H1N1-09, nasal	125	90664
Novel influenza-H1N1-09, p-free	126	90666
OPV, bivalent (non-US)	178	-
OPV, trivalent (US)	02	90712
PCV10 (non-US)	177	-
Plague	23	90727
PCV7, Pneumococcal conjugate	100	90669
Rabies, intradermal injection	40	90676
Rabies, intramuscular [retired code]	18	-
Rotavirus, tetravalent	74	-
Typhoid, parenteral, H-P	41	90692
Typhoid, parenteral, AKD (U.S. military)	53	90693
Typhoid conjugate (non-US)	190	-

Non-Specific Formulations

Below is a table of codes that should rarely be sent in an HL7 message. These codes could impact how a provider continues to immunize a patient and are not specific enough to enable the IMR forecaster to predict the next scheduled immunization correctly.

Immunization Name	CVX Code	CPT Code
Adenovirus, unspecified formulation	82	-
COVID-19, unspecified	213	-
DTaP, unspecified formulation	107	-
Hep A, pediatric, unspecified formulation	31	-
Hep A, unspecified formulation	85	90730
Hep B, unspecified formulation	45	90731
Hib, unspecified formulation	17	90737
HPV, unspecified formulation	137	-

IG, unspecified formulation	14	90741
Influenza, unspecified formulation	88	90724
Influenza nasal, unspecified formulation	151	-
Influenza, Southern Hemisphere, unspecified formulation	194	-
Japanese Encephalitis, unspecified formulation	129	-
Meningococcal, unspecified formulation	108	-
Meningococcal B, unspecified formulation	164	-
Meningococcal MCV4, unspecified formulation	147	-
OPV, unspecified formulation	182	-
OPV, monovalent, unspecified formulation (non-US)	179	-
Pneumococcal, unspecified formulation	109	-
Pneumococcal Conjugate, unspecified formulation	152	-
Polio, unspecified formulation	89	-
Rabies, unspecified formulation	90	90726
Rotavirus, unspecified formulation	122	-
Td(adult), unspecified formulation	139	-
Td, adsorbed, preservative free, adult use, Lf unspecified	196	-
Tetanus toxoid, unspecified formulation	112	-
Typhoid, unspecified formulation	91	-
Yellow Fever, unspecified formulation	184	-
Zoster, unspecified formulation	188	-

Other Gold Standard Immunization Best Practices

Below reflects additional fields that are extremely helpful in vaccine ordering, reminder/recall, adverse reactions, and running IMR reports.

Entering VFC Eligibility

VFC Eligibility is a required field for HL7 for patients **under the age of 19** when entering in **current** immunizations. If the VFC status is not entered for each current immunization administered to that age group, the immunization will be considered historical and information stored for that immunization will only include Date of Administration, CVX Code and Lot Number.

In addition, VFC Eligibility will correctly identify an immunization as publicly supplied or privately purchased. These statistics help the Immunization Program determine how much supply is needed to immunize the under 19 population.

The table below reflects the VFC Eligibility codes to be sent within the HL7 message.

VFC Code	VFC Status
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/Underinsured
V07 *	SCHIP (not VFC eligible)

*NOTE: V07 is only accepted for backward compatibility

Entering Immunization Lot Number and Expiration Date

Entering this information reflects a current immunization and can be invaluable in times of recall. Patients can be notified and appropriate action taken to revaccinate, if required. These fields are strongly recommended by CDC on a national level.

Entering Immunization Manufacturer

This field is sent using an MVX code and should always be filled in when entering a lot number. The table below represents the valid codes to be sent within the HL7 message.

Manufacturers Name	MVX Code
Abbott Laboratories	AB
Adams Laboratories, Inc.	AD
Akorn, Inc	AKR
Alpha Therapeutic Corporation	ALP
AstraZeneca	ASZ
Barr Laboratories	BRR
Bavarian Nordic A/S	BN
Baxter Healthcare Corporation	BAH
Berna Products Corporation	BPC
Biotest Pharmaceuticals Corporation	BTP
bioCSL	CSL
Crucell	CRU
Dispensing Solutions	DSI
Dynaport	DYN
Dynavax, Inc.	DVX
DynPort Vaccine Company, LLC	DVC
Emergent BioSolutions	MIP
GeoVax Labs, Inc.	GEO
GlaxoSmithKline	SKB
Greer Laboratories, Inc.	GRE
Grifols	GRF
ID Biomedical	IDB
Immuno-U.S., Inc.	IUS
Intercell Biomedical	INT
Janssen	JSN
Johnson and Johnson	JNJ
Kedrian Biopharma	KED
Korea Green Cross Corporation	KGC
Massachusetts Biologic Laboratories	MBL
MCM Vaccine Company	MCM
MedImmune, Inc. (AstraZeneca)	MED
Merck & Co., Inc.	MSD
Moderna US, Inc.	MOD
NABI	NAB
New York Blood Center	NYB

Novartis Pharmaceutical Corporation	NOV
Novavax, Inc.	NVX
Organon Teknika Corporation	OTC
Ortho-clinical Diagnostics	ORT
Other manufacturer	OTH
PaxVax	PAX
Pfizer, Inc	PFR
Protein Sciences	PSC
Rebel Distributors	REB
Sanofi Pasteur	PMC
Sclavo, Inc.	SCL
Seqirus	SEQ
Talecris Biotherapeutics	TAL
The Research Foundation for Microbial Diseases of Osaka University (BIKEN)	JPN
TEVA Pharmaceuticals USA	TVA
United States Army Medical Research and Material Command	USA
Unknown manufacturer	UNK
Valneva	VAL
Vetter Pharma Fertigung GmbH & Co. KG	VET
Wyeth	WAL

Entering Route

This field is strongly recommended by CDC on a national level. The table below reflects the codes to be sent within the HL7 message.

Administration Route	Accepted Route Code
Intradermal	ID
Intramuscular	IM
Intranasal	NS
Intravenous	IV
Oral	PO
Subcutaneous	SC
Transdermal	TD

Entering Administration Site

This field is strongly recommended by CDC on a national level. The table below reflects the codes to be sent within the HL7 message.

Administration Site	Accepted Site Code
Left Thigh	LT
Left Arm	LA
Left Deltoid	LD
Left Gluteus Medius	LG
Left Vastus Lateralis	LVL
Left Lower Forearm	LLFA

Right Arm	RA
Right Thigh	RT
Right Vastus Lateralis	RVL
Right Gluteus Medius	RG
Right Deltoid	RD
Right Lower Forearm	RLFA

Sending All Immunizations Entered

If a patient is new to the practice, immunizations given elsewhere should be entered – because the full immunization history is important for determining which immunizations to administer. These are important to the Immunization Registry as well.

When sending immunization data, it is important to ensure that all immunizations entered into the EHR are going to be sent via HL7. Though not all systems may have this capability, when sending real-time data, this means sending both the immunizations **administered** today AND the immunizations **entered** today that were given in the past. If able, please be sure all immunizations entered into the system today are sent, not just those you administered.