



CAIR2 HL7 v2.5.1

VXU Implementation Guide

California Immunization Registry

Version 4.0

Consistent with

*HL7 Version 2.5.1 Implementation Guide
for Immunization Messaging, Release 1.5*

September 2024

Revision History

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CAIR Data Exchange Contact Information

For data exchange questions and support, please email CAIRDataExchange@cdph.ca.gov.

To get the latest information regarding data exchange with CAIR2, please visit the [Data Exchange Page](#) on the CAIR website.

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Overview

The [California Immunization Registry \(CAIR2\)](#) is a secure, confidential, statewide computerized immunization information system for California residents. The goal of CAIR2 is to improve immunization rates for all California children through an innovative public-private partnership. CAIR2 is a collaborative effort involving regional immunization registry services, with the support of their local health departments, the California Department of Public Health Immunization Branch, and a spectrum of key stakeholders across the state.

Participation in CAIR2 is open to healthcare providers, schools, childcare facilities, county welfare departments, family childcare homes, foster care agencies, WIC service providers, and health care plans. To participate, users must sign a confidentiality agreement stating they will maintain the confidentiality of the patient immunization information and will only use the information to provide patient care or to confirm that childcare or school immunization requirements have been met.

This specification document was written as an “easy to read and implement” guide. The finer details and explanations of HL7 have been simplified. The guide is intended to provide the necessary information for the exchange of immunization records between CAIR2 and external health providers.

The recommendations listed in this implementation guide are in line with the CDC document [HL7 Version 2.5.1: Implementation Guide for Immunization Messaging, Release 1.5](#).

All tables referenced in this guide can be found in the appendix of the CDC implementation guide linked above.

California Assembly Bill 1797 (AB1797)

As of January 1, 2023, healthcare providers who administer vaccines or/and offer TB tests **will be required** to enter:

- Immunization information into CAIR2 (or [Healthy Futures/RIDE](#))
- Race and ethnicity information for each patient in the immunization registry
- TB test results (in development)

For more information on AB1797 and CAIR2, please visit the [AB1797 FAQ](#) page.

Bi-Directional Capability – QBP/RSP

CAIR2 supports real-time immunization record query messages (QBP) and will return immunization histories or immunization histories plus forecasting in a response file (RSP).

The CAIR2 [BiDX Implementation Guide](#) can be downloaded from the CAIR website.

Sites interested in BiDX are required to complete an online [CAIR2 Bidirectional Interest/Readiness survey](#) as a first step in the BiDX onboarding process.

To get the most value from the BiDX process, each site should consider submitting all active patient historical doses to CAIR2 so that patient vaccination recommendations returned to your EHR will be correct. Consult with one of our [CAIR2 Data Exchange Specialists](#) about submitting prior immunizations records (historical data) for your active patients.

Sending VXU Data to CAIR

CAIR2 accepts unsolicited HL7 v2.5.1 vaccination record updates (VXU) in real time. CAIR2 uses SOAP web services as the transport mechanism. Details regarding the SOAP format can be found in the [CAIR2 VXU Test Plan](#) located on the [Data Exchange Tech Support Page](#).

Requirements for Inventory Decrementing in CAIR2

Provider sites can have vaccine doses decrement from inventory in CAIR2 through data exchange. For the inventory to decrement correctly in CAIR2, inventory with matching lot number and vaccine eligibility need to exist in CAIR2. The following fields in the HL7 message must be populated accurately. See details beginning on page 37.

Segment / Field	Data Element	Comments
MSH-22.1	Responsible Sending Org	CAIR2 Org Code in MSH-22.1, must match the CAIR2 Org Code of the site where the vaccine inventory will be drawn from.
RXA-5.1	Administration Code	Vaccine code submitted must match vaccine in the CAIR2 inventory
RXA-9.1	Administered Notes	Must be coded as a given shot. Not historical.
RXA-11.4	Administered-at Location	CAIR2 Org Code in this field must match the CAIR2 Org Code in MSH-22.1.
RXA-15	Substance Lot Number	Vaccine lot number sent must match lot number in CAIR2 inventory

Segment / Field	Data Element	Comments
RXA-17	Manufacturer Code	Manufacturer code must be the correct MVX code for the vaccine submitted
RXA-20	Completion Status	Must be 'CP', 'PA', or empty.
RXA-21	Action Code	Must be 'A' or 'U'
OBX-5.1	Observation Value	VFC Funding Eligibility Category and Vaccine Funding Source code sent in this field must match with the eligibility category of the vaccine lot in the CAIR2 inventory

Note: By default, the inventory decrementing feature for all CAIR2 sites is set to 'NO'. Sites wishing to use the inventory decrementing feature in CAIR2 must contact and coordinate with a Data Exchange Specialist at CAIR before the decrementing feature is activated.

HL7 VXU File Format and Content

Unsolicited Vaccination Update (VXU)

All immunization messages should be sent as a VXU type HL7 message. Regardless of whether the message contains a new record or an update to an existing record, CAIR2 requires a full VXU message to be sent with all required fields populated. A full VXU message should be generated by the sending system for any updates to existing patient records, and should contain all required segments, components, and subcomponents of a full message.

VXU Message Structure (Ignored segments not shown)

Segment	Cardinality	Description	Usage	Notes
MSH	[1..1]	Message Header	R	Every message begins with an MSH.
PID	[1..1]	Patient Identification	R	Every VXU requires one PID segment.
PD1	[1..1]	Patient Additional Demographics	R	Every PID segment must have one PD1 segment. Required for CAIR Disclosure information.
[[NK1]]	[0..*]	Next of Kin/Associated Parties	RE	PID segment in a VXU may have zero or more NK1 segments.
{			R	Begin Order Group – Each VXU must contain at least one Order Group
ORC	[1..*]	Order Request	R	Each RXA requires exactly one ORC
RXA	[1..1]	Pharmacy/Treatment Administration	R	Each ORC requires exactly one RXA
[RXR]	[0..1]	Pharmacy/Treatment Route	RE	Every RXA segment in a VXU may have zero or one RXR segment.
[[OBX]]	[0..*]	Observation/Result	RE	Every RXA segment in a VXU may have zero or more OBX segments.
}				End order segment

Note: [XYZ] Square brackets enclose optional segments

{XYZ} Curly brackets enclose segments which can be repeated

[[XYZ]] Defines an optional segment which can be repeated

Sample VXU Message

The following sample message contains one RXA segment. The CAIR2 provider Org Code (and sending ID) is identified as DE-000001 and the data is coming from the provider's internal system called MyEMR. The file was sent on July 30, 2023. The file is using HL7 version 2.5.1 and the message ID is CA0001. The patient is George M. Jones, Jr., a white male with a patient ID of PA123456 and a birth date of 02/27/2014. His mother's maiden name is Martha G. Miller. His address is 1234 W First St in Beverly Hills, CA, 90210. His home number is 555-555-5555. His mobile number is 555-222-3333. His primary language is English, and he is the second child in a multiple birth.

The publicity code is set for reminder/recall, any method, and his protection indicator is set to N, with an effective date of 7/30/2023. His mother is the identified guardian in the record, and her married name is the same as the patient's.

One vaccination record is recorded, a new immunization of Tdap given by the primary provider on 7/30/2023 with a dosage amount of .5 mL and a lot number of 0039F. The vaccine lot expires on 05/31/2025. The manufacturer is GlaxoSmithKline and the vaccination was recorded as a completed shot (CP) and is marked as an "add" or new record. The vaccine was given as intramuscular in the left arm of the patient. The immunization was ordered by Jimmy Brown, MD, administered by Janet Smith, PA, and Dave Clark entered the information into the EMR (MyEMR). The patient is VFC eligible, and the patient's VFC eligibility status is uninsured. Funding Source is Public-VFC.

Here is the sample HL7 message created from the above narrative. Note that indentation has been added to each segment for readability.

```
MSH|^~\&|MyEMR|DE-000001| |CAIR2|20230730123030-
0700||VXU^V04^VXU_V04|CA0001|P|2.5.1|||ER|AL|||Z22^CDCPHINVS|DE-000001
PID|1||PA123456^^^MYEMR^MR||JONES^GEORGE^M^JR^^L|MILLER^MARTHA^G^^^M|20140227|M||2
106-3^WHITE^CDCREC~2040-4^KOREAN^CDCREC|1234 W FIRST ST^^BEVERLY
HILLS^CA^90210^^H|^PRN^PH^^^555^555555~^PRN^CP^555^2223333~^NET^Internet^noemail@noe
mail.com||ENG^English^HL70296|||2186-5^not Hispanic or Latino^CDCREC||Y|2
PD1|||||||02^REMINDER/RECALL – ANY METHOD^HL70215|N|20230730|||A|20140730|
NK1|1|JONES^MARTHA^^^L|MTH^MOTHER^HL70063|1234 W FIRST ST^^BEVERLY
HILLS^CA^90210^^H|^PRN^PH^^^555^555555|
ORC|RE||197023^CMC||||^Clark^Dave||1234567890^Brown^Jimmy^^^^^NPPES^L^^^NPI^^^^^^^M
D
RXA|0|1|20230730||58160-0842-52^Tdap^NDC^115^Tdap^CVX|0.5|mL^mL^UCUM||00^NEW
IMMUNIZATION RECORD^NIP001|1234567890^Smith^Janet^^^^^NPPES^^^^^NPI^^^^^^^PA|^DE-
000001|||0039F|20250531|SKB^GlaxoSmithKline^MVX|||CP|A
RXR|C28161^INTRAMUSCULAR^NCIT|LA^LEFT ARM^HL70163
OBX|1|CE|64994-7^Vaccine funding program eligibility category^LN|1|V03^VFC eligibility –
Uninsured^HL70064|||F||20230730140500
OBX|2|CE|30963-3^VACCINE FUNDING SOURCE^LN|1|VXC51^Public-VFC^CDCPHINVS|||F
```

Master Field List

The Master Field List shows every field accepted by CAIR2 in one table. For more details on each field see the documentation under the segment and field description sections following this table. Use this table as a quick reference but read the expanded segment documentation for more complete information. A few pointers on reading the table:

Usage column code interpretations:

- **R – Required:** A conforming sending application shall populate all “R” elements with a non-empty value
 - **RE – Required, but may be empty:** The element may be missing from the message, but must be sent by the sending application if there is relevant data. If the sending application does not know the required values, then that element may be omitted. As a general rule, if an “RE” field is left empty, a warning will be returned back to the submitter in the ACK. Warnings will not prevent the immunization from posting in CAIR.
 - **O – Optional:** CAIR may read or use the information but does not require it to be sent.
 - **C – Conditional:** The usage code has an associated condition predicate that determines the operational requirements (usage code) of the element.
- **All HL7 Code Tables referenced in this document are from the CDC document *HL7 Version 2.5.1 Implementation Guide for Immunization Messaging v1.5*.** The most recent version can be viewed or downloaded from the [CDC’s IIS Technical Guide web page](#).
 - The order of the segments in the table aligns with the standard VXU message structure

Segment / Field	Data Element	Usage	HL7 Code Table	Comment
MSH-1	Field Separator	R		Required value is
MSH-2	Encoding Characters	R		Required values ^~\&
MSH-4	Sending Facility	R		Required in MSH segment. Sending facility ID supplied by CAIR.
MSH-6	Region Code	RE		Region Code Value = “CAIR2”
MSH-7	Date/time of message	R		
MSH-9	Message type	R		VXU^V04^VXU_V04

Segment / Field	Data Element	Usage	HL7 Code Table	Comment
MSH-10	Message control ID	R		Used to tie acknowledgement to message
MSH-11	Processing ID	R		Required by HL7. Constrain to 'P' . Empty field or any other value will cause the message to be rejected.
MSH-12	HL7 Version ID	R	HL70104	Version 2.5.1 only.
MSH-15	Accept Acknowledgement Type	RE	HL70155	
MSH-16	Application Acknowledgement Type	RE	HL70016	If blank, MSH-16 defaults to 'ER' .
MSH-21	Message Profile Indicator	RE		Z22^CDCPHINVS expected.
MSH-22	Responsible Sending Org	C(R/RE)		Value of MSH-22 should be the CAIR2 Org Code of the 'Sending Responsible Organization' who administered the immunization (in most cases, use the RXA-11.4 value). If MSH-22 is empty, the value in RXA-11.4 will be used as the 'sending responsible organization'. If both MSH-22 and RXA-11.4 are empty, the VXU will return a fatal error.
PID-3	Patient ID	R		This is the patient ID from the provider's system, commonly referred to as medical record number. CAIR2 only accepts type codes, 'MR' , 'PI' , 'PN' , 'PRN' , or 'PT' .
PID-5	Patient Name	R		Each name field has a 50-character length limit in CAIR2. Must be > one character in length or the message will fail.
PID-6	Mother's Maiden Name	RE		Used in the matching algorithm.
PID-7	Date of Birth	R		YYYYMMDD
PID-8	Sex	R	HL70001	'M' , 'F' , 'X' or 'U' only.
PID-10	Race	RE	HL70005	Required by CA AB1797 law. Empty value will return a warning.

Segment / Field	Data Element	Usage	HL7 Code Table	Comment
PID-11	Patient Address	RE		Empty values will return a warning.
PID-13	Home Phone Number	RE		Home Phone, Cell Phone, and email address accepted. Cell phone and/or email address are required to obtain the Digital Vaccination Record .
PID-15	Primary Language	RE	HL70296	Only ENG and SPA are accepted in CAIR2 currently.
PID-22	Ethnic Group	RE	HL70189	Used to further identify race as Hispanic or non-Hispanic. Required by CA AB1797 law. Empty value will return a warning.
PID-24	Multiple Birth Indicator	RE	HL70136	'Y', 'N', or blank. Empty value is treated as 'N' in CAIR.
PID-25	Birth Order	C(R/O)		If PID-24 = 'Y' a birth order number (1, 2, 3, etc...) must be entered.
PID-29	Patient Death Date and Time	C(RE/X)		If PID-30 is valued 'Y'.
PID-30	Patient Death Indicator	RE	HL70136	Field indicates whether the patient is deceased. Values are either 'Y', 'N', or empty.
PD1-11	Publicity Code	RE	HL70215	Indicates reminder/recall intentions. A blank value will default to 'Y' in CAIR.
PD1-12	Protection Indicator	R		'Y' or 'N'. Indicates whether patient data should be 'locked' from view of CAIR2 providers outside of the facilities that provided immunizations to the patient.
PD1-13	Protection Indicator Effective Date	C(R/O)		Required if PD1-12 is supplied.
PD1-16	Immunization Registry Status	RE	HL70441	Status of the patient in relation to the sending provider organization.
PD1-17	Immunization Registry Status Effective Date	C(RE/X)		Date for the registry status reported in PD1-16. If PD1-16 is valued.
NK1-1	Set ID	R		Empty value will cause the NK1 segment to be ignored.
NK1-2	Next of Kin Name	R		Name of next of kin or associated party.

Segment / Field	Data Element	Usage	HL7 Code Table	Comment
NK1-3	Relationship	R	HL70063	Personal relationship that the next of kin or associated party has to the patient.
NK1-4	Address	RE		Primary address of next of kin.
NK1-5	Phone Number	RE		Home or Cell phone and/or email address of next of kin.
ORC-1	Order Control	R		Constrain to "RE".
ORC-2	Placer Order Number	RE		Uniquely identifies the order among all orders sent by a provider organization.
ORC-3	Filler Order Number	RE		Uniquely identifies the order among all orders sent by a provider organization that filled the order.
ORC-10	Entered By	RE		This is the person that entered the immunization record into the system.
ORC-12	Ordering Provider	RE		The name of the provider ordering the immunization. It is expected to be empty if the immunization record is transcribed from a historical record. Only one repetition is allowed in this field.
ORC-17	Entering Organization	RE		If populated, use CAIR2 Org Code in ORC-17.1
RXA-1	Give Sub-ID counter	R		Constrain to '0' (zero).
RXA-2	Administration Sub-ID counter	R		Constrain to '1' (one).
RXA-3	Date/Time Start of Administration	R		YYYYMMDD
RXA-5	Administration Code	R		CVX or NDC codes accepted. Sending both NDC and CVX codes together in the RXA-5 field is accepted. Ten and 11-digit NDC codes, with or without dashes, are accepted. Both Unit of Use and Unit of Sale accepted.

Segment / Field	Data Element	Usage	HL7 Code Table	Comment
RXA-6	Administered Amount	C(R/O)		Required for all given doses. If the amount is unknown, then the value '999' must be placed in this field. Comma separators are not allowed in this field.
RXA-7	Administered Units	C(R/X)		If RXA-6 is supplied, unit value should be 'mL^mL^UCUM'.
RXA-9	Administered Notes	C(R/O)	NIP001	Indicates historical or given shot. A value of '00' in 9.1 is required for inventory decrementing. An empty value translates to 'historical' in CAIR2.
RXA-10	Administering Provider	C(RE/O)		The person who administered the shot. Required If RXA-9.1 = '00' and RXA-20 is valued at 'CP' or 'PA'.
RXA-11	Administered-at Location	C(R/O)		CAIR2 org code of the location where the shot was administered. CAIR2 org code supplied by CAIR. If RXA-9.1 = '00' then this field is required. If MSH-22 is empty, RXA-11.4 must be populated with a valid CAIR2 Org Code.
RXA-15	Substance Lot Number	C(RE/O)		If RXA-9.1 = '00' and RXA-20 is valued at 'CP' or 'PA', substance lot number must be supplied. Required for inventory decrementing.
RXA-16	Substance Expiration Date	C(RE/O)		If RXA-9.1 = '00' and RXA-20 is valued at 'CP' or 'PA'.
RXA-17	Substance Lot Mfr Name	C(RE/O)	HL70227	If RXA-9.1 = '00' and RXA-20 is valued at 'CP' or 'PA'. MVX code only. Required for inventory decrementing.
RXA-18	Substance/Treatment Refusal Reason	C(R/X)	NIP002	If RXA-20 is valued 'RE'.
RXA-20	Completion Status	RE	HL70322	Only complete records (CP) and Partial Administrations (PA) are processed. Empty value will be treated as ' CP '.
RXA-21	Action Code	RE	HL71224	Values ' A ', ' U ', and ' D ' accepted. Empty value will be treated as ' A '.

Segment / Field	Data Element	Usage	HL7 Code Table	Comment
RXR-1	Route	RE	HL70162	Route of the administration.
RXR-2	Administration Site	RE	HL70163	Body site of the administration route.
OBX-1	Set ID – OBX	RE		Sequence number of the OBX. First instance should be set to '1' (one).
OBX-2	Value Type	RE		Should be "CE" – coded element.
OBX-3	Observation Identifier	RE	NIP003	LOINC "64994-7" and "30963-3" accepted. All other OBX segments will be ignored as of this specification release.
OBX-4	Observation Sub-ID	RE		Required to group related OBX segments.
OBX-5	Observation Value	RE	HL70064	See table values in the OBX detailed section.
OBX-11	Observation Result Status	RE		Constrain to "F" for final.
OBX-14	Date/Time of the Observation	RE		MMDDYYYY

SEGMENT DETAILS

MSH: Message Header Segment

The Message Header (MSH) segment is required for each message sent. Multiple messages may be sent back-to-back. MSH segments separate multiple messages.

Position	Field Name	Status
1	Field separator	required
2	Encoding characters	required
3	Sending application	optional
4	Sending facility	required
5	Receiving application	ignored
6	Receiving facility	required, but may be empty
7	Date/time of message	required
8	Security	ignored
9	Message type	required
10	Message control id	required
11	Processing id	required
12	Version id	required
13	Sequence number	ignored
14	Continuation pointer	ignored
15	Accept acknowledgment type	required, but may be empty
16	Application acknowledgment type	required, but may be empty
17	Country code	ignored
18	Character set	ignored
19	Principal language of message	ignored
20	Alternate character set handling scheme	ignored
21	Message Profile Identifier	required, but may be empty
22	Sending Responsible Organization	required, but may be empty

MSH-1: Field separator

CAIR2 expects to receive standard character: '|'

NOTE: The CDC Immunization Guide requires senders to only use the standard character.

MSH-2: Encoding characters

CAIR2 expects standard encoding characters: ^~\&

NOTE: The CDC Immunization Guide requires senders to only use the standard characters.

MSH-4: Sending facility ID

The CAIR2 sending facility ID is assigned automatically after enrolling in the [CAIR Immunization Gateway Service \(IGS\) Portal](#). The sending facility ID will be sent to the Site in a secure email. Data submitters will place their assigned CAIR2 sending ID/Org Code in MSH-4. This assigned ID should be used for all messages sent.

Position	Field Name	Status
1	namespace id	required
2	universal id	ignored
3	universal id type	ignored

MSH-6: Receiving Facility

The receiving facility field was previously used by CAIR2 to route VXU data to the non-CAIR2 registries in California.

Position	Field Name	Status
1	namespace id	Use "CAIR2"
2	universal id	ignored
3	universal id type	ignored

MSH-7: Date/time of message

The date and time the message was created. This field is required.
The degree of precision must be at least to the second.

Format example: YYYYMMDDHHMMSS+/-ZZZZ

MSH-9: Message type

The type of message being sent.

Message type: VXU

Trigger event: V04

Message structure: VXU_V04

Position	Field Name	Status
1	message type	required
2	trigger event	required
3	message structure	required

MSH-10: Message Control ID

The Message Control ID is a unique id for the message that is generated by the sending system. This field is used to tie the acknowledgement to the message.

Format: STRING

MSH-11: Processing ID

Required by HL7. **Only value accepted is “P” for production. All other values will cause the message to be rejected.**

MSH-12: Version ID

Must be valued **2.5.1**

MSH-16: Application acknowledgment type

Indicates whether a response should be returned to the submitter, and if so, under what conditions. An empty MSH-16 will default to 'ER'. **CAIR recommends placing 'AL' in MSH-16.**

HL7-defined Table 0155 – Accept/Application Acknowledgment conditions.

Value	Description	Status	Result
AL	Always	accepted	ACK will be returned for all messages received
NE	Never	accepted	ACK will NEVER be returned (Not recommended)

ER	Error/Reject conditions only	accepted	MSA and ERR segments of the ACK will only be returned if the VXU contains an error.
SU	Successful completion only	accepted	Behavior is the same as submitting an 'AL'.

MSH-22: Sending Responsible Organization

The CAIR2 Org Code for the location that 'owns' the vaccination shall be sent in MSH-22.1. The CAIR2 Org Code in MSH-22.1 should match the value sent in RXA-11.4 of a given shot in the HL7 message. If the values do not match, the org code sent in MSH-22.1 will be used for the incoming vaccinations sent in the HL7 message and a warning message will be returned in the ACK indicating that RXA-11.4 and MSH-22.1 do not match.

For inventory decrementing in CAIR2, the value in MSH-22.1 will be the CAIR2 Org Code where the vaccine was administered. If MSH-22.1 is empty, the value will default to the CAIR2 Org Code sent in RXA-11.4. If there are multiple RXA segments, with multiple CAIR2 Org Codes in one message and MSH-22.1 is empty, the message will be rejected.

PID: Patient Identifier Segment

The Patient Identifier segment includes essential information for matching an incoming patient record to patient records previously sent by other providers.

Position	Field Name	Status
1	Set id	ignored
2	Patient id	ignored
3	Patient identifier list	required
4	Alternative patient id	ignored
5	Patient name	required
6	Mother's maiden name	required, but may be empty
7	Date/time of birth	required
8	Sex	required
9	Patient alias	ignored
10	Race	required, but may be empty
11	Patient address	required, but may be empty
12	County code	Ignored
13	Phone number – home/mobile	required, but may be empty

Position	Field Name	Status
14	Phone number - business	optional
15	Primary language	required, but may be empty
16	Marital status	ignored
17	Religion	ignored
18	Patient account number	ignored
19	SSN number - patient	ignored
20	Driver's license number - patient	ignored
21	Mother's identifier	ignored
22	Ethnic group	required, but may be empty
23	Birthplace	ignored
24	Multiple birth indicator	required, but may be empty
25	Birth order	C (R/O); if PID-24 is valued "Y"
26	Citizenship	ignored
27	Veterans' military status	ignored
28	Nationality	ignored
29	Patient death date and time	C (RE/X) If PID-30 is valued "Y"
30	Patient death indicator	required, but may be empty
31	Identify Unknown Indicator	ignored
32	Identity Reliability Code	ignored
33	Last Update Date/Time	optional
34	Last Update Facility	ignored
35	Species Code	ignored
36	Breed Code	ignored

NOTES: Patient Mapping in CAIR2

It is very important to provide as much demographic data on the patient as possible. The patient's name, date of birth, and sex are required fields. Additional information about the parents or guardians—in particular the birth mother name—as well as accurate current address are all used to identify patients. The more information provided, the better the matching process and the less likely it is that a duplicate patient record will be created.

The provider’s patient identifier is located in the PID segment, field 3. This is a required field. According to HL7 specification, this field can be repeated, meaning that the provider may send multiple identifiers along with their appropriate identifier types. CAIR2 will only accept patient IDs with an identifier type code of **MR** (medical record number), **PI** (patient internal identifier), **PN** (person number) **PRN** (provider number), or **PT** (patient external identifier). The identifier should be the one used in the provider’s EHR to uniquely identify patients. Other identifier types, including social security number or Medicare number are ignored. It is therefore recommended that the provider include only the accepted types of patient identifiers for each patient and to use that identifier type consistently for all patient records submitted. CAIR2 will store multiple patient identifiers in the patient record.

PID-3: Patient identifier list

This is the patient ID from the provider’s system, commonly referred to as the medical record number.

Warning: The sending system's patient ID is a required field. The message will be rejected if this ID is not sent or cannot be found in this field. The identifier type code in PID-3.5 is also required and if not submitted the message will be rejected.

Position	Field Name	Status
1	id	required
2	check digit	ignored
3	code identifying the check digit scheme employed	ignored
4	assigning authority	Required. If empty, a warning ACK will be returned.
5	identifier type code	required
6	assigning facility	ignored

Note: CAIR2 only accepts identifier type codes **MR** (*medical record number*), **PI** (*patient internal identifier*), **PN** (*person number*) **PRN** (*provider number*), or **PT** (*patient external identifier*) in PID-3.5. Repetitions are accepted in this field.

EX: |4568562^^^MYEHR^MR|

PID-5: Patient name

The legal name must be sent in the first repetition. The last, first, and middle names must be alpha characters only (A-Z). The last name or the given name should not contain the patient's suffix (e.g. JR or III). The given name should not include the patient's middle name or middle initial. These should be sent in their appropriate fields. Numbers, or characters such as “()”, “?”, “!”, etc.. are not allowed in name fields.

Hyphens (-) and apostrophes (‘) are accepted. First name and last name fields must be greater than one character in length.

Warning: The message will be rejected if the first and/or last name is missing.

Position	Field	Status
1	family name (last name)	required
2	given name (first name)	required
3	middle initial or name	required, but may be empty
4	suffix	required, but may be empty
5	prefix	ignored
6	degree	ignored
7	name type code	required, but may be empty
8	name representation code	ignored

Note: Repetitions are accepted in this field. The first repetition shall contain the legal name of the patient. The second repetition may contain the patient alias (AKA). Valid type codes must be used to indicate the name type used in PID-5 (i.e., legal vs alias). Values for the name type code field are from **HL7-defined Table 0200 – Name type**.

EX: Sending a legal name and alias in PID-5:

```
|Smith^John^J^^^^L^~Smith^Johnnyboy^^^^A|
```

PID-6: Mother's maiden name

This field should contain the patient's mother's maiden name as well as the mother's first name. **This field is used for patient matching.** If the field is valued, the requirements below must be followed.

Position	Field	Status
1	family name	required
2	given name	required
3	middle initial or name	ignored
4	suffix	ignored
5	prefix	ignored
6	degree	ignored
7	name type code	required, but may be empty
8	name representation code	ignored

Note: Values for the name type code field are from HL7-defined Table 0200 – Name type

PID-7: Date of birth

The patient's date of birth. This date is required because it is critical to several functions including immunization recommendations/forecast.

Format: YYYYMMDD

PID-8: Sex

The patient's gender.

Value	Description	Status
F	Female	accepted
M	Male	accepted
X	Non-binary	accepted
U	Unknown	accepted

Note: California State legally recognizes “non-binary” as a third gender option. The gender code “X” has become the standard for a non-binary gender option and is currently used on California driver’s licenses. Empty PID-8 field will default to ‘U’ in CAIR2.

PID-10: Race

Patient’s race is sent in this field. Submitting the patient’s race is required under California [AB1797](#) law. A **warning** ACK will be returned if the race field is empty or an invalid value submitted. Repetitions are accepted in this field. CAIR has implemented a new code for those patients that refuse to state their race. The code is **PHC1175 – “Prefer Not to Say”**. This code is NOT equivalent to ‘unknown’ and should not be used to indicate an ‘unknown’ race. The code should be used when the patient is asked for their race but refuse to state. If PID-10 is valued, the requirements below must be followed.

Position	Field	Status
1	identifier	required
2	text	optional
3	name of coding system	required, but may be empty; use HL7005

Note: Values for the race identifier field can be found in Appendix A of this document.

Ex. of multiple race groups in PID-10: |2028-9^Asian^HL7005~2046-1^Thai^HL005|

PID-11: Patient address

The patient’s address is sent in this field. If the field is valued, the requirements below must be followed for the address to populate in CAIR2. Empty field or empty components of the field will result in a warning ACK returned. Fields PID-11.1 (Street address) and PID-11.3 (city) are limited to 50 characters. PID-11.4 (State) must only contain the two-digit state abbreviation (e.g. “CA” for California).

Position	Field	Status
1	street address	required
2	other designation	required, but may be empty
3	city	required
4	state or province	required
5	zip or postal code	required
6	country	optional
7	address type	required, but may be empty
8	other geographic designation	ignored
9	county/parish code	optional
10	census tract	ignored
11	address representation code	ignored

Format: |123 Some Street Ave^Some City^CA^99999^H|

PID-13: Phone number (home, mobile, and email address)

The patient’s home phone, mobile phone, and email address are sent in this field. If the field is valued, the requirements below must be followed. Empty field or empty components of the field will result in a warning ACK returned.

Cell phone and/or email address is required for clients to retrieve their California Digital Vaccination Record (DVR). For more information on obtaining the DVR, please visit the [Digital Vaccine Record web page](#).

Position	Field	Status
1	phone number	optional
2	use code	Required (Warning ACK returned if code invalid or not submitted).
3	equipment type	Required . Use “PH” to indicate home phone, “CP” to indicate cell phone, and “Internet” or “X.400” for email address. An empty value will be treated as ‘CP’.

Position	Field	Status
4	email	C (R/X) If PID-13.2 (telecommunication use code is valued as “NET”.
5	country	ignored
6	area code	C (RE/X) If PID-13.2 (telecommunication use code is valued not “NET”.
7	phone	C (RE/X) If PID-13.2 (telecommunication use code is valued not “NET”.
8	extension	ignored
9	any text	ignored

Note: Values for the use code are found in table HL70201. Repetitions are allowed in this field.

EX: PID-13 format indicating home phone, cell phone, and email address:

|^PRN^PH^^555^5555555~^PRN^CP^^555^2223333~^NET^Internet^someone@em
ail.com|

PID-15: Primary language

The primary language of the patient or responsible party (if child.) This information is used to ensure that the appropriate language is used in mailings or other contacts. If the field is valued, the requirements below must be followed.

Position	Field	Status
1	identifier	required
2	text	optional
3	name of coding system	required, but may be empty; use HL70296

Note: Currently only **ENG** and **SPA** are accepted language codes in CAIR2. Language codes sent other than ENG or SPA will not be consumed by CAIR and may result in a warning ACK returned.

PID-22: Ethnic Group

This field is for the ethnicity of the patient. Submitting the patient’s ethnicity is required under California [AB1797](#) law. A **warning** ACK will be returned if the ethnicity field is empty or contains an invalid value. CAIR has implemented a new code for those patients that refuse to state their ethnicity. The code is **PHC1175 – “Prefer Not to Say”**. This code is NOT equivalent to ‘unknown’ and should not be used to indicate an ‘unknown’ ethnicity and should be used when the patient is asked for their ethnicity but refuse to state.

If PID-22 is valued, the requirements below must be followed.

Position	Field	Status
1	identifier	required
2	text	optional
3	name of coding system	required, but may be empty; use CDCREC

Note: The identifier for ethnicity can be found in [CDCREC table – Ethnic Group](#)

PID-24: Multiple Birth Indicator

This field indicates whether the patient was part of a multiple birth. If empty, CAIR2 will default this field to “N”.

Value	Description
Y	The patient was part of a multiple birth
N	The patient was a single birth

PID-25: Birth Order

If the patient is part of a multiple birth, a value (number) indicating the patient’s birth order is entered in this field. If PID-24 is populated with a ‘Y’, then this field shall be populated.

PID-29: Patient Death Date and Time

This field contains the date and time at which the patient death has occurred. Must be valued if PID-30 is valued with a ‘Y’.

PID-30: Patient Death Indicator

This field indicates whether the patient is deceased.

PD1: Additional Demographics Segment

The Patient Demographic Segment contains patient demographic information that may change from time to time. CAIR2 uses this segment to indicate whether the person wants to receive reminder/recall notices and whether the patient wants his or her data protected.

Position	Field Name	Status
1	Living dependency	ignored
2	Living arrangement	ignored
3	Patient primary facility	ignored
4	Patient primary care provider name & id number	ignored
5	Student indicator	ignored
6	Handicap	ignored
7	Living will	ignored
8	Organ donor	ignored
9	Separate bill	ignored
10	Duplicate patient	ignored
11	Publicity code	required, but may be empty
12	Protection indicator	required
13	Protection indicator effective date	C (R/O) Required if PD1-12 is supplied.
14	Place of worship	ignored
15	Advance directive code	ignored
16	Immunization registry status	required, but may be empty
17	Immunization registry status effective date	C (RE/X) If the PD1-16 field is valued
18	Publicity code effective date	ignored

PD1-11: Publicity code

This field indicates whether the patient wishes to receive reminder/recall notices. Use this field to indicate a specific request from the patient/parent or leave blank. An empty value will be treated the same as a “02” value in this field, meaning that it is OK for a provider site to send reminder/recall notices regarding immunizations to this patient.

Position	Field Name	Status
1	identifier	required, but may be empty
2	text	optional
3	name of coding system	required, but may be empty; use HL70215 if valued
4	alternate identifier	ignored
5	alternate text	ignored
6	name of alternate coding system	ignored

Note: Values for this field can be found in [User-defined Table 0215 – Publicity code](#)

PD1-12: Protection Indicator

This field identifies whether a person’s information may be shared with other CAIR2 users. The protection state must be actively determined by the clinician. CAIR will translate an empty value sent for PD1-12 as **disclosed/agree to share**. *(Please see below text for more detailed information regarding disclosure and sharing)*

Value in HL7 2.5.1	HL7 Standard
Y	Protect the data. Client (or guardian) has indicated that the information shall be protected. (Do not share data)
N	It is not necessary to protect the data from other clinicians. Client (or guardian) has indicated that the information does not need to be protected. (Sharing is OK)

Notes: Patient disclosure and sharing

California Immunization Registry Statute Health and Safety Code Section 120440 states that health care providers planning to provide patient or client information to an immunization system must disclose to the patient or client, or the parent or guardian of the patient or client, that their information is being shared with CAIR and advised of their rights under the law. This code was specifically established to govern who can access immunization registries, what information can be maintained, and how this information can be used. CAIR conforms to all requirements of this code. The [CAIR2 disclosure form](#) lists the rights of the patient or parent/guardian.

Only participating health care providers have direct access to patient and immunization data in CAIR2. Patients or their guardians have the option of setting patient data as shared or not shared. When a patient record is shared, any authorized provider using CAIR2 can view the patient's immunization data. When a patient record is set as not shared, only those provider sites that provided immunizations to the patient can view the patient's immunization data.

Patient disclosure information must be submitted by providers participating in data exchange with CAIR2. Before patient data can be exchanged with CAIR2, patients or clients, or the parent or guardian of the patient or client must be given the opportunity to "opt-out" of having their data shared in CAIR2. This data should still be sent to CAIR2 as a "locked" (not shared) record.

The local health department and the State Department of Health Services may maintain access to these "locked" records for the purpose of protecting the public health pursuant to Sections 100325, 120140 and 120175, as well as Sections 2500 to 2643.20, inclusive of Title 17 of the California Code of Regulations.

It is the provider's responsibility to inform patients that their immunization information is being shared with CAIR2. This can be done verbally, but it is also recommended that a sign, a printed form, or both, also be used to ensure that patients understand this disclosure.

If the provider's EMR system does not support storing disclosure and sharing information and the provider is following the guidelines set forth above for patient disclosure, it is possible to set PD1-12 to the default value of "N" (OK to share) in all submitted messages. If a default value is sent in PD1-12, then the date of disclosure must be populated in PD1-13. If a value is defaulted to 'N', in order to handle instances where a patient wishes to opt out of sharing the provider will need to provide the patient/parent/guardian with the link to the CAIR2 "Request to Lock or Unlock My CAIR Record" form to reset their data to a "not-shared" status. The form can be accessed electronically from the [CAIR Forms web page](#).

PD1-13: Protection Indicator Effective Date

This field indicates the effective date for PD1-12

Format: YYYYMMDD

PD1-16: Immunization Registry Status

This field identifies the current status of the patient in relation to the sending provider organization. If PID-29 (date of death) is populated, then the value of PD1-16 must be 'P' – Permanently Inactive.

Refer to User Defined Table 0441 in the CDC Implementation Guide for all accepted values.

PD1-17: Immunization Registry Status Effective Date

This field indicates the effective date for the registry status reported in PD1-16.

NK1: Next of Kin Segment

The NK1 segment contains information about the patient's other related parties. The segment is optional, but if submitted in the HL7 message, the following field requirements must be followed. **If any of the required fields are left empty, the NK1 segment will be ignored, and a 'warning' will be returned in the ACK.**

Position	Field Name	Status
1	Set id - NK1	required
2	Name	required
3	Relationship	required
4	Address	required, but may be empty
5	Phone number	required, but may be empty

NK1-1: Set ID

This field contains the number that identifies this transaction. For the first occurrence of the segment, the sequence number shall be '1' (one), for the second occurrence the sequence number shall be '2' (two), and so on...

Note: This field is required if the data in the NK1 segment is to populate CAIR.

NK1-2: Name

This field contains the name of the next of kin or associated party. If the field is valued, the requirements below must be followed.

Position	Field	Status
1	family name (last name)	required
2	given name (first name)	required
3	middle initial or name	required, but may be empty
4	suffix	optional
5	prefix	ignored
6	degree	ignored
7	name type code	ignored

NK1-3: Relationship

This field contains the actual personal relationship that the next of kin/associated party has to the patient.

If the field is valued, the requirements below must be followed.

Position	Field	Status
1	identifier	required
2	text	optional
3	name of coding system	required, but may be empty. use HL70063
4	alternate identifier	ignored
5	alternate text	ignored
6	name of alternate coding system	ignored

Note: For the identifier, please refer to [User-defined table 0063 – Relationship](#).

NK1-4: Address

This field contains the address of the next of kin or associated party. The field follows the same address formatting rule as the PID-11 field. Empty components of the address field may result in a warning returned in the ACK.

NK1-5: Phone Number

This field contains the phone number of the next of kin or associated party. The field follows the same phone number formatting rule as the PID-13 field. However, in the NK1-5 field only one primary phone number is consumed in CAIR2. Email address may also be submitted in the NK1-5 field following the same formatting as the PID-13 field. Missing components of the NK1-5 field will result in a warning being returned in the ACK.

ORC: Order Control Segment

The Order Request (ORC) segment is required for 2.5.1 messages and indicates information about the pharmaceutical order. While many of the elements don't apply directly to immunizations (as the immunizations are usually ordered, delivered, and administered at the same location), some of the fields allow for better control of immunization data.

Position	Field Name	Status
1	Order Control	required, constrain to 'RE'
2	Placer Order Number	required, but may be empty
3	Filler Order Number	required, but may be empty
4	Placer Group Number	ignored
5	Order Status	ignored
6	Response Flag	ignored
7	Quantity/Timing	ignored
8	Parent	ignored
9	Date/Time of Transaction	ignored
10	Entered By	required, but may be empty
11	Verified By	ignored
12	Ordering Provider	required, but may be empty
13	Enterer's Location	ignored
14	Call Back Phone Number	ignored
15	Order Effective Date/Time	ignored
16	Order Control Code Reason	ignored
17	Entering Organization	required, but may be empty If populated, use the CAIR2 Org Code of the facility.
18...31		Fields 18 – 31 are ignored

ORC-1: Order Control

ORC-1 must be constrained to "RE"

ORC-2: Placer Order Number

The placer order number is used to uniquely identify this order among all orders sent by a provider organization.

ORC-3: Filler Order Number

Unique identifier from the system where the order was filled.

ORC-10: Entered By

This identifies the individual that entered this particular order.

ORC-12: Ordering Provider

This field contains the identity of the person who is responsible for creating the request (i.e., ordering physician). In the case where this segment is associated with a historic immunization record and the ordering provider is not known, then this field should not be populated. For given vaccines, if the ORC-12 field is empty or does not contain the ordering provider's first and last name, a warning ACK will be returned to the submitter.

Note: This field must contain the ordering provider's NPI number in ORC-12.1 and the Identifier Type Code "NPI" in ORC-12.13. The ordering provider's professional suffix must be sent in ORC-12.21. A missing professional suffix will result in a warning sent back in the ACK. An example of the ORC-12 field formatting is as follows:

|1234567890^WELBY^MARK^J^^^^^CMS_NPPES^^^^^NPI^^^^^^^MD|

Position	Field Name	Status
1	ID number	Must be an NPI number.
2	family name	required
3	given name	required
4	middle initial or name	optional
5	suffix	optional
6	prefix	optional
7	degree	No longer used. Use professional suffix in sequence 21 (ORC-12.21)
8	source table	ignored
9	assigning authority	required if ORC-12.1 is populated
10	name type code	required, but may be empty
11	identifier check digit	ignored
12	code identifying the check digit scheme employed	ignored
13	identifier type code	Required if ORC-12.1 is populated. Must be valued with "NPI"

14.. 20		Components 14 – 20 are ignored
21	Professional Suffix	Required

Note: Only one repetition is allowed in ORC-12. If multiple repetitions are submitted, only the first repetition is read. All other repetitions will be ignored.

ORC-17: Entering Organization

This field identifies the organization that the enterer belonged to at the time they enter/maintain the order, such as medical group or department. The person who entered the request is defined in ORC-10 (entered by). ORC-17 will be the CAIR2 Org Code of the Site location.

RXA: Pharmacy/Treatment Administration Segment

The RXA segment carries pharmacy administration data. This segment is required to indicate which vaccinations are given. This segment is required if there are vaccinations to report. All vaccinations should be reported in one VXU message, not in separate messages.

Note: Inventory Decrementing in CAIR2 Through Data Exchange:

Provider sites can decrement vaccine doses from inventory in CAIR2 through data exchange. The RXA segment fields that must be included for inventory decrementing are indicated in the detailed field explanations following this table. **By default, the inventory decrementing feature for all CAIR2 sites is set to ‘NO’.** Sites wishing to use the inventory decrementing feature in CAIR2 must contact and coordinate with a [Data Exchange Specialist](#) at CAIR before the decrementing feature is activated.

Position	Field Name	Status
1	Give sub-ID counter	required; constrain to “0” (zero)
2	Administration sub-ID counter	required; constrain to “1”
3	Date/time start of administration	required
4	Date/time end of administration	ignored
5	Administered code	NDC or CVX code required
6	Administered amount	required (if amount is unknown, use ‘999’)
7	Administered units	required if amount is not ‘999’
8	Administered dosage form	ignored
9	Administration notes	required. If empty, the dose will be entered into CAIR2 as ‘historical’

Position	Field Name	Status
10	Administering provider	required if RXA-9.1 = '00'
11	Administered-at location	required if RXA-9.1 = '00'
12	Administered per (time unit)	ignored
13	Administered strength	ignored
14	Administered strength units	ignored
15	Substance lot number	required if administered dose
16	Substance expiration date	required, but may be empty
17	Substance manufacturer name	required if administered dose
18	Substance refusal reason	required if RXA-20 = 'RE'
19	Indication	ignored
20	Completion status	required, but may be empty; empty field will default to 'CP'
21	Action code	required, but may be empty; empty field will default to 'A'
22..26		Fields 22 -26 are ignored.

RXA-1: Give sub ID counter

CAIR expects a "0" (zero) in this field.

RXA-2: Administration sub-ID counter

CAIR expects a "1" (one) in this field.

RXA-3: Date/time start of administration

The date/time start of administration is used to record the date when the vaccination was given. Any time information sent in this field is ignored and need not be sent. It is important that this date be the actual date the vaccination was given and not the date that it was recorded or billed. **Format: YYYYMMDD**

RXA-5: Administered code

This field identifies the medical substance administered. **CVX or NDC codes are required.** Sending an alternate code (NDC or CVX) in the second triplet of RXA-5 is accepted (e.g., |58160-0842-52^Tdap^NDC^115^Tdap^CVX|).

Position	Field	Status
1	identifier	required
2	text	optional
3	name of coding system	Required (CVX or NDC).
4	alternate identifier	required, but may be empty
5	alternate text	optional
6	name of alternate coding system	required if RXA-5.4 is populated (CVX or NDC)

Note: The following NDC code formats are now accepted in CAIR: 10-digit with or without dashes and 11-digit with or without dashes. Unit of Use and Unit of Sale NDC codes are accepted.

CVX and NDC crosswalk tables are available and maintained by the Centers for Disease Control and Prevention, Immunization Information System Support Branch (IIS SB) for use in HL7 data transmission. The code sets are available through the [CDC IIS Data Code sets web page](#).

New codes are added several times a year. CDC offers an email service that sends updates when new codes are added to their tables. Information about this service is available on the websites listed above. It is critical to keep code sets up to date to appropriately report vaccinations. **Steps should be taken to ensure that someone is receiving these emails and keeping the code sets up to date.**

Sending an NDC code that has been listed on the CDC code set page as having an 'end date' will return a warning if the administration date in RXA-3 is after the NDC end date. The vaccine will post in the CAIR application, but the below warning ACK will be returned and the dose will be marked as 'Not Valid' in CAIR2:.

ERR||RXA^1^3^1|102^Data type error^HL70357|W|1^||logical Date error^HL70533|||**Warning: RXA-3 Administration Date of Service is invalid for the NDC given, please check your records and update immunization.**

CVX codes marked as 'Inactive' on the CDC code set page, CVX codes for non-US vaccines, and those CVX codes mapped to 'unassigned' or 'not otherwise specified'/'NOS' vaccines must be sent as 'historical' (RXA-9.1 **not equal** to '00'). CVX codes for 'inactive', non-US vaccines, and 'NOS' vaccines sent as 'given' (RXA-9.1 = '00') will be transformed to 'historical' in CAIR2 and a warning ACK will be returned:

ERR||RXA^1^9|102^Data type error^HL70357|W|4^|Invalid value^HL70533|||**Warning: Unspecified Formulation (NOS) vaccines are to be used for historical doses. Immunization has been saved as historical.**

RXA-6: Administered amount

The amount of vaccine that was given. This should be expressed in milliliters (mL). The amount shall be placed here and the units in RXA-7. **Do not put the units in this field.**

Format: Number

Note: If amount is unknown, use '999' in this field.

RXA-7: Administered units

The units associated with the number in RXA-6. A value of mL is expected.

Position	Field	Status
1	identifier	required, but may be empty; should be 'mL'
2	text	ignored
3	name of coding system	required, but may be empty; use "UCUM" if valued
4	alternate identifier	ignored
5	alternate text	ignored
6	name of alternate coding system	ignored

Ex: |mL^mL^UCUM|

RXA-9: Administration notes

This field is used to indicate whether this immunization record is based on a historical record or was given by the reporting provider. It should contain the information source (see [NIP-defined table NIP001 – Immunization information source](#)). An empty RXA-9.1 will default to '01' (historical) in CAIR2.

Note: This field is required and must be '00' (given vaccine) for inventory decrementing.

Position	Field	Status
1	identifier	Required for given vaccines
2	text	optional
3	name of coding system	required, but may be empty; use NIP001 if valued
4	alternate identifier	ignored
5	alternate text	ignored
6	name of alternate coding system	ignored

RXA-10: Administering provider

This field is intended to contain the name and ID number of the person physically administering the vaccine. This field is required for given vaccines. If the field is valued, it must follow the specifications below. If the RXA-10 field is left empty, and RXA-9.1 = '00', a warning ACK will be returned. Numbers, or characters such as "\$", "?", "!", etc.. are not allowed in name fields. Hyphens (-) and apostrophes (') are accepted. Parentheses are also accepted but discouraged. First name and last name fields must be greater than one character in length.

For the Administering Provider information to post successfully in CAIR2, the format of the field must be either:

**|IDNumber^LastName^FirstName^^^^^^AssigningAuthority^^^^TypeCode^^^^
^^^ProfessionalSuffix|**

Or

|^LastName^FirstName^^^^^^^^^^^^^^^^^^^^^^ProfessionalSuffix|

Position	Field Name	Status
1	ID number	required, but may be empty
2	family name	required
3	given name	required
4	middle initial or name	optional
5	suffix	optional
6	prefix	optional
7	degree	No longer used. Use professional suffix in sequence 21 (RXA-10.21)
8	source table	ignored
9	assigning authority	required if RXA-10.1 is populated
10	name type code	required, but may be empty
11	identifier check digit	ignored
12	code identifying the check digit scheme employed	ignored
13	identifier type code	required if RXA-10.1 is populated
14.. 20		Components 14 – 20 are ignored
21	Professional Suffix	required, but may be empty

Note: Health care providers who administer vaccines covered by the National Childhood Vaccine Injury Act are required to ensure that the permanent medical record of recipient indicates the name and title (professional suffix) of the person who administered the vaccine. See more information at the [CDC's Document the Vaccination\(s\) web page](#). If the professional suffix is missing from RXA-10, a warning message will be returned in the ACK.

RXA-11: Administered at location

The administered at location is used to indicate the facility at which the immunization was given. The facility (**CAIR2 org code**) should be sent in position 4.

Note: This field is required for decrementing inventory in CAIR2 through data exchange if MSH-22.1 is not populated with the CAIR2 org code. For given shots, the CAIR2 org code sent in RXA-11.4 must match the CAIR2 org code sent in MSH-22.1. The CAIR2 org code sent in MSH-22.1 will override the CAIR2 org code sent in RXA-11.4 if different.

Position	Field Name	Status
1	point of care	ignored
2	room	ignored
3	bed	ignored
4	facility	required if RXA-9.1 value is '00'
5....16		ignored

EX: |^^^(CAIR2 Org Code)|

RXA-15: Substance lot number

This field contains the lot number of the vaccine administered. It may remain empty if the dose is from a historical record.

Format: String

Note: This field is required for decrementing inventory in CAIR2 through data exchange.

Enter Exact Vaccine Lot Numbers Provided by the Manufacturer

California healthcare providers are required by the [National Vaccine Childhood Injury Act](#) and [California Health and Safety Code Section 120440\(c\)\(4\)](#) to document the date of administration, manufacturer, and lot number for each immunization they administer.

CAIR2 users are required to enter the exact lot number issued by the manufacturer when entering vaccine lot numbers into the lot field in CAIR2. **Please do not add text to the end of the lot number to distinguish between two funding sources (e.g., VFC, Private, SGF, 317).**

When entering a new lot in CAIR2, users should instead use the eligibility field in the “manage inventory” section of CAIR2 to distinguish between two lots of vaccine with the exact same lot number. For example, to distinguish between a lot of VFC-funded vaccine and a lot of Private-funded vaccine, CAIR2 users must set the lot of VFC-funded vaccine as “VFC” eligibility and the lot of Private-funded vaccine as “Private” eligibility.

A new enhancement will soon be made to CAIR2 to distinguish between two vaccine lots more easily when they share the same lot number, the same funding source, yet different dosage amounts (e.g., one lot is 0.5 mL, and another lot is 0.25 mL) for vaccinating different age groups.

RXA-16: Substance expiration date

This field contains the expiration date of the vaccine administered. Note that vaccine expiration date does not always have a “day” component; therefore use the last day of the month for the ‘day’ component of the expiration date.

Format: YYYYMMDD

RXA-17: Substance manufacturer

This field contains the manufacturer of the vaccine administered. If the field is valued, the requirements below must be followed. Code system “**MVX**” should be used to code this field. The CDC's National Center for Immunization and Respiratory Diseases ([NCIRD](#)) developed and maintains [HL7 Table 0227, Manufacturers of Vaccines \(MVX\)](#).

Position	Field	Status
1	identifier	required
2	text	optional
3	name of coding system	required, but may be empty; use “MVX”
4	alternate identifier	ignored
5	alternate text	ignored
6	name of alternate coding system	ignored

Note: The MVX code must be of the manufacturer associated with the vaccine code provided in RXA-5. A warning ACK will be returned if the MVX does not match with the vaccine code provided in RXA-5.

RXA-18 – Substance/Treatment Refusal Reason

If RXA-20 is populated with the completion status of 'RE' (Refused), then RXA-18 must be populated with a value from [CDC defined table NIP002](#).

EX: |00^Parental Decision^NIP002|

Position	Field	Status
1	identifier	required
2	text	optional
3	name of coding system	required, but may be empty; use "NIP002"

CDC-defined NIP002 – Substance refusal reason

Value	Description	Status
00	Parental decision	accepted
01	Religious exemption	Ignored at this time
02	Other (must add text component of the CE field with description)	Ignored at this time
03	Patient decision	Ignored at this time

NOTE: Only Substance refusal reason with the value '00' – 'Parental Decision', is accepted in CAIR2 at the time of this writing. All other values are ignored. A future release of CAIR2 will allow more refusal reason values to post in CAIR2.

RXA-20: Completion Status

This field indicates if the dose was successfully given. Complete records (CP), Partial administrations (PA) and Refused (RE) doses (with '00' parental decision in RXA-18) are processed. Any other value sent in RXA-20 will cause the RXA segment to fail.

Note: An empty field will be treated as 'CP'.

Position	Field	Status
1	id	required, but may be empty.

HL7 User-defined Table 0322 – Completion status

Value	Description	Status
CP	Complete	accepted
RE	Refused	accepted, if RXA-18 is populated with the refusal reason from CDC-defined table NIP002. RXA-18 must be '00'.
NA	Not Administered	accepted, but will fail the RXA segment
PA	Partially Administered	accepted as a 'subpotent dose'

RXA-21: Action code

This field indicates the action expected by the sending system. **An empty field will be treated as 'A'.**

Value	Description	Status
A	Add	accepted
U	Update	accepted
D	Delete	accepted

RXR: Pharmacy Route Segment

The Pharmacy Route (RXR) segment is a continuation of the RXA segment.

Position	Field	Status
1	route	required, but may be empty
2	site	required, but may be empty
3...5	administration device	Fields 3 – 5 are ignored

RXR-1: Route

The route is the place or method that was used to give the vaccination. This is normally dependent on the type of vaccination given. If the field is valued, the requirements below must be followed.

Position	Field	Status
1	identifier	required
2	text	optional
3	name of coding system	required, but may be empty

Note: Codes for the identifier can be found in HL7-defined Table 0162 – Route of administration. **FDA NCI Thesaurus codes are accepted in RXR-1.1.**

Ex: |C28161^Intramuscular^NCIT|

RXR-2: Site

The site is the place on the body that the vaccination was given. This is normally decided at time of administration. If the field is valued, the requirements below must be followed.

Position	Field	Status
1	identifier	required
2	text	optional
3	name of coding system	required, but may be empty; use HL70163

Note: Codes for the identifier can be found in HL7-defined Table 0163 – Administrative site. EX: |RD^Right deltoid^HL70163|

OBX: Observation Segment

The Observation segment includes additional information that could not be sent in the RXA. In CAIR2 the OBX segment will be used to record Vaccine Eligibility and Vaccine Funding Source by vaccine dose. Unrecognized observations will be ignored by CAIR.

If the OBX segment is sent, the below requirements must be followed.

Position	Field Name	Status
1	Set ID - OBX	required
2	Value Type	required; constrain to “CE”
3	Observation Identifier	required if RXA-9.1 value is “00”
4	Observation Sub-ID	required, but may be empty
5	Observation Value	required for decrementing inventory in CAIR2
6	Units	ignored
7	Reference Ranges	ignored
8	Abnormal Flags	ignored
9	Probability	ignored
10	Nature of Abnormal Test	ignored
11	Observation Result Status	required; should be “F” for Final

Position	Field Name	Status
12	Effective Date of Reference Range Values	ignored
13	User Defined Access Checks	ignored
14	Date/Time of the Observation	required, but may be empty
15...25		ignored

OBX-1: Set ID – OBX

Indicates the current sequence number for this OBX as it sits under the RXA.

OBX-2: Value Type

This field contains the format of the observation value in OBX. **Value type will be ‘CE’**

OBX-3: Observation Identifier

This indicates what kind of data is being sent in this OBX. One way to look at this is OBX-3 poses the question and OBX-5 answers it. For example, OBX-3 might indicate Vaccine funding program eligibility, which can be read as “What program was this person eligible for when this vaccine was administered?” The answer in OBX-5 could be “VFC eligible-Medi-Cal/Medi-Cal Managed Care.”

Position	Field	Status
1	identifier	required
2	text	optional
3	name of coding system	required, use ‘LN’
4	alternate identifier	ignored
5	alternate text	ignored
6	name of alternate coding system	ignored

Table LN – LOINC

Value	Description	Status
64994-7	Vaccine funding program eligibility category	Accepted
30963-3	Funding Source	Accepted
30945-0	Vaccination contraindication/precaution	Accepted

NOTE: Both Funding Source and Vaccine Eligibility OBX segments must be sent when RXA-9.1='00'. If the OBX segments are missing or the content submitted is not valid, a warning ACK will be returned.

OBX-4: Observation Sub-ID

Indicates if this observation is part of a grouping.

OBX-5: Observation Value

This is the answer to the question that was posed in OBX-3.

For proper inventory decrementing in CAIR2, the Vaccine Eligibility Funding Status in OBX-5.1 is required and must match the funding source of the vaccine lot entered in CAIR2.

Position	Field	Status
1	identifier	required, but may be empty
2	text	optional
3	name of coding system	required, but may be empty, use HL70064

CAIR Accepted Values/Mapping for Vaccine Eligibility and Funding Source in the OBX segment of the VXU.

Vaccine Eligibility categories for OBX-5.1, when OBX-3.1 = 64994-7	Vaccine Eligibility Description	Vaccine Funding Source for OBX-5.1, when OBX-3.1 = 30963-3	Vaccine Funding Source Description
V01	not VFC eligible (Private Pay/Insurance)	PHC70	Private Funds
V02	VFC eligible – Medi-Cal/Medi-Cal Managed Care	VXC51	Public VFC
V03	VFC eligible - Uninsured	VXC51	Public VFC
V04	VFC eligible - American Indian/Alaskan Native	VXC51	Public VFC
V05	VFC eligible - Underinsured	VXC51	Public VFC
V23 (V07 is still accepted at this time)	317 Funded / VFA	VXC52	Public non-VFC
CAA01	State General Fund Vaccines	VXC52	Public non-VFC

Note: VXC50 – Public Funds, General may be sent with “V01” eligibility in specific cases, such as outbreak situations where the vaccine doses are provided to the public at no cost.

For more information on 317 Funded Vaccines and State General Fund Vaccines, see the [Vaccine Eligibility Guidelines](#).

Here is an example of reporting Vaccine Funding Program Eligibility and Vaccine Funding Source in the OBX segment:

OBX|1|CE|64994-7^Vaccine funding program eligibility category^LN||V02^VFC eligible-Medi-Cal/Medi-Cal Managed Care^HL70064|||||F|||20110701130100

OBX|2|CE|30963-3^Vaccine Funding Source^LN|1|VXC51^Public-VFC^CDCPHINVS|||||F

OBX-14: Date/Time of the Observation

Records the date/time of the observation

HL7 ACK File Format and content

CAIR2 ACK messages are formatted by CAIR2 following the CDC HL7 guidelines for immunization messaging.

There are two fields submitted in the MSH segment of the VXU that pertain to acknowledgements: MSH-15 and MSH-16. The MSH-16 field, Application Acknowledgement Type, is used to determine the conditions for sending an acknowledgement message indicating the success or failure to process the data contained in the VXU message. The following table shows results for the five potential values:

Value	Description	Status
AL	Always	ACK message always sent
NE	Never	ACK message never sent
ER	Error	ACK message sent only on error condition
SU	Success	ACK message sent only on successful load
<blank>	Blank value	If blank, MSH-16 treated as 'ER'

Note: If MSH-16 is not populated and the message contains no errors, the MSA segment will not be returned. Only the MSH segment will be returned. **CAIR recommends using the value 'AL' in MSH-16 of the VXU message.**

CAIR2 ACK Segment Structure

Segment	Cardinality	Usage	Comment
MSH	(1..1)	R	Message Header Segment. Every message begins with an MSH.
MSA	(1..1)	R	Message Acknowledgment. Every ACK has at least one MSA segment, unless the MSH-16 field of the VXU is empty or valued with 'ER' and the VXU had no errors or warnings, or MSH-16 contains "NE".
[{ERR}]	(0..*)	RE	Error description. Included if there are errors

MSH – Message Header Segment

The Message Header Segment for the ACK will have the same number of fields as the VXU MSH segment. The values in the fields will reflect information about a previously received, single record. The data types for each component and sub-component are the same for the VXU MSH and the ACK MSH.

MSH: Message Header Segment for ACK

The Message Header (MSH) segment is required for each ACK sent.

Position	Field Name	Value sent by CAIR
1	Field separator	MSH-1 field shall be
2	Encoding characters	MSH-2 field shall be ^~\&
3	Sending application	CAIR IIS (release number) EX: CAIRIIS2.8.8
4	Sending facility	Constrained to CAIR IIS
5	Receiving application	Echoes value sent in MSH-3 of the VXU
6	Receiving facility	Echoes the value sent in MSH-22.1 of the VXU
7	Date/time of message	
8	Security	Not sent
9	Message type	ACK^V04^ACK
10	Message control id	Echoes value sent in MSH-10 of the VXU
11	Processing id	Constrained to "P"
12	Version id	Constrained to "2.5.1"
13	Sequence number	Not sent
14	Continuation pointer	Not sent
15	Accept acknowledgment type	Constrained to "NE"
16	Application acknowledgment type	Constrained to "NE"
17	Country code	Not sent
18	Character set	Not sent
19	Principal language of message	Not sent
20	Alternate character set handling scheme	Not sent
21	Message Profile Identifier	Constrained to "Z23^CDCPHINVS"
22	Sending Responsible Organization	Constrained to "CAIR IIS"
23	Receiving Responsible Organization	Echoes value sent in MSH-4.1 of the VXU

MSA – Message Acknowledgment Segment

The MSA segment contains information used to identify the receiver's acknowledgement response to an identified prior message.

Position	Field Name	Value sent by CAIR
1	Acknowledgment Code	AA, AE, or AR
2	Message Control ID	Echoes value sent in MSH-10 of the VXU

MSA-1 – Acknowledgment code

This field contains an acknowledgment code from table HL70008. In MSA-1 only the value shown in the table will be used.

Value (MSA-1)	Description	Comment
AA	Application Accept	Message was accepted without error
AE	Application Error	Message was processed and errors or warnings are being reported.
AR	Application Reject	Message was rejected because one of the following occurred: <ul style="list-style-type: none">• Unsupported Message Type• Unsupported event code• Unsupported processing ID• Unable to process for reasons unrelated for format or content

MSA-2 – Message Control ID

This field contains the message control ID of the message sent by the sending system. It allows the sending system to associate this response with the message for which it is intended. **This field echoes the message control ID sent in MSH-10 by the initiating system.**

ERR – Error Segment

The error segment reports information about errors or warnings in processing the message. The segment may repeat. Each error or warning will have its' own ERR segment.

Position	Field Name	Value sent by CAIR
1	Error code and location	Not supported in v2.5.1
2	Error location	Segment, field, component, repetition of the error

Position	Field Name	Value sent by CAIR
3	HL7 error code	Refer to HL7 table 0357 of the CDC guide
4	Severity	If error occurs, will use “E”, if warning occurs will use ‘W’, if informational only, an ‘I’ will be used
5	Application Error Code	Refer to User Defined table 0533 of the CDC guide
6	Application Error Parameter	Optional
7	Diagnostic Information	Optional
8	User Message	Text briefly describing the error that occurred in the VXU message

NOTE: CAIR has released a document titled “CAIR2 IIS HL7 ACK Error Report. ACK/NAK Message Reference”. This document lists ACKs generated from CAIR2, possible causes and suggested corrections. The document is available [here](#).

ERR-4 – Severity

Severity	Description	Behavior	Resubmission Required
E	ERROR	VXU or RXA segment failure due to required field or segment missing or incorrect value submitted.	Resubmission required for vaccination sent to be processed
W	WARNING	“Required but may be empty” field contains an invalid value or is missing. These include non-fatal errors with potential loss of data. This is only a warning and will not prevent the vaccination from posting in CAIR2.	Resubmission is recommended to correct the warning.
I	INFORMATION	Informational only. MSA-1 will be ‘AA’, but ERR segment will be present to indicate the information regarding the transaction	No resubmission is needed

Example ACK Messages Generated by CAIR2:

Information (ERR-4 = "I")

MSH|^~\&|CAIR IIS2.8.3.6|CAIR IIS|EPIC|DE-000002|20230306113614-0800||ACK^V04^ACK|21859394|P|2.5.1|||NE|NE||||Z23^CDCPHINVS|CAIR IIS|DE-000001

MSA|AA|21859394

ERR||RXA^1|205^Duplicate key identifier^HL70357||3^Illogical Value error^HL70533|||Incoming Immunization already exists in the system.

Warning – (ERR-4 = "W" - A 'warning' message will not prevent the immunization from posting in CAIR2)

MSH|^~\&|CAIR IIS2.8.3.6|CAIR IIS|EPIC|DE-000002|20230306113950-0800||ACK^V04^ACK|21859394|P|2.5.1|||NE|NE||||Z23^CDCPHINVS|CAIR IIS|DE-000001

MSA|AE|21859394

ERR||PID^1^10|102^Data type error^HL70357|W|4^Invalid value^HL70533|||Warning: PID-10 Race Code was not present. Correct and resubmit.

Error (ERR-4 = "E" – Message or Required Field/Segment Rejected)

MSH|^~\&|CAIR IIS2.8.3.6|CAIR IIS|EPIC|DE-000001|20230306113732-0800||ACK^V04^ACK|21859394|P|2.5.1|||NE|NE||||Z23^CDCPHINVS|CAIR IIS

MSA|AE|21859394

ERR||PID^1^5^2|101^Required field missing^HL70357|E|6^Required observation missing^HL70533|||MESSAGE REJECTED. REQUIRED FIELD PID-5-2 MISSING. Correct and resubmit.

Application Rejection (MSA-2 = "AR")

MSH|^~\&|CAIR IIS2.8.3.6|CAIR IIS|EPIC|DE-000002|20230306114132-0800||ACK^V04^ACK|21859394|P|2.5.1|||NE|NE||||Z23^CDCPHINVS|CAIR IIS|DE-000001

MSA|AR|21859394

ERR||MSH^1^11|202^Unsupported processing ID^HL70357|E|4^Invalid value^HL70533|||Message Rejected. Invalid Processing Id in MSH-11. Must be "P" only. Correct and resubmit.

VALID MESSAGE – MSA-2 = "AA" - No Errors or Warnings

MSH|^~\&|CAIR IIS4.0.0|CAIR IIS||UATPARENT|20160630||ACK^V04^ACK|TEST001|P|2.5.1|||||||CAIR IIS|UATPARENT

MSA|AA|1791129

APPENDIX A

CAIR2 accepted race and sub-race categories.

HL7 Main Race Code	Description	
1002-5	American Indian or Alaska Native	
2028-9	Asian	
	HL7 Sub-Race Code - Asian	Description
	2029-7	Asian Indian
	2030-5	Bangladeshi
	2033-9	Cambodian
	2034-7	Chinese
	2036-2	Filipino
	2037-0	Hmong
	2038-8	Indonesian
	2039-6	Japanese
	2040-4	Korean
	2041-2	Laotian
	2042-0	Malaysian
	2044-6	Pakistani
	2045-3	Sri Lankan
	2046-1	Thai
	2035-4	Taiwanese
	2047-9	Vietnamese
2054-5	Black or African American	
2076-8	Native Hawaiian or Other Pacific Islander	
	HL7 Sub-Race Code – Native Hawaiian or Other Pacific Islander	Description
	2088-3	Chamorro
	2101-4	Fijian
	2087-5	Guamanian
	2079-2	Native Hawaiian

	2500-7	Other Pacific Islander
	2080-0	Samoan
	2082-6	Tongan
2106-3	White	
2131-1	Other Race	
PHC1175	Prefer Not to Say	