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 | CDCPHINV | DE-000001
```

**PID**
```
1 | PA123456 | MYEMR | MR | JONES | GEORGE | M | JR | L MILLER | MARTHA | G | M | 2106-3 | WHITE | CDCREC | 1234 W FIRST ST | BEVERLY
```

**PID**
```
1 | JONES | MARTHA | L | MTH | MOTHER | HL70063 | 1234 W FIRST ST | BEVERLY
```

**ORC**
```
RE | 197023 | CMC | Clark | Dave | Smith | Janet
```

**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

• 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^^^^NP|1417991407^Carpio^Francisco^Camaclang^^^^NG^^^^NP
RXA|0|1||20161001|20161001|368^meningococcal MMVC4^CVX^^|^0.500|mL^Milliliters^UCUM||0^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|11111111||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^1^0^0|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|20060501|M|2076-8^Hawaiian^HL70005|2622 Crystal Swalel^Semiahmoo^CA^990415-8494^USA|^PRN^PH^555^5132388|2186-5^not Hispanic^CDCREC
PD1^^^^NG|1500000000^Shatner^William^^^^NG^^^^NP|||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|20161000|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|11111111||20161001104000||VXC40^Eligibility captured at the immunization level^CDCPHINVS
OBX|2|TS|29768-9^Date vaccine information statement published^LN|2|20111014|11111111||
ACK Error Example #3


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^El Sobrante^CA^94803|^L

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

RXA[0]|20161001|20161001|168^meningococcal MVC4^CVX|^0.500|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|V02^VFC eligible - Medi-Cal/Medi-Cal Managed|^HL70064|||F|21610011040000^VXC40^Eligibility captured at the immunization level^CDCPHINVS

OBX[2]|TS|29768-9^Date vaccine information statement published^LN|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
Using DX Check Status to Monitor ACK Messages

- Click ‘Check status’ under Data Exchange
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.
Using DX Check Status to Monitor ACK Messages

- The Job Name lists each message 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.
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.
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
Questions?

- CAIRDataExchange@cdph.ca.gov