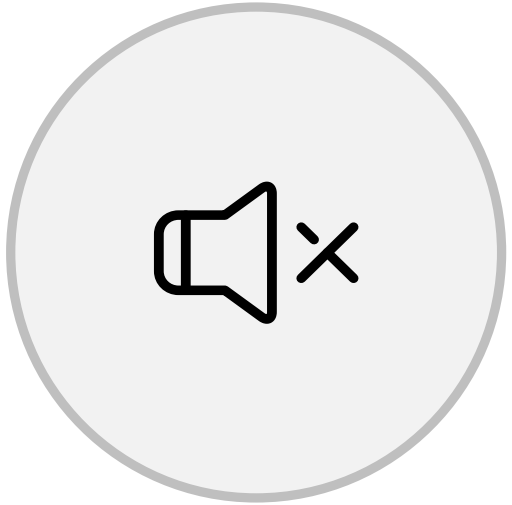
AIRA
AMERICAN IMMUNIZATION REGISTRY ASSOCIATION

AIRA Discovery Session

CDS Assessment in AART: Getting the most out of your report

June 24, 2019
4pm ET

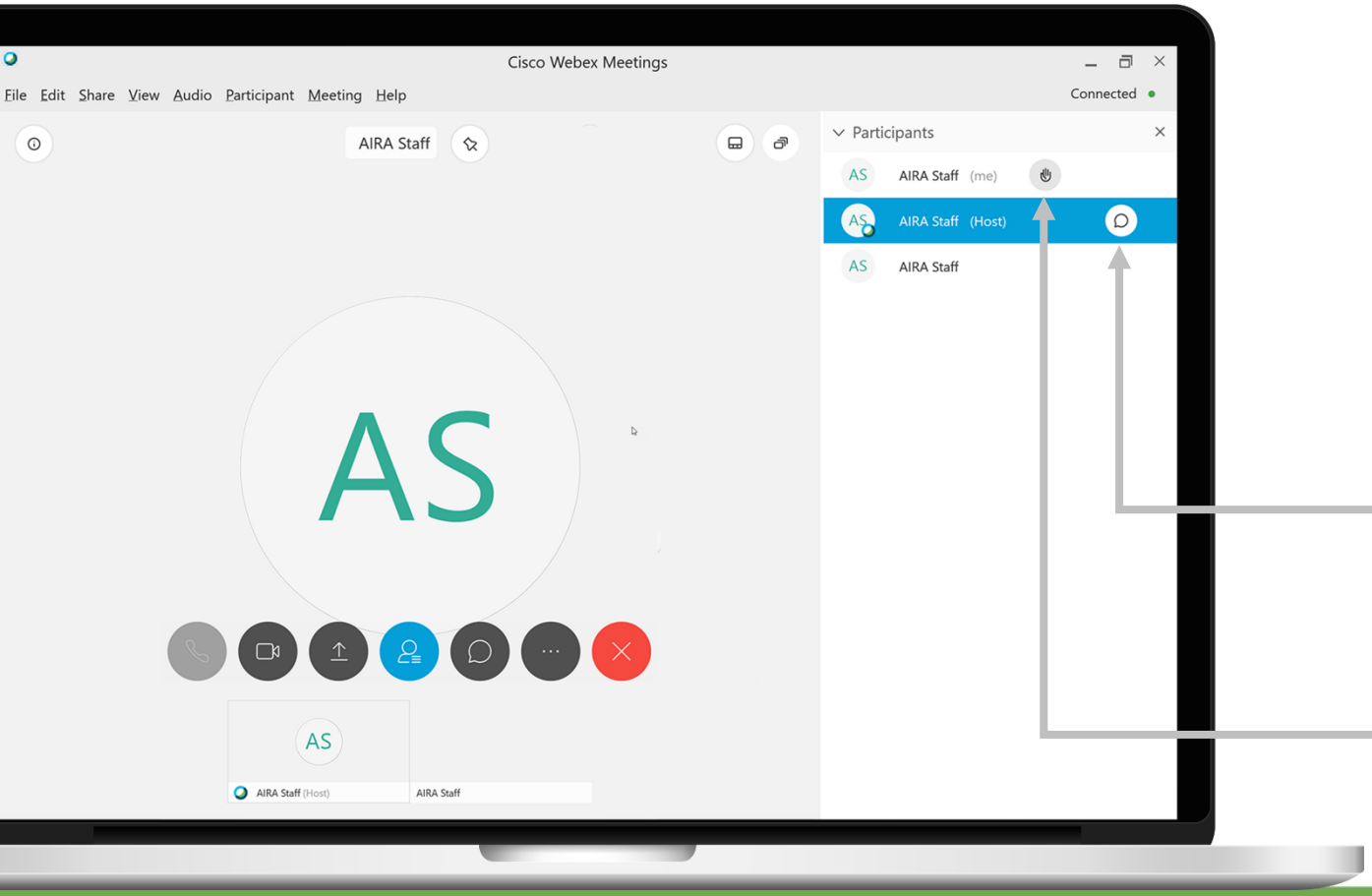
Welcome



All phone lines
are muted

This meeting is being recorded
and will be posted on the
AIRA repository

Welcome



How do I ask a question?

- There will be time allotted for Q&A following the presentation, to unmute your line press *6
- Via WebEx:

Select the chat icon next to the host and type question into the chat box.

Select the hand icon next to your name and you will be called on.

Today's Topic

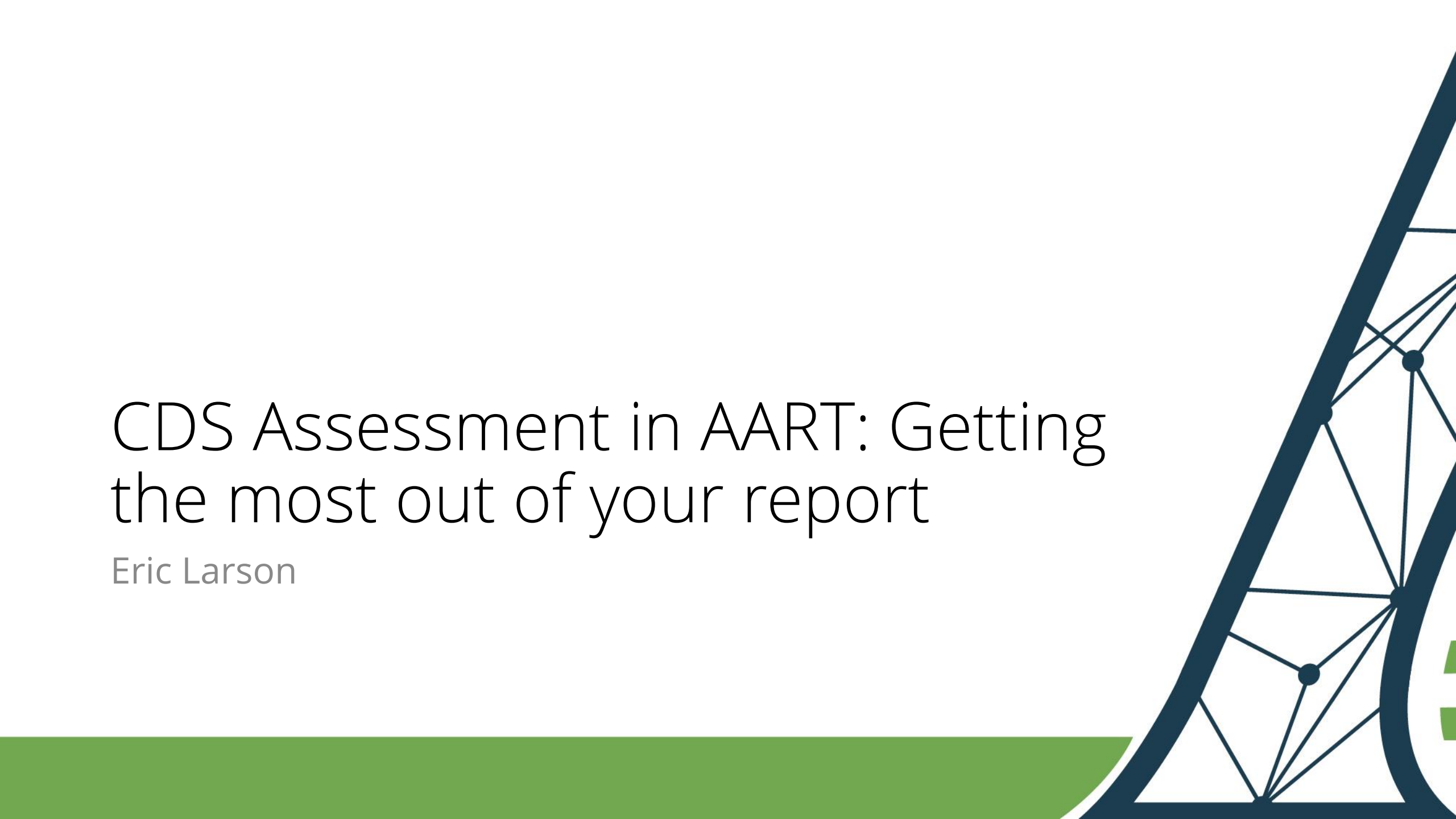
- Increase understanding of how to interpret Clinical Decision Support (CDS) testing results in the Aggregate Analysis Reporting Tool (AART)
- Hear about how this information is being used out in the wild
- Questions, Comments, Discussion

Today's Speakers

- Eric Larson, Senior Technical Project Manager, AIRA
- Kevin Snow, Senior Developer and Architect, Envision Partners
- Brad Couse, Senior Developer, Envision Partners
- David Baron, Clinical Applications Coordinator, Tennessee Department of Health Immunization Program
- Liz Harris, Public Health Nurse Consultant, Tennessee Department of Health Immunization Program

CDS Assessment in AART: Getting the most out of your report

Eric Larson



Topics

- Background
- CDS Assessment
- Preliminary Baseline Aggregate Results
- AART Demo of CDS Assessment – if time permits

Background

AIRA's Measurement for Assessment and Certification Advisory Workgroup (MACAW)

Jane Lammers, Nevada IIS - Co-Chair

Aaron Bieringer, Minnesota IIS - Co-Chair

Shannon Coleman, STC

Roger Aikin, Arizona IIS

Jillian Doss-Walker, IHS

Dave McCormick, Indiana Imm Program

Rob Snelick, NIST

Amy Metroka, NYC IIS

Wendy Nye, Michigan IIS

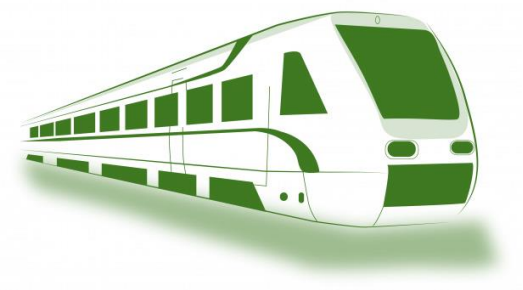
Josh Hull, Michigan IIS

LaTreace Harris, IISSB, CDC

Eric Schuh, DXC

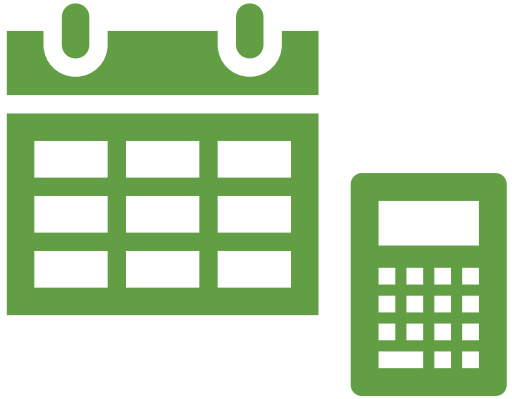
Kevin Snow, Envision Technology

Standards Alignment



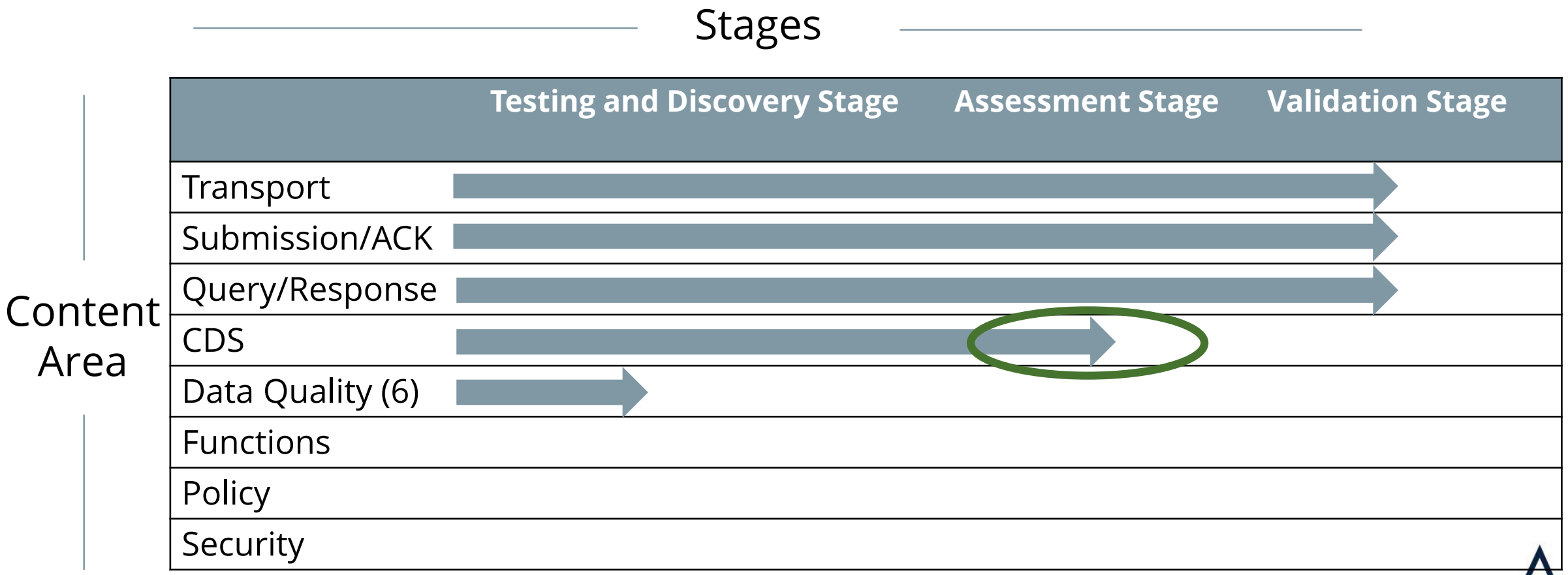
Transport
13 Page Specification

HL7 V2
408 Page IG
28 Page Addendum
Additional Guidance Documents

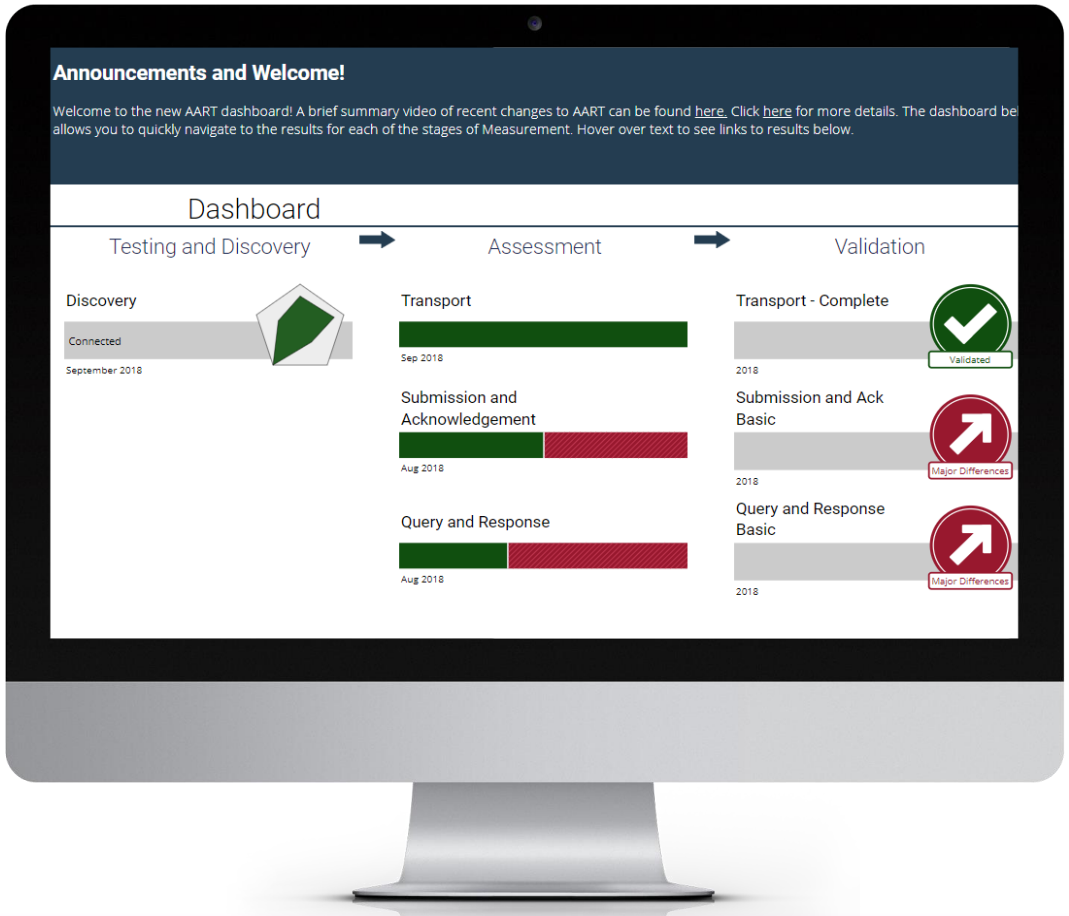


CDS
139 Page Logic Specification
23 Disease Specific Excel Spreadsheets
Future Iterations Continue…

Measurement and Improvement Initiative is a Sequenced, Rolling Process



Aggregate Analysis Reporting Tool (AART)



- AIRA developed measurement Tool
- Testing is performed on a quarterly basis
- Each IIS has a dashboard of their individual results
- Quarterly national aggregate reports are developed and published

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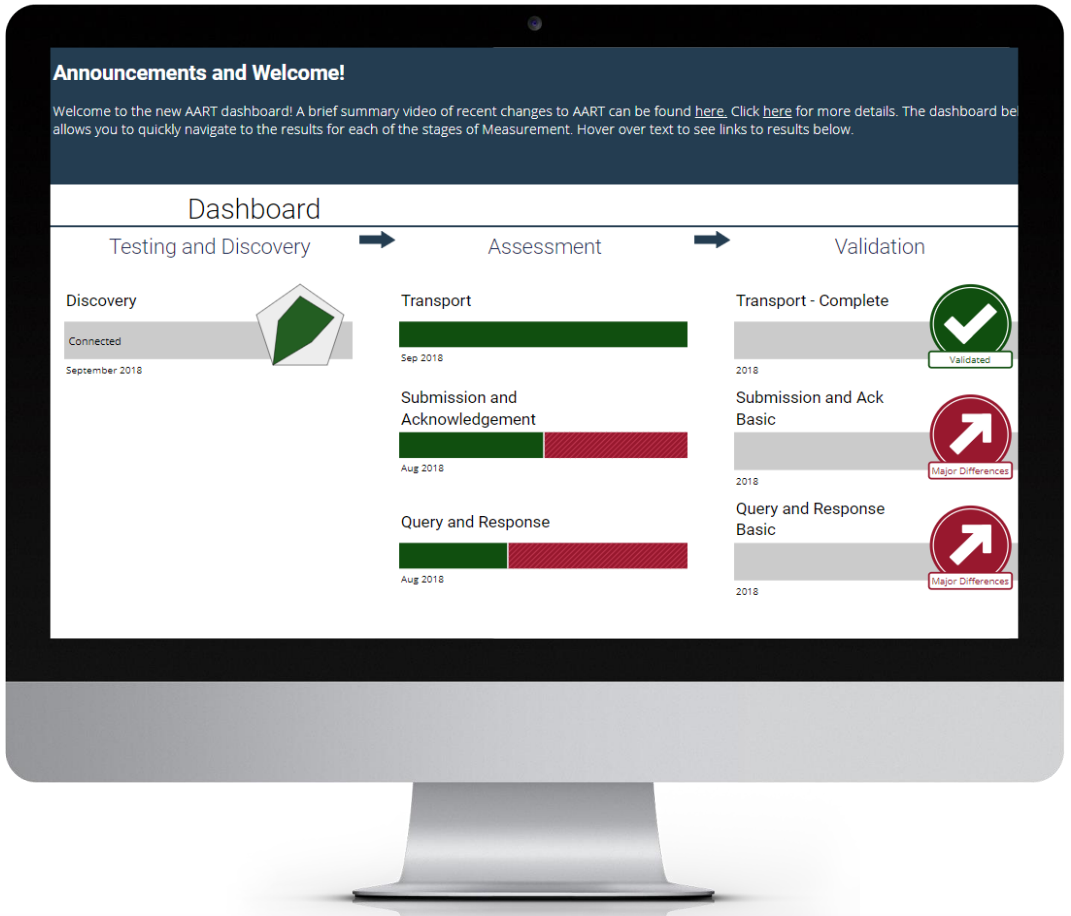
NIST
National Institute of Standards and Technology
U.S. Department of Commerce



CDC WSDL Validator

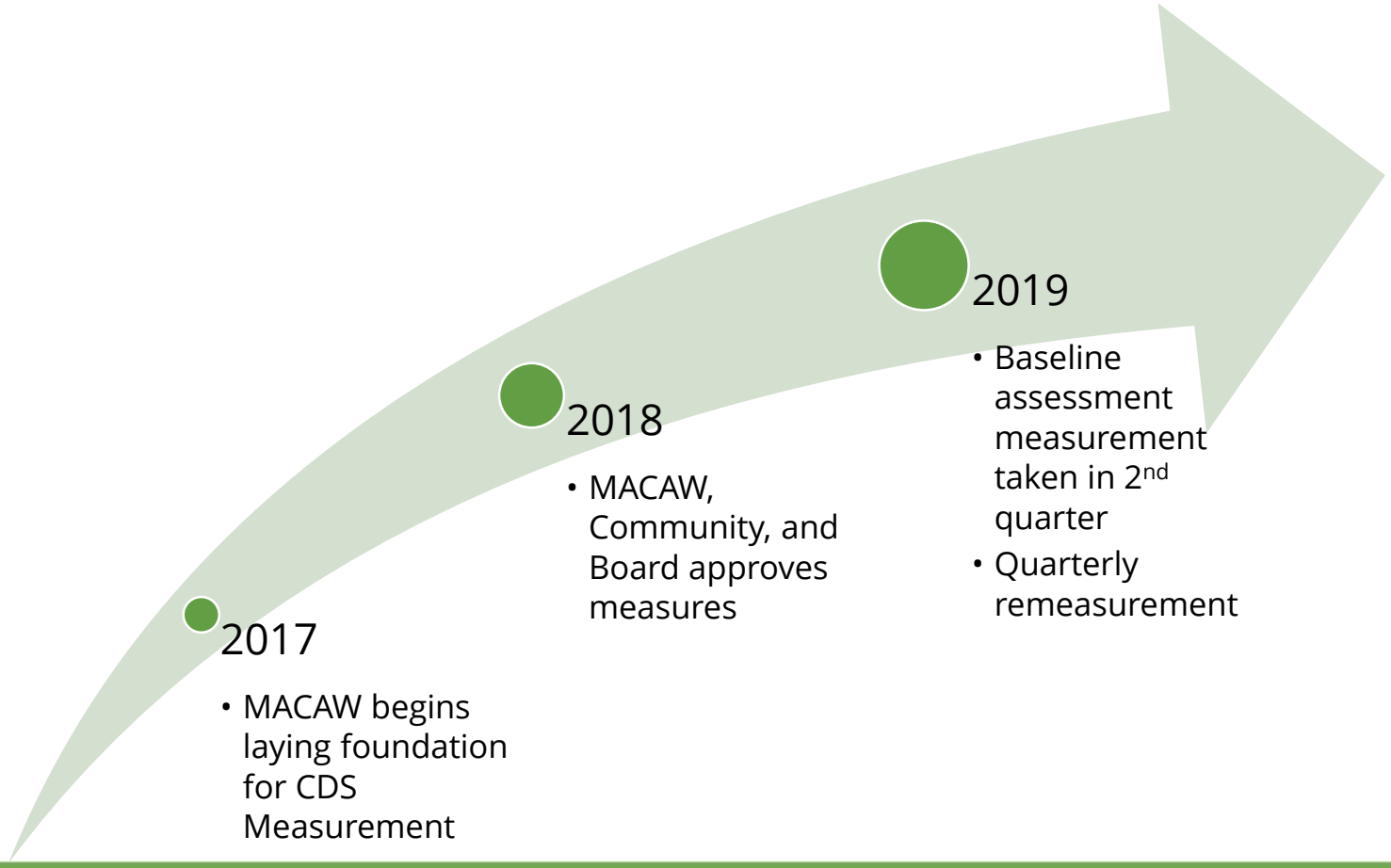
HL7 VXU/ACK Validator

HL7 QBP/RSP Validator

CDS Test Case Management and Execution

CDS Assessment

High-level Timeline for CDS



Clinical Decision Support (CDS)

Functional Standard 10
The IIS forecasts *pediatric, adolescent, and adult* immunizations in a manner consistent with Advisory Committee on Immunization Practices (ACIP) recommendations

Pediatric

Birth through 6 years
DTaP, Hep A, Hep B, Hib, MMR, PCV, Polio, Rotavirus, Varicella, Influenza

Adolescent

7 years through 18 years
HPV, Meningococcal, Tdap/Td, Influenza, Hep B, MMR, Polio, Varicella

Adult

19 years and above
Tdap/Td, Zoster, PCV, PPSV, Influenza, HPV, Varicella, Meningococcal

- Routine age-based (including catch-up) recommendations will be tested
- Increased risk, immunities, and contraindications are out of scope at this time

CDS Measures and Tests

CDS Concept	Supports	Accuracy
Evaluation Status *Did the dose count?*		Pediatric (503) Adolescent (140) Adult (22)
Earliest Date *When could the next dose be given?*		Pediatric (427) Adolescent (116) Adult (22)
Recommended Date *When should the next dose be given?*		Pediatric (427) Adolescent (116) Adult (22)

Test Cases

- Majority from latest version of CDSi at beginning of quarter
  - Some tests were intentionally excluded in Assessment
    - All IIS merged doses
    - Test cases created HL7 challenges (e.g., test case in past)

- Additional AIRA-created tests added to test areas CDSi doesn't
  - Expected results based on CDSi Logic Specification and Supporting Data

Testing Methodology

- Existing HL7 interfaces are leveraged to test CDS
  - number of test cases
  - current IT landscape
  - sustainability of a quarterly process

- Basic process
  - AIRA submits patient and immunizations to IIS via VXU message
  - AIRA queries for the patient and analyzes the CDS response from the IIS

Testing Methodology (Cont'd)

- To be measured, the IIS must
  - Process a basic VXU with one or more historical vaccination events
  - Be able to respond to a query for the patient in a timely manner
    - <70 seconds from submission
  - Include CDS in their RSP
  - Adhere to CDS rules in HL7
    - e.g., must use proper LOINC codes, CVX codes, etc.

Testing Methodology (Cont'd)

- This has some limitations
  - Not all IIS are able to be measured
  - Not all tests can be measured across all IIS
    - IIS deduplicate vaccines through similar, but not identical set of rules.
    - What is a duplicate vaccine (and merged) in one IIS, may not be in another
  - Just because an IIS doesn't return a concept in HL7, doesn't necessarily imply the CDS engine doesn't have the concept.

Preliminary Baseline Aggregate Results

CDS Measures and Tests

CDS Concept	Supports	Accuracy
Evaluation Status *Did the dose count?*	✓	Pediatric (503) Adolescent (140) Adult (22)
Earliest Date *When could the next dose be given?*	✓	Pediatric (427) Adolescent (116) Adult (22)
Recommended Date *When should the next dose be given?*	✓	Pediatric (427) Adolescent (116) Adult (22)

Preliminary Assessment Results

CDS Concept	Supports (N=34)
Evaluation Status *Did the dose count?*	**13**
Earliest Date *When could the next dose be given?*	**32**
Recommended Date *When should the next dose be given?*	**34**

Preliminary Assessment Results

CDS Concept	Supports (N=34)	Meets*	Deviates*
Evaluation Status *Did the dose count?*	**13**	**9**	**1**
Earliest Date *When could the next dose be given?*	**32**	**12**	**7**
Recommended Date *When should the next dose be given?*	**34**	**10**	**7**

* Meets and Deviates represent the average number of IIS across three accuracy measures (peds, adolescent, & adult)

General Recommendations

- Include Evaluation Status in your HL7
- Focusing on low performing Vaccine Groups can greatly improve alignment.
  - Many IIS only had 1 or 2 vaccine groups which were problematic
- Overall HepB, DTaP/Tdap/Td, and HPV were the lowest scoring and may be the best place to focus in the near term

CDS Assessment: An IIS Vendor Perspective

Kevin Snow and Brad Couse, Envision Partners

June 2019

Supporting CDSi through HL7

Implementing and Maintaining Immunization Forecast and Evaluation through HL7

Brad Couse and Kevin Snow

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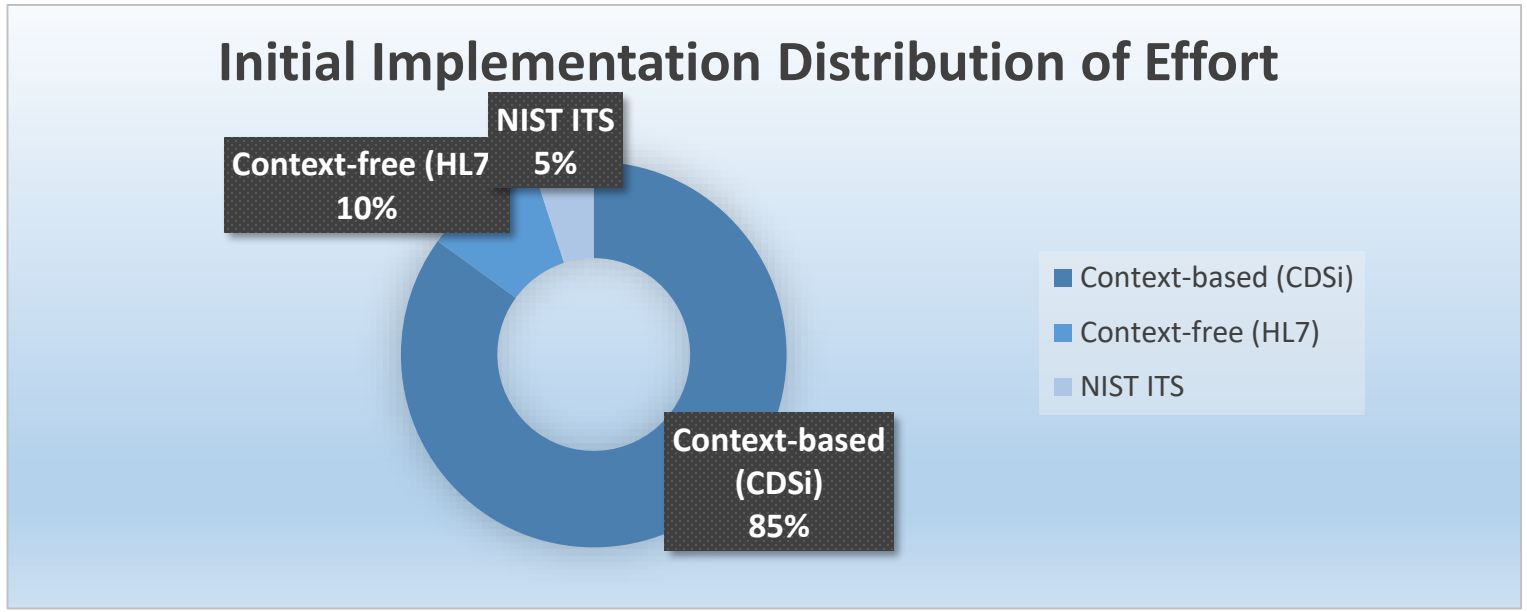

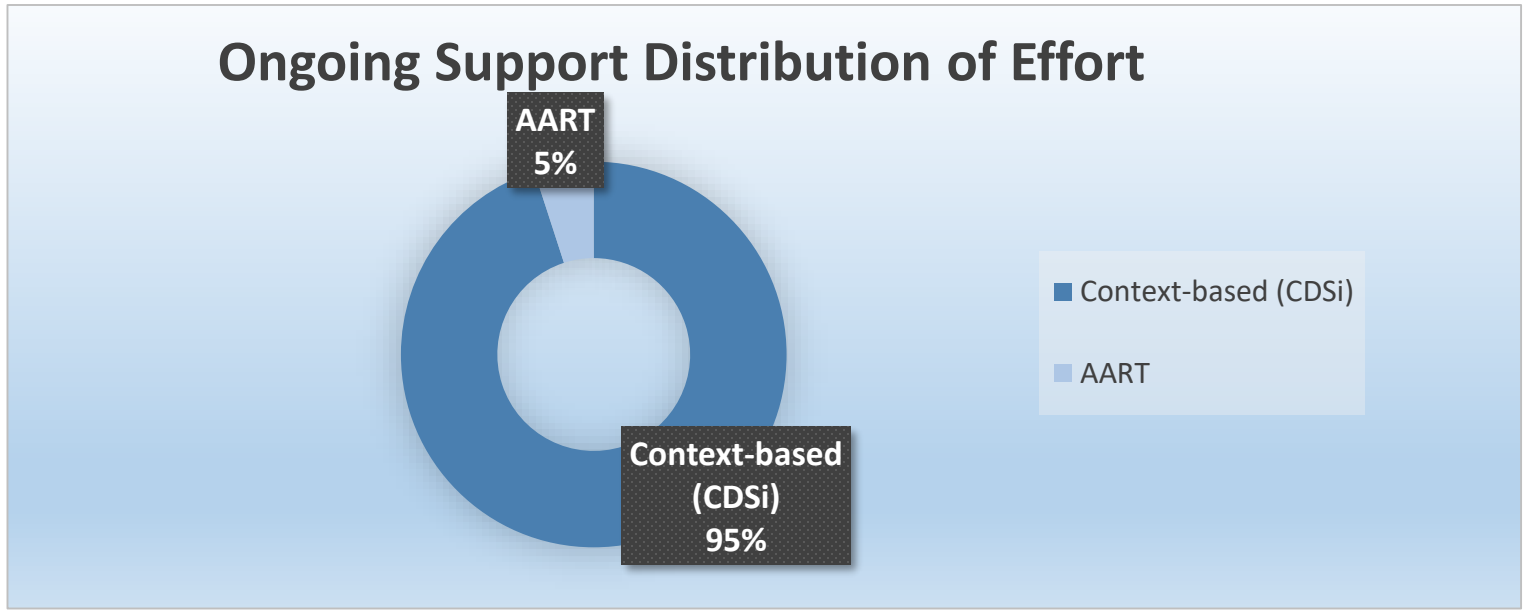

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CDSi - https://www.cdc.gov/vaccines/programs/iis/cdsi.html
NIST ITS - https://hl7v2-iz-r1.5-testing.nist.gov:8098/iztool/
AART - http://app.immregistries.org/aart/home

Consume & Validate CDSi Data

- Baseline existing environment
- Import new supporting data
- Run internal tests
- Import new Healthy and/or UC Test Cases
- Run test cases
- Reconcile differences, make changes, test, repeat…
- Document differences
- SME testing and review
- Jurisdiction review

Edit Test Case

Cancel | Update | Execute Test

Test Case ID * 2013-0579
Status * ACTIVE
Source * CDSI
Vaccine Group (WebIZ): PCV / PNEUMOCOCCAL
Test Status

Test Case Name: DOSE # 2 PCV 13 AT AGE 10 WEEKS-5 DAYS

Patient DOB: 12/18/2018 (0Y 2M 3D)
Gender: F
Medical History Text:
Medical History Code:
Code System:
Allergy Risk Code (WebIZ):

Series Status:
Evaluation Type: AGE: BELOW ABSOLUTE MINIMUM

Assessment Date: 02/21/2019
Parsed Rule: I(+0D)
Delete?
Rule Type:
Major Span:
Minor Span:

Forecast Test Type: RECOMMENDED BASED ON AGE
Vaccine Forecasted: 133, PCV 13
Forecast Number: 2

Forecast	Date	Age	Parsed Rule	Delete?	Rule Type	Major Span	Minor Span
Earliest	03/21/2019	0Y 3M 3D	I(+4W)	☐			
Recommended	04/18/2019	0Y 4M 0D	A(+4M)	☐			
Past Due	06/14/2019	0Y 5M 27D	A(+4M)	☐			

Vaccination History

#	Date	Age	Name	CVX	MVX	Status	Reason	Parsed Rule	Delete?	Rule Type	Major Span	Minor Span
1	01/25/2019	0Y 1M 7D	PREVNAR 13	133	PFR	VALID			☐			
2	02/21/2019	0Y 2M 3D	PREVNAR 13	133	PFR	NOT VALID	AGE: TOO YOUNG		☐			
3	MM/DD/YYYY								☐			
4	MM/DD/YYYY								☐			
5	MM/DD/YYYY								☐			
6	MM/DD/YYYY								☐			
7	MM/DD/YYYY								☐			

Observations (Underlying Conditions)

#	Code	Date	Text
1		MM/DD/YYYY	
2		MM/DD/YYYY	
3		MM/DD/YYYY	

Case History

Date Added	Date Updated	CDS Version	Change Reason
01/01/2013	01/04/2018	1.0	

Envision Comments:

☐ Skip Reason:

Antigen | Vaccine Group | Vaccination History | Vaccine Types

Change antigen: PNEUMOCOCCAL

Pneumococcal risk 6-18 years 3-dose PPSV23-PPSV23-PCV13 series | Pneumococcal start at 24 months series | Pneumococcal 65+ 2-dose PPSV23-PCV13 series

Pneumococcal risk adult 3-dose PPSV23-PCV13-PPSV23 series | Pneumococcal 4-dose series | Pneumococcal risk adult 3-dose PPSV23-PPSV23-PCV13 series

Pneumococcal risk 2-6 years 2-dose series | Pneumococcal risk 2-dose PPSV-PCV series | Pneumococcal risk 6-18 years 3-dose PPSV23-PCV13-PPSV23 series

Pneumococcal risk 2-dose PCV-PPSV series | Pneumococcal 65+ 2-dose PCV13-PPSV23 series | Pneumococcal dose 2 at 7 months series | Pneumococcal risk 3-dose series PCV-PPSV-PPSV

Pneumococcal adult risk 2-dose PPSV-PCV series | Pneumococcal risk 1-dose series | Pneumococcal start at 12 months series | Best Patient Series

− Series Result

Series Name: Pneumococcal 4-dose series

Is Best: Yes

Status: Not Complete

Reason: Patient Series is not complete

Score: 1

Target Dose Count: 5

Target Dose Number Forecasted: 2

Forecast Dates:

- Earliest Date: 03/21/2019
- Unadjusted Recommended Date: 04/18/2019
- **Adjusted Recommended Date: 04/18/2019**
- Latest Date: 12/17/2023
- Unadjusted Past Due Date: 06/14/2019
- Adjusted Past Due Date: 06/14/2019

+ Select Relevant Patient Series Results

+ Evaluation Results

− Forecast Results

Back to Top

Target Dose Number: 2, Administered Dose: PCV13 / 02/21/2019

- Vaccine Name: PCV13
- Vaccine Id: 2
- Date Administered: 02/21/2019
- Administered Status: Not Valid
- Reason: Age: Too young, Preferable Interval: Grace period
- Target Dose Number: 2
- Target Dose Status: Not Satisfied
- General Description:
- Steps:
  - **Evaluate Dose Administered Condition**, 6.1 - page #: 50
  - **Evaluate Conditional Skip**, 6.2 - page #: 51
  - **Evaluate Inadvertent Vaccine**, 6.3 - page #: 55
  - **Evaluate Age**, 6.4 - page #: 56
    - Question: Was the vaccine dose administered at a valid age?
    - Answer: No
    - Reason: Too young
      - Rule ⇒ Date administered < absolute minimum age date?
        Result: Yes

Description	Value
Date Administered	02/21/2019
Abs Min Age Date	02/22/2019

      - Rule ⇒ Absolute minimum age date <= date administered < minimum age date?
        Result: No

Description	Value
Date Administered	02/21/2019
Abs Min Age Date	02/22/2019
Min Age Date	02/26/2019

      - Rule ⇒ Minimum age date <= date administered < maximum age date?
        Result: No

Description	Value
Date Administered	02/21/2019
Min Age Date	02/26/2019

These are steps defined in logic spec w/ page # reference

Decision Table Results

What About Logic Changes?

- Non-trivial or even substantial
- Increased time from notification and deployment
- New and updated tests as well

How Can We Improve Process?

- Decrease time from ACIP announcement to deployment
- More test cases
- CDSi Pre-release
- Mechanism for out-of-cycle release

Takeaways

- Have a process
- Develop and/or use external tool
- Testing, testing, testing
- Ask questions & provide feedback

Context-free (HL7)

*While there will always be ongoing issues if you get this right the first time this will *mostly* be a one-time effort

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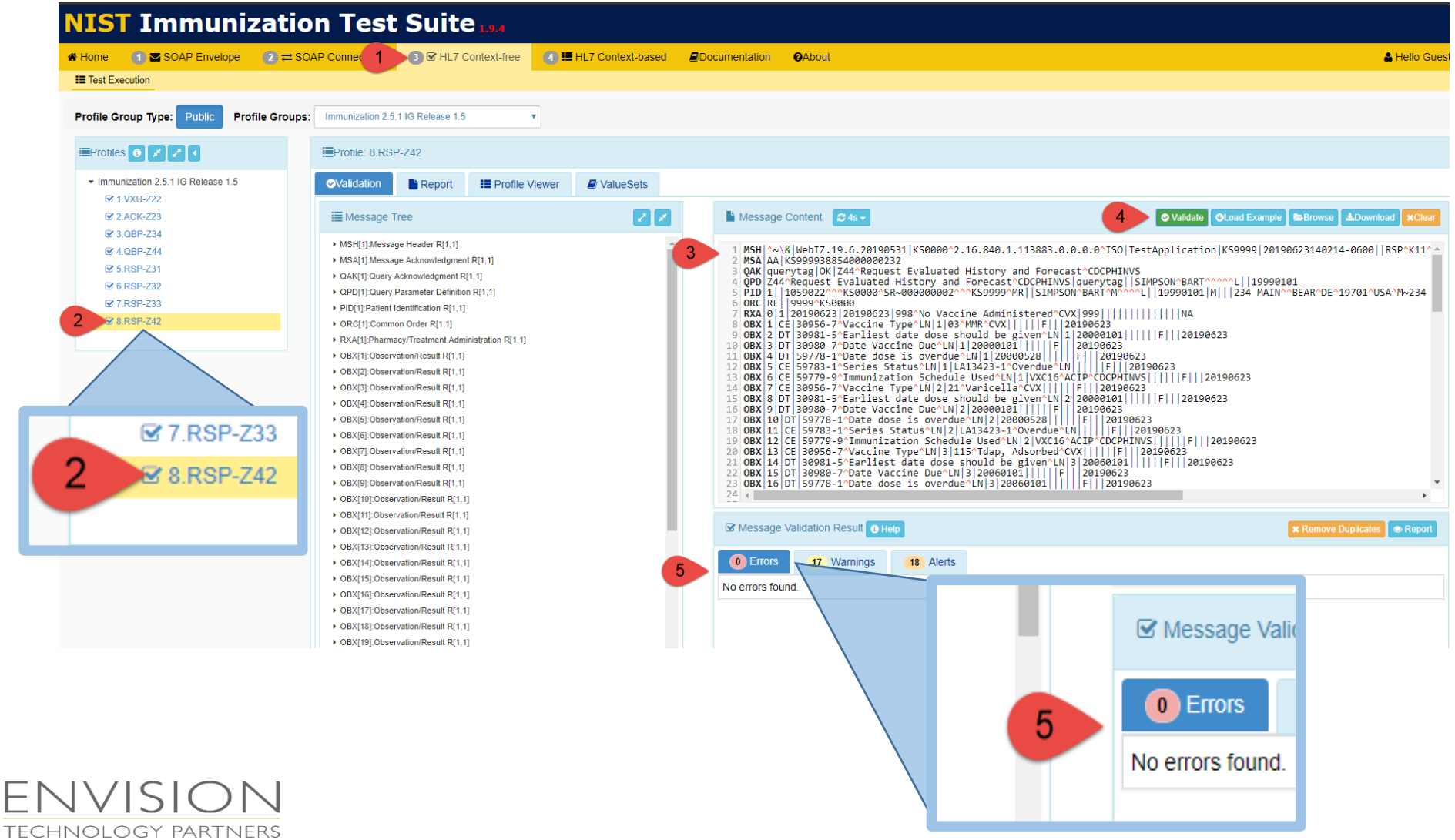
Context-free (HL7) Tools



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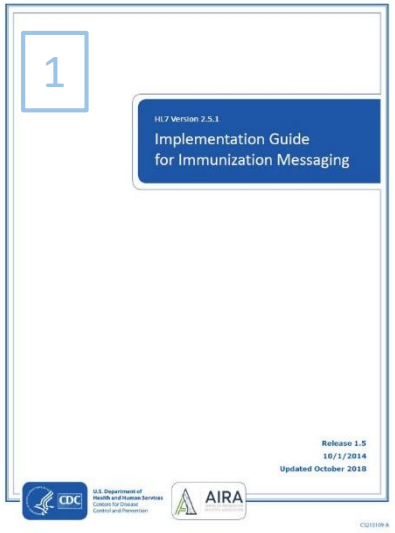
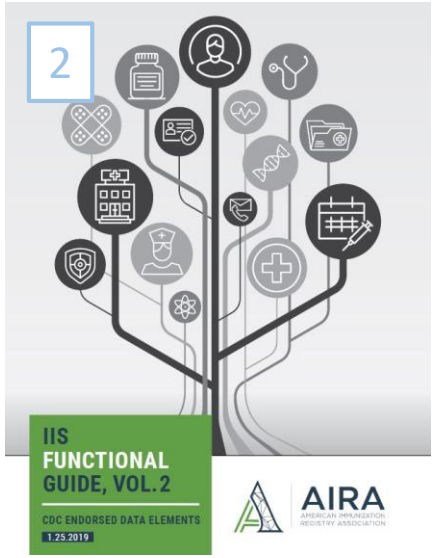
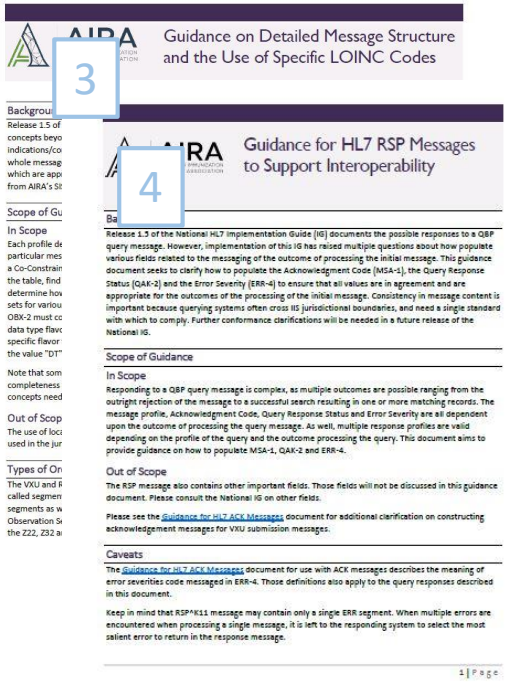
Context-free (HL7) Documentation







1. HL7 Version 2.5.1 Implementation Guide for Immunization Messaging, Release 1.5 2018 Update
2. IIS Functional Guide, Vol. 1: Query and Response
3. Document | Guidance on Detailed Message Structure and the Use of Specific LOINC Codes
4. Document | Guidance for HL7 RSP Messages to Support Interoperability

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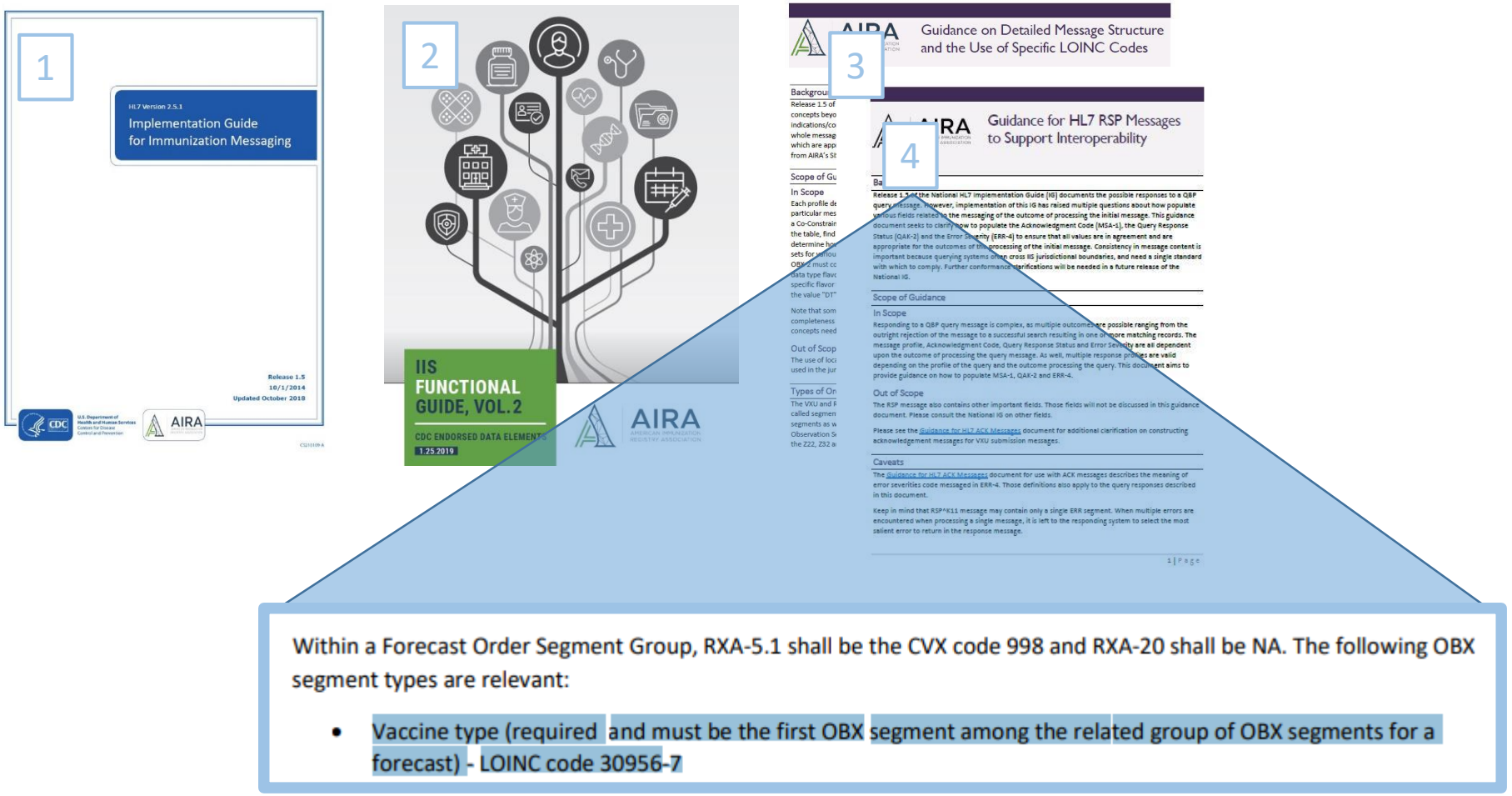
Remember when I said *mostly*…



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AART

- Let's say your HL7 messages are all valid and you pass all the CDSi test cases. That means everything should pass in AART… right?

…wrong. Why not?

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AART

2 key areas might result in test differences

1. Some CDSi test cases do not test well through HL7
2. You may be on a different version of supporting data

AART

- Some CDSi tests do not test correctly through HL7.

2013-0405

Evaluations

Date	Vaccine	Actual	Expected	FITS Status
02/14/2019	HPV, unspecified formulation (137)		VALID	Unknown
03/09/2019	HPV, unspecified formulation (137)	VALID	INVALID	Fail

```
MSH|^~\&||||||VXU^V04^VXU_V04|hLiKoy|P|2.5.1|||ER|AL|||||Z22^CDCPHINVS||
PID|1||hLiKoy^^^FITS^MR||Jackson^Willa^Lyndell^^^^L|Walcott^Aisha^^^^^M|2010022
NK1|1|Samuelson^Aisha^^^^^L|MTH^Mother^HL70063
ORC|RE||hLiKoy.1^|||||||||||||||
RXA|0|1|20190216||165^165^CVX|999|||01||^^^DE0003|||||||||A
ORC|RE||hLiKoy.2^|||||||||||||||
RXA|0|1|20190311||165^165^CVX|999|||01||^^^DE0003|||||||||A
```

Received two historical vaccines 23 days apart with no additional information

BR01	If vaccination events for the same Vaccine – Family/Group occur within a maximum window of 23 days, they need to be examined. A registry can set a tighter constraint, based on: • Staffing for manual review;	This business rule is applied first and is the precondition for the use of any other business rules. An explanation for 23 days window: most shots allowed to be made within 28 days of each other, minus 4 days grace period. Not all states use such a grace period (e.g.,

Vaccine deduplication prevented two copies of the vaccine from going in and the test *failed*…

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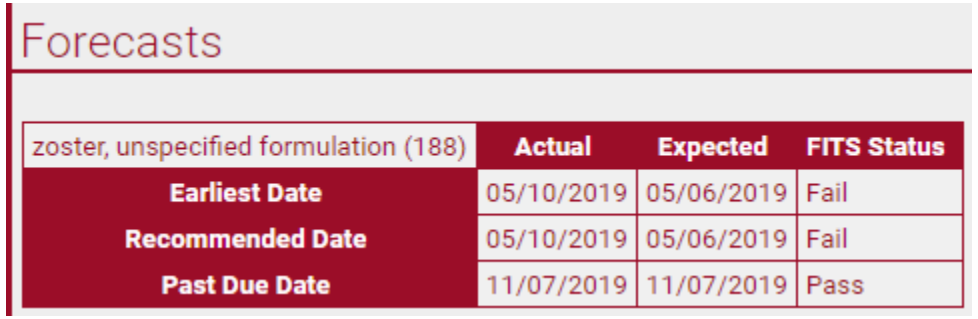
NOTE: Failures like these should only be present in discovery
NOTE: Failures like these should not result in failure in the future

AART

Remaining failures seemed to be a handful of adult cases with 4 days difference.



Forecasts

zoster, unspecified formulation (188)	Actual	Expected	FITS Status
Earliest Date	05/10/2019	05/06/2019	Fail
Recommended Date	05/10/2019	05/06/2019	Fail
Past Due Date	11/07/2019	11/07/2019	Pass

1. Why the difference between AART and WebIZ?
2. What to do?

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CDS Assessment: An IIS Program Perspective

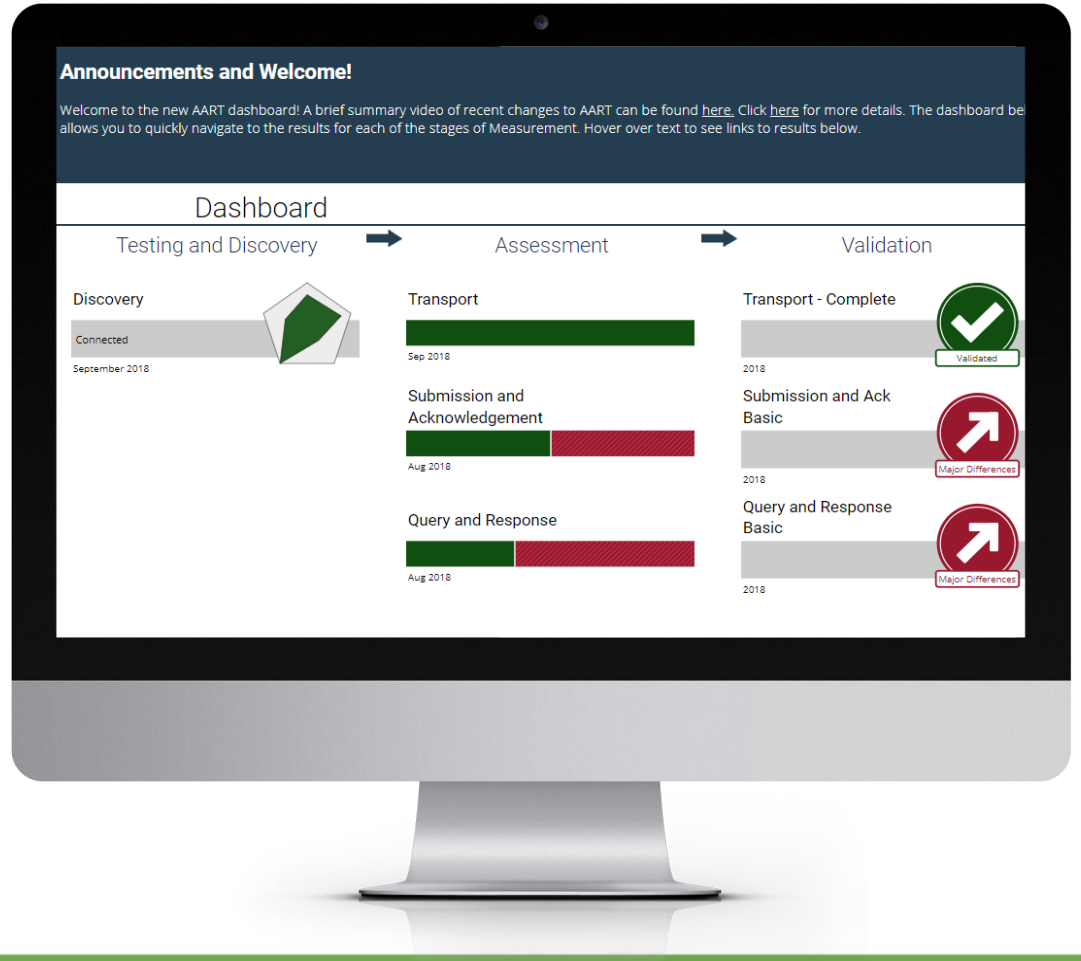
David Baron and Liz Harris, Tennessee

AART Demo of CDS Reports

Individual CDS Assessment Reports

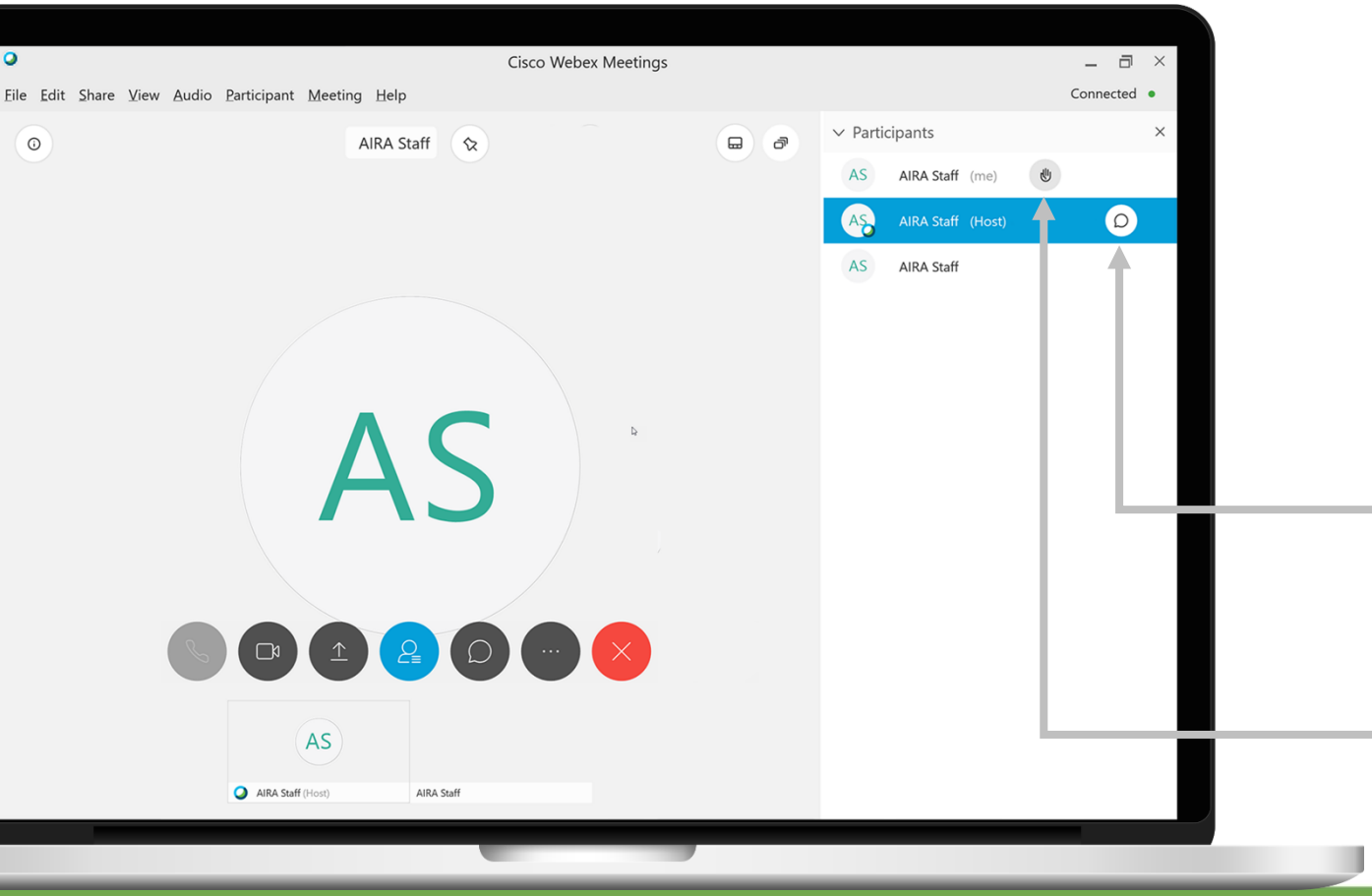
- 34 IIS have received their CDS Assessment Reports for Q2 2019
  - **12 IIS:** Not connected or currently unavailable for testing
  - **5 IIS:** Does not include CDS in RSP
  - **5 IIS:** Patient not found
  - **2 IIS:** Does not have query capability

AART Demo


Announcements and Welcome!
Welcome to the new AART dashboard! A brief summary video of recent changes to AART can be found here. Click here for more details. The dashboard be
allows you to quickly navigate to the results for each of the stages of Measurement. Hover over text to see links to results below.
Dashboard
Testing and Discovery
Assessment
Validation
Discovery
Connected
September 2018
Transport
Sep 2018
Submission and Acknowledgement
Aug 2018
Query and Response
Aug 2018
Transport - Complete
2018
Validated
Submission and Ack Basic
2018
Major Differences
Query and Response Basic
2018
Major Differences

Questions, Comments, Discussion?

Questions, Comments, Discussion?



How do I ask a question?

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Select the hand icon next to your name and you will be called on.

Thank you to our presenters, and thanks to all of you for joining us!

A brief evaluation survey will be sent out following this webinar

The next Discovery Session will be July 22nd at 4pm ET