

CAIR2

Data Exchange 101: How to Ensure Your Clinic Submits Quality Data to CAIR2

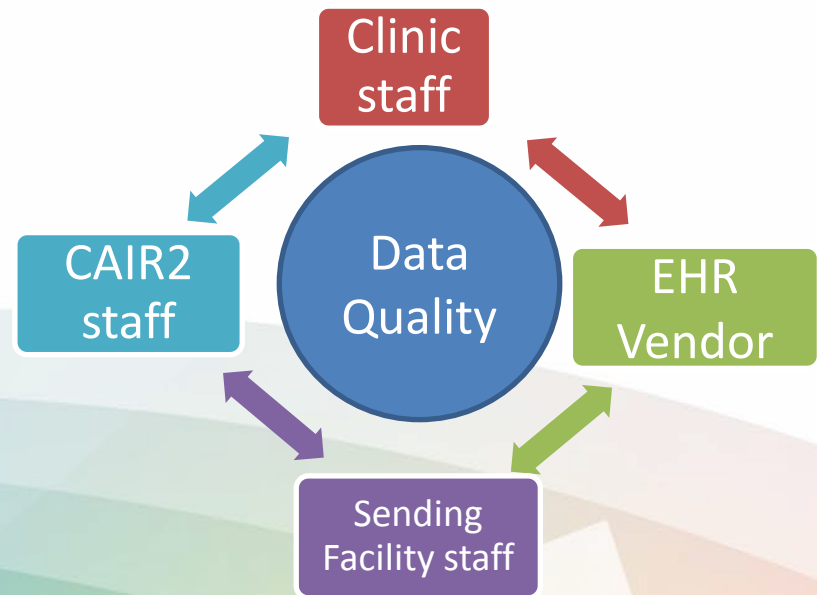
How is Data Quality Defined?

- **Patient Data should be accurate**
 - User Issues - Is patient info entered into EHR correctly?
 - EHR Issues - Is patient info sent to CAIR correctly?
- **Patient Data should be complete**
 - The more patient info CAIR2 has, the higher the probability that incoming data will be merged to the correct patient.
- **Patient Data should be timely**
 - Timely submission guarantees that data is in CAIR by next doctor visit

Maintaining Data Quality

To ensure that only high quality data is sent to CAIR2, sites sending data from EHR systems should make sure their staff:

- Enter accurate and complete patient demographic and shot information into their EHR
- Work with vendor or staff to resolve any data accuracy or integrity issues
- Monitor DE submissions to CAIR2 on an ongoing basis to ensure continuity and accuracy



Know How to Use Your EHR

- Make sure all staff are adequately trained, particularly new staff
- Make sure staff entering all relevant patient info into EHR so data sent to CAIR2 is complete
- Ensure that EHR interface is properly configured for easy and accurate use
 - Drop-down menus are useful but can be improperly used. For instance, a pediatric practice sending only adult Hep B doses to CAIR2 may indicate staff is selecting the wrong vaccine in an EHR drop-down menu

Work with Your EHR Vendor When Issues Arise

- Don't ignore software issues that may impact proper usage and the accuracy of your patient medical records
- Know your EHR contact and report any issues to them
 - Don't be afraid to ask for help; after all, you are paying them for their service!!
 - Work with them to resolve an EHR issues, including any impacting accurate data submission to CAIR2

Ensure that Patient Info Sent to CAIR2 Is Accurate

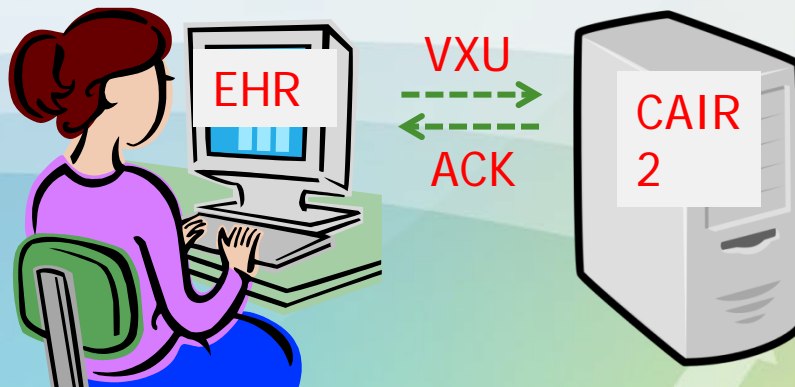
- Confirm data quality by:
 1. Monitoring your clinic's DX message flow and proper data quality either via your EHR or through use of the 'Check Status' screen in CAIR2
 2. Communicate with your vendor if message flow is interrupted or excess errors occur
 3. Periodically look up patients in CAIR2 to make sure the records in CAIR2 accurately reflect what your EHR has sent

Setting Up DX Monitoring in Your Practice

1. Determine how your practice will monitor messaging
 - Some EHRs can receive and display DX acknowledgement (ACK) messages. Consult with your vendor to see if this option is available.
 - If not available, use the DX 'Check Status' function in CAIR2 instead to monitor DX activity. Access requires 'Power' user or 'DX QA' user status in CAIR2.
2. Assign primary responsibility for DX monitoring to one of your staff members
 - Implement an ongoing DX data monitoring process, e.g. daily, weekly, randomly chosen messages, failed messages only, etc.
3. Periodically compare selected patient records in your EHR with the same patient records in CAIR2 to ensure that the information in CAIR2 matches the information in your EHR.

DX Message Types

- A **VXU** message (Vaccine Update, Unsolicited) is the HL7 message type that your EHR uses to send patient vaccinations to CAIR2.
- An **ACK** message is an 'acknowledgement' message sent back to your EHR by CAIR2 indicating the message status.



VXU Message Structure

- Multiple segments, multiple fields per segment
 - *MSH* (Message Info)
 - *PID* (Patient Info)
 - *PD1* (Additional Patient Info, e.g. Disclosure, sharing status, etc.)
 - *NK1* (Next of Kin Info)
 - *ORC* (Order Control, required with RXA)
 - *RXA* (Treatment/Vaccination Info)
 - *RXR* (Vaccine Route /Body Site Info)
 - *OBX* (Additional Vaccine Info, e.g. VFC eligibility, VIS date, etc.)
- Fields within segments are pipe-delimited (|), subfields are hat-delimited (^)
- Many Fields, SubFields have defined codesets (e.g. CVX, MCX)

Sample VXU

MSH|^~\&|MyEMR|DE-000001| |CAIRLO|20160701123030-
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||2106-
3^WHITE^CDCREC|1234 W FIRST ST^^BEVERLY
HILLS^CA^90210^^H||^PRN^PH^^^555^5555555||ENG^English^HL70296|||2186-5^not Hispanic or
Latino^CDCREC||Y|2

PD1|||||||02^REMINDER/RECALL – ANY METHOD^HL70215|N|20140730||A|20140730|

NK1|1|JONES^MARTHA^^^L|MTH^MOTHER^HL70063|1234 W FIRST ST^^BEVERLY
HILLS^CA^90210^^H|^PRN^PH^^^555^5555555|

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^MERCK^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|||20110701140500

ACK Message Structure

```
MSH|^~\&|CAIR IIS4.0.0|CAIR IIS||DE-000001|20160630||ACK^V04^ACK|1791129|P|2.5.1|||||CAIR IIS|DE-000001|
MSA|AE|1791129|
ERR|RXA^1^10^1^13|0^Message accepted^HL70357|W|5^Table value not found^HL70533|||Informational error - No
value was entered for RXA-10.13
```

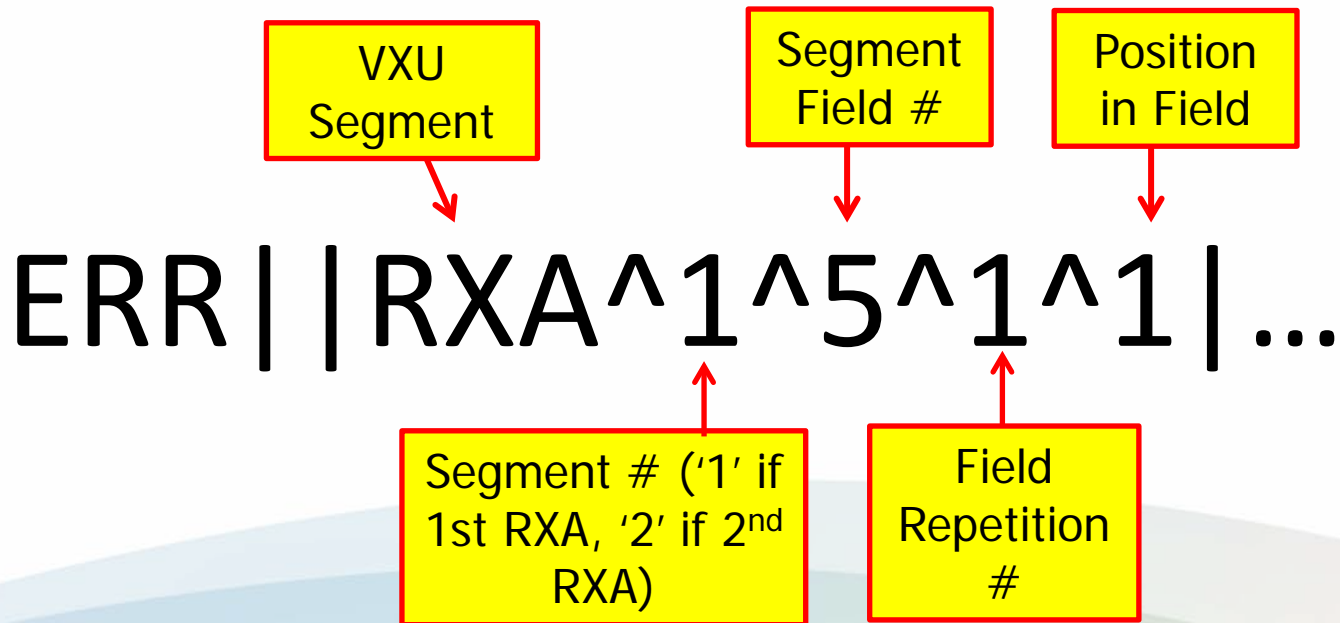
- Three Segments

- *MSH (Message Header segment)*
- *MSA (Acknowledgment segment)*
 - *MSA-1 (Ack Code)*
 - ‘AA’ (Accepted)
 - ‘AE’ (Error)
 - ‘AR’ (Error, Rejected)
 - *MSA-2 (Message Control ID)*
 - Also in VXU (MSH-10)
- *ERR (Error segment - there may be several of these)*
 - *ERR-2 (Error Location, e.g. Segment, field)*
 - *ERR-3 (HL7 Error Code, see Table HL7 0357)*
 - *ERR-4 (Severity: “E” > “W” > “I”)*
 - *ERR-5 (Application Error Code, see Table HL7 0533)*
 - *ERR-8 (User Message) – Description of error and outcome*

How to Read/Interpret Your ACK Messages

- If an ACK message has no 'ERR' segment, message/data was accepted by CAIR2
- If ACK has ERR segment, determine:
 - Error location in message (ERR-2 field)
 - Error severity (ERR-4 field, is it 'E' > 'W' > 'I'?)
 - Error description (ERR-8 field)
- Report errors/send failed messages to vendor, particularly if:
 - A high percentage of messages have errors (>5%)
 - There are distinct error patterns (multiple messages with the same error)

How to Read ACK ERR-2 (Error Location) Field



So this VXU's error is located in RXA-5.1 (RXA-5 field, 1st position)

ACK Error Example #1

1. Invalid Vaccine Code (ERR-2 = 'RXA-5.1', ERR-4='E', ERR-8= 'RXA IGNORED-invalid code')

ACK

MSH|^~\&|CAIR IIS2.0.0.0|CAIR IIS||DE-007957|20161128||ACK^V04^ACK|420122|P|2.5.1|||||||CAIR IIS|DE-007957

MSA|**AE**|420122

ERR||**RXA^1^5^1^1**|102^Data type error^HL70357|**E**|4^Invalid value^HL70533||**RXA IGNORED - 368 is an invalid CVX code**

VXU

MSH|^~\&|TESTAPP|DE-007957|IMMUM|CAIR2|20161128||VXU^V04^VXU_V04|420122|P|2.5.1|||NE|AL|||||DE-007957|

PID|1||20130399^^^HLN^MR||Short^Keith^^^^L||20040501|M||2054-5^African American^HL70005|1096 Lazy Drive^^New Deal^CA^94607-4944^USA||^PRN^PH^^^555^7077279|||||||2186-5^not Hispanic^CDCREC

PD1|||^^^NG|1600000000^Mean Joe^Greene^^^^^NG^^^NP|||||N|20161001

NK1|1|Howard^Natalie^^^^L|MTH^Mom^HL70063|4038 Mozart Drive^^El Sobrante^CA^94803^^L

ORC|RE|||||||1595^Carpio^Francisco^^^^^NG||1417991407^Carpio^Francisco^Camaclang^^^^^NG^^^NP

RXA|0|1|20161001|20161001|**368**^meningococcal MMVC4^CVX^^|0.500|mL^Milliliters^UCUM||00^New immunization

record^NIP001|1417991407^SMITH^JOHN^^^^^NG^^^XX|43GARDNERSC^^^||M15167-vfc|20171031|SKB^GlaxoSmithKline^MVX|||CP|A

RXR|IM^Intramuscular^HL70162|LD^Left Deltoid^HL70163

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

Managed^HL70064|||||F|||20161001104000||VXC40^Eligibility captured at the immunization level^CDCPHINVS

OBX|2|TS|29768-9^Date vaccine information statement published^LN|2|20111014|||||F

ACK Error Example #2

2. Missing OBX-3, leading to RXA rejection (ERR-2 field = 'OBX-3, RXA-0', ERR-4 field = 'E', ERR-8 field = 'RXA rejected because of invalid OBX')

ACK

MSH|^~\&|CAIR IIS2.0.0.0|CAIR IIS||DE-007957|20161125||ACK^V04^ACK|410103|P|2.5.1|||||||CAIR IIS|DE-007957
MSA|AE|410103

ERR|1|**OBX^1^3^0**|101^Required field missing^HL70357|**E**|6^Required observation missing^HL70533|||INACCURATE OR MISSING
OBSERVATION VALUE. NO VALUE STORED.

ERR|2|**OBX^1^3^0**|101^Required field missing^HL70357|**W**|6^Required observation missing^HL70533|||**OBX #1 IGNORED -
REQUIRED FIELD OBX-3 MISSING.**

ERR|3|**RXA^1^^0**|102^Data type error^HL70357|**E**|6^Required observation missing^HL70533|||**RXA #1 rejected because of invalid
OBX**

VXU

MSH|^~\&|TESTAPP|DE-007957|IMMUM|CAIR2|20161125||VXU^V04^VXU_V04|410103|P|2.5.1||NE|AL|||||DE-007957|
PID|1||20130396^^^HLN^MR||Mitchell^Sophie^^^^L||20060501|M||2076-8^Hawaiian^HL70005|2622 Crystal Swalel^^Semiahmoo^CA^990415-
8494^USA|^PRN^PH^^^555^5132338|||||||2186-5^not Hispanic^CDCREC
PD1||^NG|1500000000^Shatner^William^^^^^NG^^^NP|||||||N|20161001
NK1|1|Bower^Katherine^^^^L|MTH^Mom^HL70063|324 Warwick Ave^^Oakland^CA^94610^^L
ORC|RE|||||||1595^Carpio^Francisco^^^^^NG||1417991407^Carpio^Francisco^Camaclang^^^^^NG^^^NP
RXA|0|1|20161001|20161001|168^meningococcal MVC4^CVX^^^|0.500|mL^Milliliters^UCUM||00^New immunization
record^NIP001|1417991407^SMITH^JOHN^^^^^NG^^^XX|43GARDNERSC^^^||M15167-vfc|20171031|SKB^GlaxoSmithKline^MVX|||CP|A
RXR|IM^Intramuscular^HL70162|LD^Left Deltoid^HL70163
OBX|1|CE|**???**|1|V02^VFC eligible - Medi-Cal/Medi-Cal Managed^HL70064|||||F|||20161001104000||VXC40^Eligibility captured at the
immunization level^CDCPHINVS
OBX|2|TS|29768-9^Date vaccine information statement published^LN|2|20111014|||||F

ACK Error Example #3

3. MSH-11 - Incorrect Processing ID Type (MSA-1 field = 'AR', ERR-2 field = 'MSH-11', ERR-4 field = 'E', ERR-8 field = 'MESSAGE REJECTED. INVALID PROCESSING ID. MUST BE P) ؟ ؟

ACK

MSH|^~\&|CAIR IIS2.0.0.0|CAIR IIS||DE-007957|20161130||ACK^V04^ACK|420182|P|2.5.1|||||CAIR IIS|DE-007957
MSA|AR|420182

ERR||MSH^1^11|202^Unsupported processing ID^HL70357|E|4^Invalid value^HL70533||MESSAGE REJECTED. INVALID PROCESSING ID. MUST BE ؟P.؟.

ERR||MSH^1^11|103^Table value not found^HL70357|W|5^Table value not found^HL70533||Informational Error - If supplied, MSH-11 should match constraint listed in spec

VXU

MSH|^~\&|TESTAPP|DE-007957|IMMUM|CAIR2|20161128||VXU^V04^VXU_V04|420182|Z|2.5.1|||||NE|AL|||||DE-007957|
PID|1||20130399^^^HLN^MR||Short^Keith^^^^L||20040501|M||2054-5^African American^HL70005|1096 Lazy Drive^^New Deal^CA^94607-4944^USA||^PRN^PH^^^555^7077279||||||2186-5^not Hispanic^CDCREC||
PD1||^NG|1600000000^Mean Joe^Greene^^^^NG^^^NP|||||N|20161001|||
NK1|1|Howard^Natalie^^^^L|MTH^Mom^HL70063|4038 Mozart Drive^^EI Sobrante^CA^94803^^L
ORC|RE|||||1595^Carpio^Francisco^^^^NG||1417991407^Carpio^Francisco^Camaclang^^^^NG^^^NP
RXA|0|1|20161001|20161001|168^meningococcal MVC4^CVX^^^0.500mL^Milliliters^UCUM||00^New immunization record^NIP001|1417991407^SMITH^JOHN^^^^NG^^^XX|43GARDNERSC^^^||M15167-vfc|20171031|SKB^GlaxoSmithKline^MVX||CP|A
RXR|IM^Intramuscular^HL70162|LD^Left Deltoid^HL70163
OBX|1|CE|64994-7^Vaccine funding program eligibility category^LN|1|V02^VFC eligible - Medi-Cal/Medi-Cal Managed^HL70064|||||F||20161001104000||VXC40^Eligibility captured at the immunization level^CDCPHINVS
OBX|2|TS|29768-9^Date vaccine information statement published^LN|2|20111014|||||F

Using DX Check Status to Monitor ACK Messages

- Only available to 'DX Power' and 'DX QA' users
- Login using your CAIR ID, Username, and Password

CAIR2 California Immunization Registry

HOME USER RESOURCES RELATED LINKS TRAINING

TRN
.....

Org Code:

Username:

Password:

Login

DO NOT ATTEMPT TO LOG ON UNLESS YOU ARE AN AUTHORIZED USER.
.....

Forgot Password?

Hot Topics [HT-1](#)

Welcome to the California Immunization Registry, CAIR! *Posted on 08/19/2015*

If you are an authorized user, please login using your unique combination of Organization Code, Username, and Password.

If you are a new user, please visit the training tab above to access training options. If you are from an organization requesting access for the first time, go to the [CAIR Enrollment](#) page to enroll. For additional information, contact the CAIR Help Desk at 800-578-7889 or CAIRHelpDesk@cdph.ca.gov. Hours are 8:00 a.m. - 5:00 p.m. Monday through Friday, excluding government holidays.

This site will work optimally for users logging in with Internet Explorer browsers versions 8 or higher, as well as Chrome, Safari or Firefox. If you are using alternate browsers and experience display issues, please consider switching to one of the supported browsers.

- [About The California Immunization Registry](#)
- [Disclaimer](#)
- [Contact Us](#)

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Using DX Check Status to Monitor ACK Messages

- Click 'Check status' under *Data Exchange*

The screenshot displays the CAIR2 web application interface. The top navigation bar includes links for home, manage access/account, forms, related links, logout, and help desk. The user is identified as Steve Nickell, a CAIR DX Power User, with the organization being the State of California Immunization Registry.

The left sidebar contains a menu with categories: Patients, Reports, and Inventory. The 'Data Exchange' section is highlighted, and the 'check status' option is selected.

The main content area shows announcements and release notes. Below these, there are sections for 'Vaccine Order/Transfer Notification ...', 'Active Inventory that is Going to Expire or Expired Lots with a Quantity ...', 'Inventory that is Running Low by Vaccine Group ...', and 'Inventory that is Running Low by Trade Name ...'. Each section contains a table of data.

Vaccine Order/Transfer Notification ...

Type	Shipped	Awaiting Return Shipment	Rejected
Order(s)		No Order Notification	
Transfer(s)		No Transfer Notification	

Active Inventory that is Going to Expire or Expired Lots with a Quantity ...

Site Name	Trade Name	Lot Number	Funding Source	On Hand	Exp Date
State of California Immunization Registry	Fluzone Quad PF 0.25mL	HELLOPUPPY247	VFC	297	08/10/2016
State of California Immunization Registry	FluLaval	HELLOKITTY247	PVT	58	08/09/2016

Inventory that is Running Low by Vaccine Group ...

Vaccine Group	Funding Source	Quantity On Hand
No vaccine groups have a low inventory.		


Inventory that is Running Low by Trade Name ...

Trade Name	Funding Source	Quantity On Hand
No trade names have a low inventory.		

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Using DX Check Status to Monitor ACK Messages

- From the 'Show' dropdown, choose over what period you would like to review recent messages.
- Choose 'Yes' from the 'Realtime?' dropdown as most Sites are submitting messages in real-time.



CAIR2

TRN 4.0.0

organization State of California Immunization Registry • user Steve Nickell • role CAIR DX Power User

Exchange Data Status

Show Realtime? Refresh

Job Name	Job Name	Exchange Data Date	Process Status	Process End Date	Status
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Using DX Check Status to Monitor ACK Messages

- The *Job Name* lists each messages received by CAIR2 from your Site during the period shown
- The status of messages that are **COMPLETE** can be viewed by clicking on the *Job Name*

CAIR2
TRN 4.0.0

home manage access/account forms related links logout help desk

organization State of California Immunization Registry • user Steve Nickell • role CAIR DX Power User

Exchange Data Status

Show Past 15 Days Realtime? Yes Refresh

Job Name	User Name	Exchange Data Date	Process Start Date	Process End Date	Status
Realtime 07/28/2016 02:58:18	real time	07/28/2016 14:58:18	07/28/2016 14:58:18	07/28/2016 14:58:18	COMPLETE
Realtime 07/28/2016 02:54:08	real time	07/28/2016 14:54:08	07/28/2016 14:54:08	07/28/2016 14:54:09	ERROR
Realtime 07/28/2016 02:47:19	real time	07/28/2016 14:47:19	07/28/2016 14:47:19		PROCESSING
Realtime 07/28/2016 09:24:16	real time	07/28/2016 09:24:16	07/28/2016 09:24:16	07/28/2016 09:24:18	COMPLETE
Realtime 07/26/2016 02:52:29	real time	07/26/2016 14:52:29	07/26/2016 14:52:29		PROCESSING
Realtime 07/26/2016 02:05:56	real time	07/26/2016 14:05:56	07/26/2016 14:05:56	07/26/2016 14:05:56	ERROR
Realtime 07/26/2016 01:32:36	real time	07/26/2016 13:32:36	07/26/2016 13:32:36	07/26/2016 13:32:37	COMPLETE
Realtime 07/26/2016 10:56:18	real time	07/26/2016 10:56:18	07/26/2016 10:56:18	07/26/2016 10:56:18	COMPLETE
Realtime 07/26/2016 10:45:07	real time	07/26/2016 10:45:07	07/26/2016 10:45:07	07/26/2016 10:45:07	COMPLETE
Realtime 07/26/2016 10:34:26	real time	07/26/2016 10:34:26	07/26/2016 10:34:26	07/26/2016 10:34:27	COMPLETE
Realtime 07/26/2016 10:25:41	real time	07/26/2016 10:25:41	07/26/2016 10:25:41	07/26/2016 10:25:41	COMPLETE
Realtime 07/26/2016 10:24:57	real time	07/26/2016 10:24:57	07/26/2016 10:24:57	07/26/2016 10:24:57	COMPLETE
Realtime 07/26/2016 10:24:00	real time	07/26/2016 10:24:00	07/26/2016 10:24:00	07/26/2016 10:24:00	COMPLETE
Realtime 07/26/2016 10:21:43	real time	07/26/2016 10:21:43	07/26/2016 10:21:43	07/26/2016 10:21:43	COMPLETE
Realtime 07/26/2016 10:18:38	real time	07/26/2016 10:18:38	07/26/2016 10:18:38	07/26/2016 10:18:38	COMPLETE
Realtime 07/26/2016 10:17:47	real time	07/26/2016 10:17:47	07/26/2016 10:17:47	07/26/2016 10:17:48	COMPLETE

Patients
patient search

Reports
reminder / recall
check reminder status
check reminder list
manage custom letters
cocasa extract
check request status
vaccine eligibility
check vaccine elig status
group patients
check group status
assessment report
check assessment
benchmark report
check benchmark
ad hoc list report
ad hoc count report
ad hoc report status
accountability report
request
check vaccine
accountability
state supplied flu report
state supplied vaccine
report

Inventory
manage inventory
manage transfers
doses administered
inventory count list

Data Exchange
check status

Using DX Check Status to Monitor ACK Messages

- The *Summary Information* table reveals whether the patient record has been updated and what information was added or updated.
- Both the submitted HL7 VXU message ('Inbound HL7 251 File') and the HL7 ACK ('HL7 251 Response') sent back to the submitter can be viewed.

The screenshot shows the CAIR2 web application interface. The top navigation bar includes links for home, manage access/account, forms, related links, logout, and help desk. The user is identified as Steve Nickell, a CAIR DX Power User, for the State of California Immunization Registry.

Under the 'Download Files for: Realtime 07/28/2016 02:58:18' section, there are two links: [HL7 251 Response \(1KB \)](#) and [Inbound HL7 251 File \(1KB \)](#). A red arrow points to the 'HL7 251 Response' link.

Below this is the 'Download Log for: Realtime 07/28/2016 02:58:18' section, which contains a table with the following data:

File	User Name	Download Date
Inbound HL7 251 File	Luis Chavez	08/03/2016 13:42:26
Inbound HL7 251 File	Luis Chavez	08/03/2016 13:42:34
HL7 251 Response	Luis Chavez	08/03/2016 13:42:23

At the bottom, the 'Summary Information for: Realtime 07/28/2016 02:58:18' section features a table with the following data:

Description	Patient	Immunization	Comment	Event	TBTest
Processed	1	1	0	0	0
Accepted	1	1	0	0	0
New	0	1	0	0	0
Updated	1	0	0	0	0
Deleted	-	0	-	-	-
Already in CAIR IIS	0	0	0	0	0
Rejected	0	0	0	0	0
Pending	0	0	0	0	0
Unprocessed (patient rejected)	-	0	0	0	0
Inventory Updated	0	0	0	0	0
Inventory Not Updated	0	1	0	0	0

A red arrow points to the 'Summary Information for: Realtime 07/28/2016 02:58:18' header.

Set Up A Schedule to Monitor DX!

- Choose at least one day per week to monitor messages
- Randomly choose 10 messages and review their status
- If 2 or more (>20%) have failed (message is rejected), open a handful more and determine if the failed messages show a consistent pattern.
- Communicate findings to your EHR vendor so he can fix.

To Request A New Account

- Go to CAIRWEB.ORG



Find out more about CAIR2

- ▶ **Pharmacies and CAIR**
Learn more about how pharmacies can report immunizations to CAIR.
- ▶ **CAIR IZ Portal – Please Login Now to Update Your Site Information!**
So CAIR can continue to communicate with your data exchange Site, please login to the [CAIR IZ Portal](#) and update your Site info.
- ▶ **CAIR Enrollment/Account Management is Now Online!** [Learn more »](#)
 - To register for electronic data submission, go to the [CAIR IZ Portal](#)
 - To enroll in CAIR to get web access, register at [CAIR New Enrollment](#)
 - To update your Account/ add Users, go to [CAIR Account Update](#)

Questions?

- CAIRDataExchange@cdph.ca.gov