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## Test Plan for HL7 VXU Submission To CAIR2

**California Immunization Registry**

Version 1.1  
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## REVISION HISTORY

Editor	Edit Date	Version
E. Dansby	July 28, 2016	1.0
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S. Nickell	November 15, 2016	1.2

## CAIR DATA EXCHANGE CONTACT INFORMATION

Please check the CAIR website at <http://cairweb.org/data-exchange-tech-support> to find the contact information for each CAIR regional registry.

For data exchange questions and support, please email [CAIRDataExchange@cdph.ca.gov](mailto:CAIRDataExchange@cdph.ca.gov).

To get the latest information regarding data exchange with CAIR2, please visit the data exchange page on the CAIR website at: <http://cairweb.org/data-exchange-tech-support/>

## OVERVIEW

This document is intended for data exchange (DX) submitters that have registered at the CAIR Immunization Portal and have received their credentials for submitting data to CAIR2 and are ready to move forward with the testing process. If you have not yet enrolled, please go to <https://igs.cdph.ca.gov/cair/> and enroll your Site. The instructions below will help guide you through the testing of your HL7 data transmissions with the California Immunization Registry (CAIR2). Note: only Site Types #1 and #3 need to install the **CAIR2 WSDL**.

### CAIR DX Site Types:

- 1) Direct submission (EHR --> Portal)
- 2) Indirect submission via data aggregator [EHR --> (HIE/HIO, vendor data warehouse, health plan data warehouse, etc.) --> Portal].
- 3) Data aggregator (e.g. HIE/HIO, vendor data warehouse, health plan data warehouse, etc.) that submits data on behalf of other Sites.

## MESSAGE CONTENT

Review the [CAIR2 HL7 2.5.1 v1.5 Data Exchange Specifications](#) document. You should ensure your EHR/interface can generate an HL7 VXU message with the correct coded values in required fields, as well as any optional fields you will be submitting.

## PRE-TESTING STEPS

### 1. CAIR Web Validation Tool (optional)

HL7 VXU messages can be validated online through a web-based engine.

<https://igsstag.cdph.ca.gov/CAIRHL7WebValidator/default.aspx>

This site does not require registration. Simply cut and paste your HL7 test message data in the message box and choose "Validate". A downloadable HL7 validation report will be generated displaying any validation errors found in the HL7 VXU message. Pre-testing your HL7 message using this validation tool is recommended. However, the CAIR web validation tool is only for the basic formatting of your HL7 message and does not have CAIR2 specific validations on all fields. The tool is designed to get your messages close to conformance only.

**NOTE:** Submitter IP address will be recorded. Under no circumstances should you submit protected health information through this website. All messages submitted should be for testing purposes only and should not contain actual protected health information of clients or patients. **Submitting data to the web validator does not qualify for Meaningful Use.**

## 2. CAIR2 TEST WSDL (Site Types #1 and #3 only)

To send test messages to the CAIR2 test environments, submitters will need to download and install the [CAIR2 TEST WSDL](https://cair.cdph.ca.gov/CATR-WS/IISService?WSDL) (URL: <https://cair.cdph.ca.gov/CATR-WS/IISService?WSDL>) to the server/interface engine that will be submitting the HL7 messages. This ensures that HL7 messages can be sent to CAIR2.

## 3. SOAP Connectivity Testing

The *connectivityTest* operation is used to test connectivity and verify that your Site is able to connect to the CAIR2 web service. Before running the *connectivityTest*, you will need to have the **CAIR TEST WSDL** installed (see above for link).

Below is a standard SOAP connectivity test. In the example below, the phrase 'HELLO WORLD' is used between the 'echoBack' tags.

```
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
xmlns:urn="urn:cdc:iisb:2011">
  <soap:Header/>
  <soap:Body>
    <urn:connectivityTest>
      <urn:echoBack>HELLO WORLD</urn:echoBack>
    </urn:connectivityTest>
  </soap:Body>
</soap:Envelope>
```

If connectivity is successful, the same phrase 'HELLO WORLD' will be returned.

```
<soapenv:Envelope xmlns:soapenv="http://www.w3.org/2003/05/soap-envelope">
  <soapenv:Body>
    <connectivityTestResponse xmlns="urn:cdc:iisb:2011">
      <return>HELLO WORLD</return>
    </connectivityTestResponse>
  </soapenv:Body>
</soapenv:Envelope>
```

If the *connectivityTest* is unsuccessful, download the **CAIR2 WSDL** again.

## TESTING HL7 MESSAGES IN CAIR2

### Real Time HL7 Message Submission

The *submitSingleMessage* operation is used to submit an HL7 message. In the *submitSingleMessage* SOAP operation the hl7Message parameter must contain the properly

formatted HL7 VXU message. HL7 messages need to be wrapped in a SOAP envelope using the credentials emailed to you after registration at the CAIR Immunization Portal. Fake patient data should be used when submitting test messages to CAIR2.

### Example HL7 VXU message in SOAP envelope:

```
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
xmlns:urn="urn:cdc:iisb:2011">
  <soap:Header/>
  <soap:Body>
    <urn:submitSingleMessage>
      <urn:username>Portal Username</urn:username>
      <urn:password>Portal Password</urn:password>
      <urn:facilityID>Portal Facility ID</urn:facilityID>
      <urn:hl7Message><![CDATA[MSH|^~&|MyEMR|DE-000001|
|CAIRLO|20160701123030||VXU^V04^VXU_V04|CA0001|P|2.5.1|||NE|AL|||DE-000001
PID|1||PA123456^^^MR||JONES^GEORGE^M^JR|MILLER^MARTHA^G|20140227|M||2106-
3^WHITE^HL70005|1234 W FIRST ST^^BEVERLY
HILLS^CA^90210^^H^^|^PRN^^^^555^55555555||ENG^English^HL70296|||2186-5^ not Hispanic or Latino
^HL70189||Y|2
PD1|||||||02^REMINDER/RECALL – ANY METHOD^HL70215|N|20140730|||A|20140730|
NK1|1|JONES^MARTHA|MTH^MOTHER^HL70063|||||||
ORC|RE||197023^CMC|||||^Clark^Dave|^Smith^Janet^^^^^^L^^^^^^^MD ||||
RXA|0|1|20140730|08^HEPB-PEDIATRIC/ADOLESCENT^CVX|.5|mL^mL^UCUM||00^NEW IMMUNIZATION
RECORD^NIP001|1245319599^Smith^Janet^^^^^^CMS^^^^NPI^^^^^^^MD |^^DE-
000001|||0039F|20200531|MSD^MERCCK^MVX||CP|A
RXR|IM^INTRAMUSCULAR^HL70162|LA^LEFT ARM^HL70163
OBX|1|CE|64994-7^Vaccine funding program eligibility category^LN|1|V03^VFC eligibility –
Uninsured^HL70064||||F||20110701140500]]>
    </urn:hl7Message>
  </urn:submitSingleMessage>
</soap:Body>
</soap:Envelope>
```

**Note:** As shown above, in the SOAP UI application you will need to add **<![CDATA[** before 'MSH' in the HL7 message and use closing brackets **]]>** at the end of the HL7 message.

If the submitSingleMessage is unsuccessful make sure:

- The correct Portal Username and Portal Password assigned through the online registration Portal are being used.
- The correct WSDL is being used

## HL7 ACK/NAK PROCESS

As each submitted HL7 VXU message is received by CAIR2, an HL7 ACK (message accepted) or NAK (message has errors/warnings) is returned back to the submitter. The returned ACK/NAKs will help to guide your Site in making changes to your data formatting until you can submit a message without errors. These ACK/NAKs follow the format laid out in the [HL7 Version 2.5.1: Implementation Guide for Immunization messaging, Release 1.5](#) and will provide details as to any segments/fields that contain errors. The NAK will also inform as to whether the error constituted a message failure or simply an informational error/warning. See page 37 of the [CAIR2 HL7 2.5.1 v1.5 Data Exchange Specifications](#) for details on the ACK/NAK format.

If your Site is submitting data to CAIR2 through an intermediary Sending Facility (e.g. HIE, cloud-based EHR, data warehouse, etc.), you should contact the Sending Facility and your EHR vendor to determine whether ACK/NAKs returned to the Sending Facility by CAIR2 can be returned and displayed in your EHR. As noted previously, Sites must monitor returned ACK/NAK messages and make corrections to their submissions as needed. Test messaging will also be monitored by DX staff who can be consulted at any time of a Site has questions at [CAIRDataExchange@cdph.ca.gov](mailto:CAIRDataExchange@cdph.ca.gov). Also, if you Site would like to engage in more extensive end-to-end message testing, contact [CAIRDataExchange@cdph.ca.gov](mailto:CAIRDataExchange@cdph.ca.gov) for a special testing account.

If your Sending Facility is unable to return ACK/NAKs or your EHR system is unable to display them, your Site will still be able to monitor data exchange messaging via the 'Check Status' functionality in the CAIR2 interface that is available to CAIR2 'Power' users (at launch) and will also available via a new 'Data Exchange Quality Assurance' ('DX QA') user role to be added later. If your Site does not currently have a 'Power' user and you wish to monitor data exchange activity, go to the [CAIR Account Update](#) site and add a 'Power' user. Trainings of new CAIR2 users, however, will not begin until after the transition to CAIR2

## DATA VALIDATION

Following the successful connection and single message submission to CAIR2, eligible providers and hospitals must pass validation testing before actual production submission can occur. Sites must conduct a series of tests to validate that they can submit a variety of possible values in the required fields (and any optional fields) correctly.

CAIR recommends that a minimum of **50-100** unique test messages be submitted to CAIR2 using a variety of coded values in the HL7 VXU messages. Table 1 below can be used as a guide for segments and fields CAIR validates for correctness.

**Table 1: Segments/Fields that shall be validated during the testing process include:**

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	R		<b>Region Code Value – See Appendix A in the CAIR HL7 specification document.</b>
MSH-7	Date/time of message	R		
MSH-9	Message type	R		<b>VXU^V04^VXU_V04</b>
MSH-10	Message control ID	R		Used to tie acknowledgement to message
MSH-11	Processing ID	R		Required by HL7. <b>Constrain to ‘P’.</b> Empty field or any other value will cause the message to be rejected.
MSH-12	HL7 Version ID	R	HL70104	Version <b>2.5.1</b> only
MSH-15	Accept Acknowledgement Type	R	HL70155	If blank, a Warning / Informational ACK is returned stating that the required MSH-15 field is missing.
MSH-16	Application Acknowledgement Type	R	HL70016	If blank, a Warning / Informational ACK is returned stating that the required MSH-16 field is missing.
MSH-21	Message Profile Indicator	RE		Sites may use this field to assert adherence to, or reference, a message profile.
MSH-22	Responsible Sending Org	RE		Value of <b>MSH-22</b> should be the CAIR Site ID of the ‘Sending Responsible Organization’ who administered the immunization (in most cases, use the <b>RXA-11.4</b> value). If <b>MSH-22</b> is empty, the value in <b>RXA-11.4</b> will be used as the ‘sending responsible organization’. If both <b>MSH-22</b> and <b>RXA-11.4</b> are empty, the record will be rejected.

Segment / Field	Data Element	Usage	HL7 Code Table	Comment
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, <b>'MR'</b> , <b>'PI'</b> , <b>'PN'</b> , <b>'PRN'</b> , or <b>'PT'</b>
PID-5	Patient Name	R		Each name field has a 50 character length limit in CAIR2
PID-6	Mother's Maiden Name	RE		
PID-7	Date of Birth	R		YYYYMMDD
PID-8	Sex	R	HL70001	<b>'M'</b> , <b>'F'</b> , <b>'U'</b> only
PID-10	Race	RE	HL70005	
PID-11	Patient Address	RE		
PID-13	Home Phone Number	RE		
PID-15	Primary Language	RE	HL70296	To ensure correct translation, please use the proper code for the HL7 version of the message.
PID-22	Ethnic Group	RE	HL70189	Used to further identify race as Hispanic or non-Hispanic
PID-24	Multiple Birth Indicator	RE	HL70136	<b>'Y'</b> , <b>'N'</b> , or blank. Empty value is treated as <b>'N'</b> in CAIR.
PID-25	Birth Order	C(R/O)		If PID-24 = <b>'Y'</b> a birth order number (1, 2, 3, etc...) must be entered.
PD1-11	Publicity Code	RE	HL70215	Indicates reminder/recall intentions. A blank value will default to <b>'Y'</b> in CAIR.
PD1-12	Protection Indicator	R		Indicates whether patient data should be shared between CAIR providers.
PD1-13	Protection Indicator Effective Date	C(R/O)		Required if PD1-12 is supplied.
PD1-16	Immunization Registry Status	RE	HL70441	Current status of the patient in relation to the sending provider organization



Segment / Field	Data Element	Usage	HL7 Code Table	Comment
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
NK1-3	Relationship	R	HL70063	Personal relationship that the next of kin or associated party has to the patient.
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		This shall be the provider ordering the immunization. It is expected to be empty if the immunization record is transcribed from an historical record.
RXA-1	Give Sub-ID counter	R		<b>Constrain to '0' (zero)</b>
RXA-2	Administration Sub-ID counter	R		<b>Constrain to '1' (one).</b>
RXA-3	Date/Time Start of Administration	R		YYYYMMDD
RXA-5	Administration Code	R		<b>CVX or NDC code required</b>
RXA-6	Administered Amount	R		<b>Required for all doses.</b> 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(RE/O)		If RXA-6 is supplied, unit value should be 'mL^mL^UCUM'.
RXA-9	Administered Notes	R	NIP001	Indicates historical or given shot.

Segment / Field	Data Element	Usage	HL7 Code Table	Comment
RXA-10	Administering Provider	C(RE/O)		The person who administered the shot. <b>If RXA-9.1 = '00' and RXA-20 is valued at 'CP' or 'PA'..</b>
RXA-11	Administered-at Location	C(R/O)		The provider site where the shot was given. Provider ID supplied by CAIR. <b>If RXA-9.1 = '00' then this field is required.</b>
RXA-15	Substance Lot Number	C(R/O)		<b>If RXA-9.1 = '00' and RXA-20 is valued at 'CP' or 'PA', substance lot number must be supplied.</b>
RXA-16	Substance Expiration Date	C(RE/O)		<b>If RXA-9.1 = '00' and RXA-20 is valued at 'CP' or 'PA'.</b>
RXA-17	Substance Lot Mfr Name	C(R/O)	HL70227	<b>If RXA-9.1 = '00' and RXA-20 is valued at 'CP' or 'PA'. MVX code only.</b>
RXA-20	Completion Status	RE	HL70322	Only complete records ( <b>CP</b> ) and Partial Administrations ( <b>PA</b> ) are processed. Empty value will be treated as ' <b>CP</b> '.
RXA-21	Action Code	RE	HL71224	Empty value will be treated as ' <b>A</b> '. Values ' <b>A</b> ', ' <b>U</b> ', and ' <b>D</b> ' accepted
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	R		Sequence number of the OBX. First instance should be set to '1' (one).
OBX-2	Value Type	R		Should be " <b>CE</b> " – coded element.
OBX-3	Observation Identifier	R	NIP003	Only " <b>64994-7</b> " Vaccine funding program eligibility category accepted. All other OBX segments will be ignored.
OBX-4	Observation Sub-ID	R		Required to group related OBX segments
OBX-5	Observation Value	R	HL70064	This is where the code for VFC eligibility will be recorded at the vaccine level.

Segment / Field	Data Element	Usage	HL7 Code Table	Comment
OBX-11	Observation Result Status	R		Constrain to "F" for final.
OBX-14	Date/Time of the Observation	RE		

Once a minimum of 50 test messages have been validated and found to contain zero errors. CAIR asks that the Site send production data from their EHR to CAIR2 production (in a 'testing' state) to ensure data quality. Make sure to include a broad cross section of vaccines in your messages to ensure your EHR is sending the correct vaccine codes (see RXA-5). This 'pre-production' step is designed to address any unforeseen issues that may arise after a Site installs their HL7 interface into production. During 'pre-production', CAIR will monitor production data until it is determined that the data quality is found to be satisfactory. All errors found during both the testing process and the pre-production process should be addressed by the Site and data resubmitted. If there are any errors occurring that require further discussion, a CAIR Data Exchange Specialist (DXS) is available to assist. The CAIR DXS can be reached via email at [CairDataExchange@cdph.ca.gov](mailto:CairDataExchange@cdph.ca.gov). Please include your assigned CAIR Site ID and Sending Facility ID (if you have one) in the email.

**NOTE:** Vendors, HIOs, and other data aggregators that are connecting to the Portal through a hub or cloud based system will only need to send the minimum 50 test messages for their hub interface testing. Once the hub testing is completed, all provider sites having their data sent using this method will be placed into the pre-production phase and monitored as outlined above.

## PRODUCTION DATA SUBMISSION

Once it has been determined by the CAIR DXS that a Site's data has passed pre-production validation, the site is then moved from a 'testing' state to 'production'. Once the Site is officially in production in CAIR2, no further test data should be submitted. While in production, CAIR2 will continue to monitor submissions for data quality to ensure that data coming into CAIR2 meets minimum data quality standards. Beyond the basic HL7 content validation that occurs during message submission, the CAIR's Data Quality Assurance (DQA) will look deeper into the data fields of the incoming HL7 messages for accuracy, completeness, and timeliness. Part of the DQA follow-up process will involve submitting data report cards back to the Sites to let them know how their Site is doing and if there are any issues that need to be addressed. If a Site is found to have data quality below a minimum standard, CAIR DXS staff reserve the right to downgrade the Site to 'testing' status until the DQ issues are resolved.