



AIRA
AMERICAN IMMUNIZATION
REGISTRY ASSOCIATION

AART User Group

Mini-Series

April 22, 2020

4:00 PM ET

Agenda

- Welcome
- Goals of the AART Mini-series
- Background: CDS Assessment and Discovery
- Testing: How CDS Test Cases are Executed
- Reports: Using CDS Reports



Goals

1) Increase the use of AART to:

- ✓ identify areas for improvement,
- ✓ prioritize IIS enhancements,
- ✓ test new IIS functionality,
- ✓ and reflect on accomplishments.

2) Support your use of AART by convening a group of engaged users to share and learn from one another



So What is AART?

AART is... the Aggregate Analysis Reporting Tool

AART was developed to visualize and compile the testing results and information on community-driven measures and tests related to Functional Standards

Did you know...

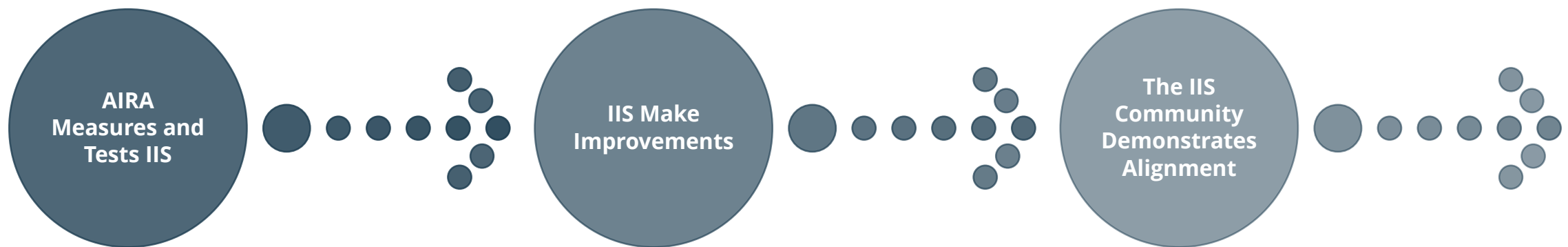
1. AART has been testing with IIS since 2015
2. There are over 6 million test cases in AART
3. You can view test results for your peer IIS at the content area level, and at the test case level



Measurement and Improvement Initiative – What Is it?

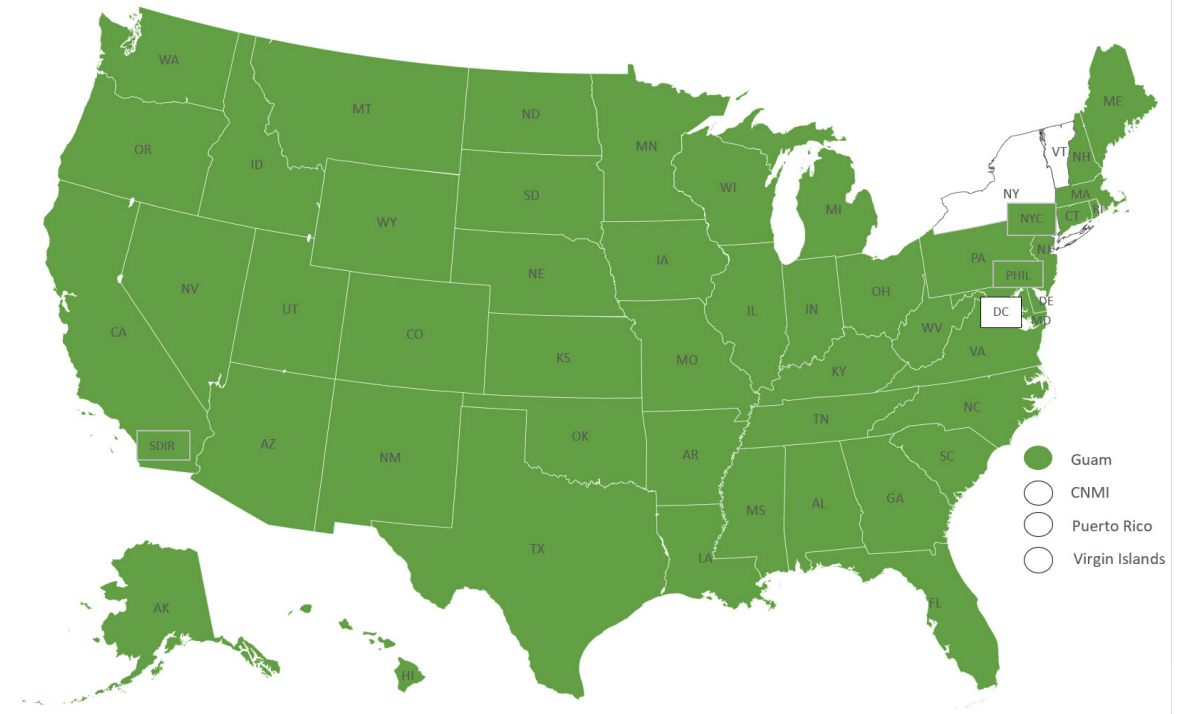


- The IIS Measurement and Improvement (M&I) Initiative began in 2015 as an effort to:
 - Test IIS alignment with standards
 - Provide IIS with information and assistance to improve



Thank You For Engaging With Us!

- Participation is strong and results are being reviewed and acted upon
- Partners are publicly recognizing improvements in standardization across IIS
- We are seeing progress in all areas of quarterly measurement



AART Clinics

- In person, @ AIRA National Meeting
 - ✓ Sign up soon for your spot for AIRA 2020
- Virtually, via online meeting tools
- Request a clinic or follow up clinic anytime!

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 below allows you to quickly navigate to the results for each of the stages of Measurement. Hover over text to see links to results below.

AIRA Sandbox Dashboard

Assessment



Validation

Transport



Q3 2019

Submission and
Acknowledgement



Q3 2019

Query and Response



Q3 2019

CDS



Q2 2019

[See Discovery Reports](#)

Transport - Complete



2019



Validated

Submission and Ack
Basic



2019



Validated

Query and Response
Basic



2019



Major Differences



AART User Group Mini-Series

Session 1: Introduction to Series, polling for future topics

Completed

Session 2: HL7 Discovery & Assessment Reports

Completed

Session 3: Clinical Decision Support

Today!

Session 4: User Experience – HL7 Assessment

Session 5: User Experience – Clinical Decision Support

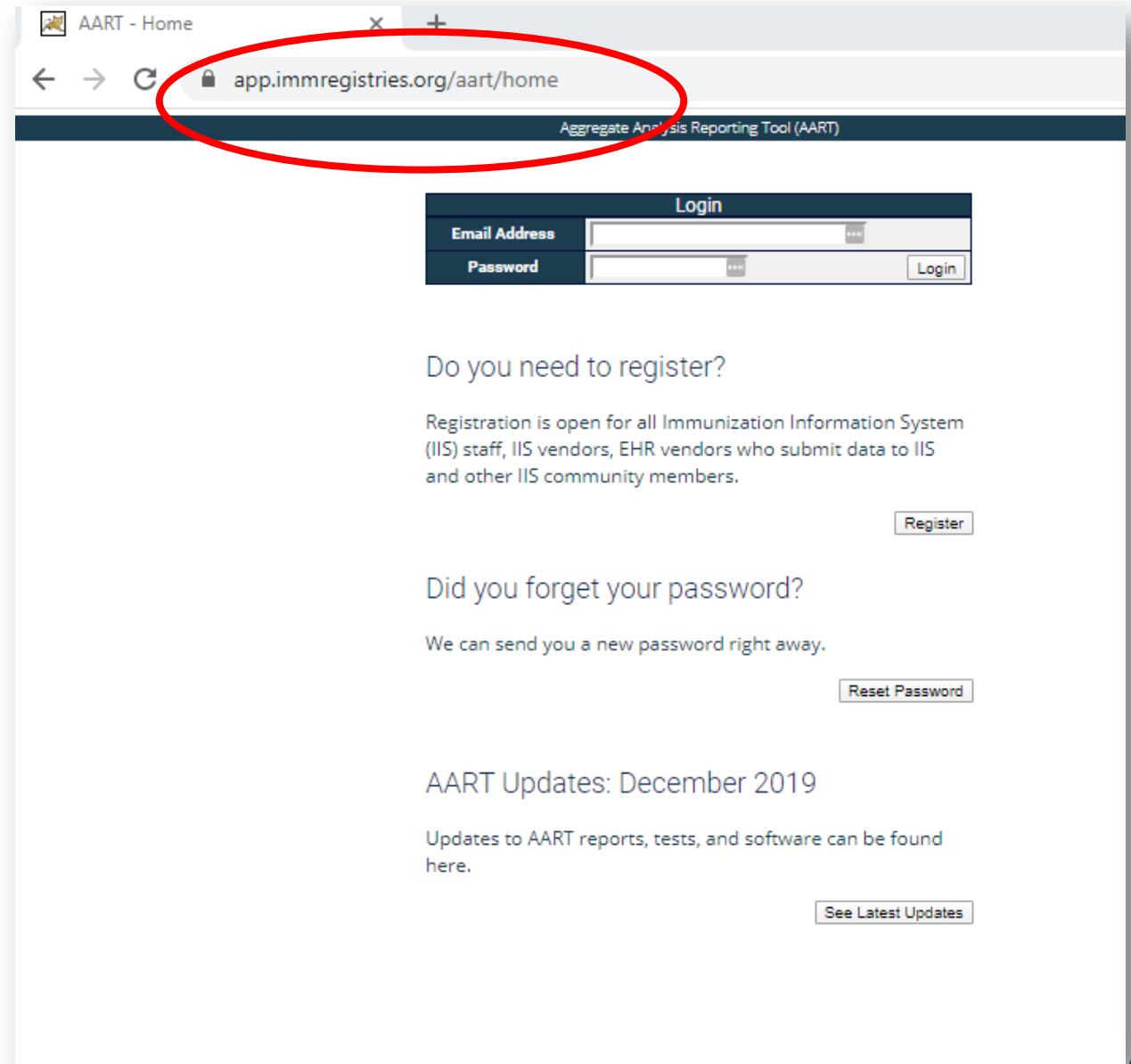
Session 6: *topic TBD*



AART Registration

- AART login page
- Register here
 - Forgot your password
- AART Updates

Reminder! If you haven't registered yet you can do that today!

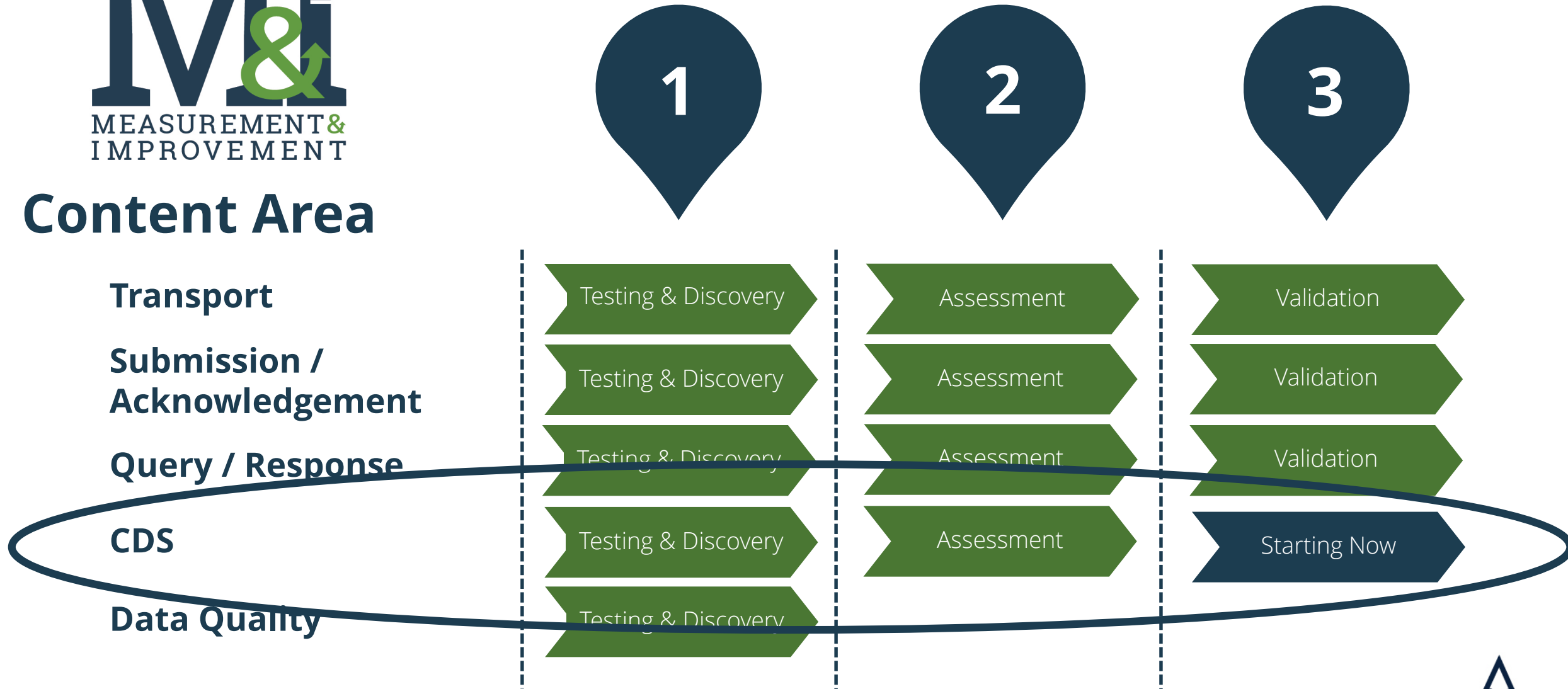


Background

CDS Assessment and Discovery



Content Area



CDS Assessment

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

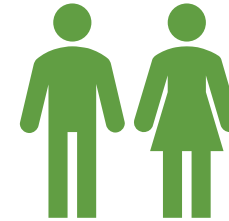
DTaP, HepA, HepB, Hib,
MMR, Pneumo (PCV), Polio,
Rotavirus, Varicella,
Influenza



Adolescent

7 years through 18 years

HPV, Meningococcal,
Tdap/Td, Influenza, HepB,
MMR, Polio, Varicella



Adult

19 years and above

Tdap/Td, Zoster, Pneumo
(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

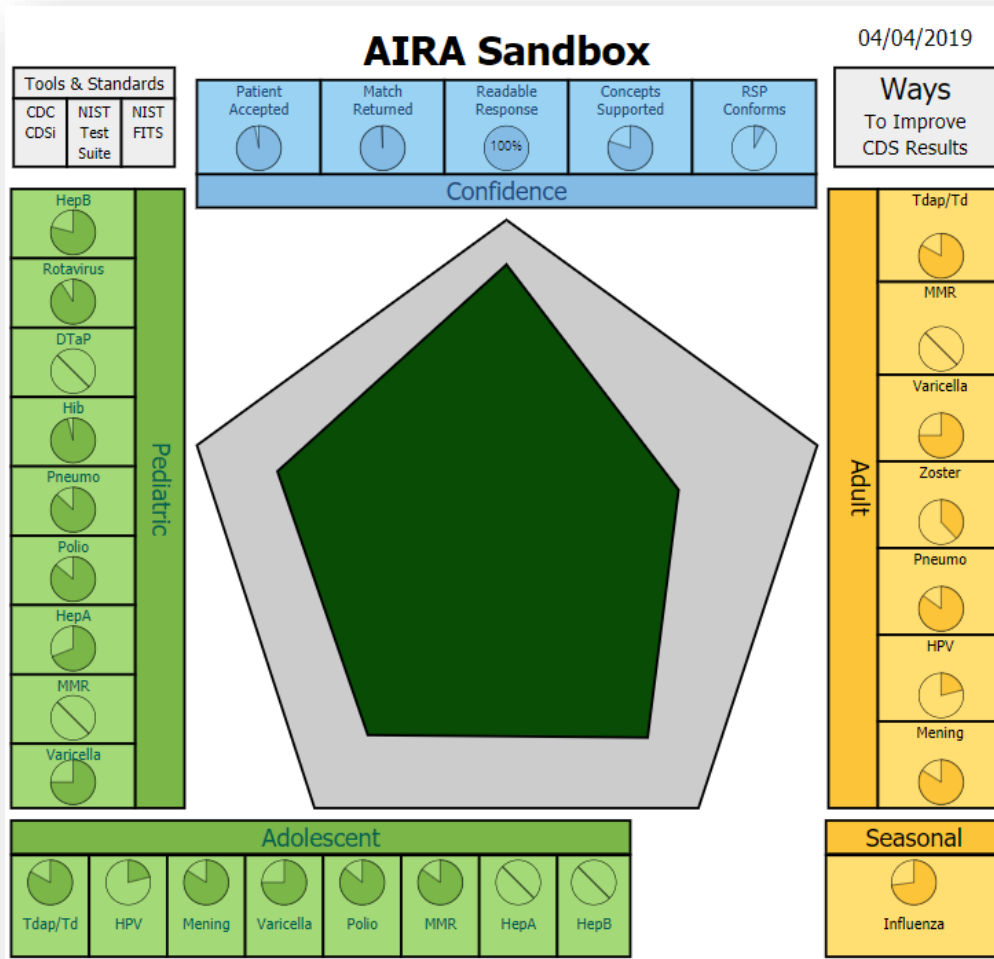


CDS Assessment

CDS Concept	Supported?	If supported, how closely aligned to ACIP?
Evaluation Status <i>Is the dose valid?</i>	Yes	Pediatric Adolescent Adult
Earliest Date <i>When could the next dose be given?</i>	Yes	Pediatric Adolescent Adult
Recommended Date <i>When should the next dose be given?</i>	Yes	Pediatric Adolescent Adult



CDS Discovery



- More test cases than Assessment
- More CDS Concepts
 - Evaluation Status
 - Series Status
 - Earliest Date
 - Recommended Date
 - Past Due Date



Assessment vs. Discovery

Assessment

- Community vetted measures
 - Measures and expectations are stable over time
- Used by:
 - Individual IIS
 - Vendors to help support IIS
 - AIRA to develop aggregate national report, identify trends, plan TA, etc.

Assessment

- Much more fluid
 - Structure, tests, concepts can grow/shrink over time
- Used by:
 - Individual IIS
 - Vendors to help support IIS
 - AIRA to work on new concepts, testing methods, content areas



Testing

How CDS Test Cases are Executed



FITS

- Forecaster for Immunization Test Suite (FITS)
 - Stores all CDSi Test Cases
 - Can execute them against CDS engine
 - Open for registration and use

NIST - Forecasting for Immunization Test Suite (FITS) 1.0

Home Test Plans Validation Documentation About Issues Register Reset Password Login

Welcome to the NIST Forecasting for Immunization Test Suite (FITS)

FITS Overview

FITS (Forecasting for Immunization Test Suite) is a web-based application for testing immunization CDS engines against ACIP recommendations. FITS creates and manages test cases, runs and validates the test cases, creates reports in standardized formats, and provides standardized (FHIR) and non-standardized (proprietary) interfaces to the CDS engines.

FITS can be used to validate immunization CDS engines independently of the system in which the CDS resides or is associated (e.g., an EHR or IIS). FITS will contain a set of test cases authored and maintained by the CDC CDSi project (<https://www.cdc.gov/vaccines/programs/iis/c>) that are available to be used to test CDS engines. Additionally, a user can create and persist their own test cases.

Have a Question?

A Google Group **FITS** has been established for discussion/questions about the tool. No membership is required. A Google account is required for posting.

- Site: <https://groups.google.com/forum/#!forum/immunization-testing>
- Email: fits-immunization-testing@googlegroups.com

Supported Browsers

The following browsers are supported:

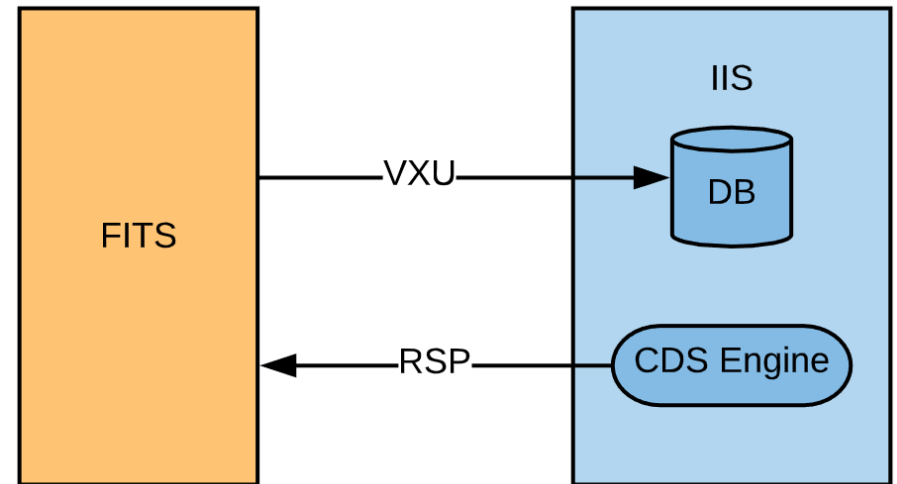
- Chrome (Recommended)
- Firefox
- Safari

<https://fits.nist.gov/fits/#/home>



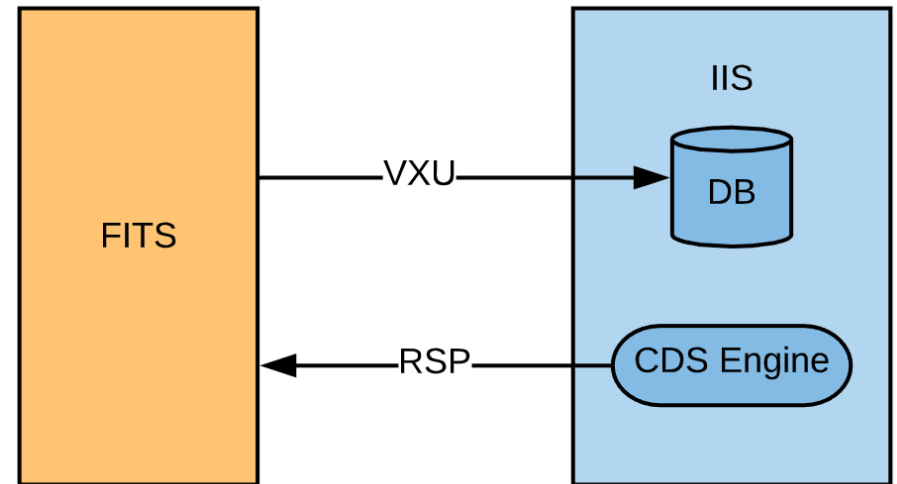
FITS Connects Direct to CDS Engines

- FITS can connect direct CDS engines:
 - LSVF, STC, ICE, MA, FHIR, SWP MDS
- FITS can test CDS engines embedded in an IIS:
 - Using HL7 v2 updates and queries
- HL7 method selected for Measurement & Improvement



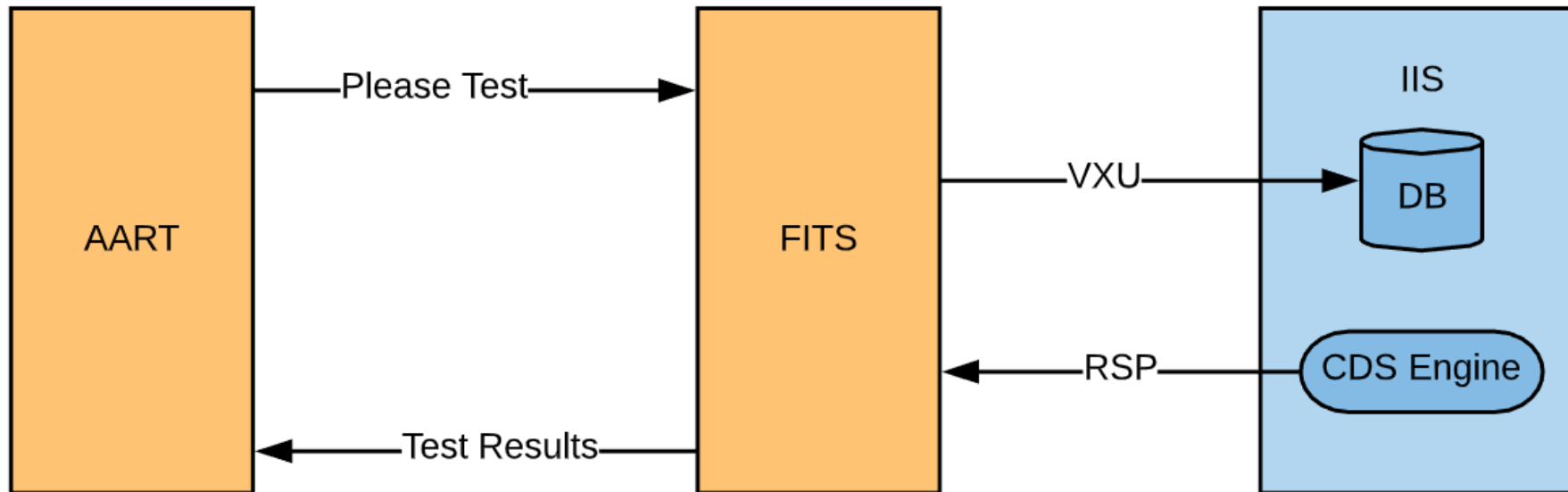
FITS Connects Direct to CDS Engines

- For each test case FITS:
 - Sends VXU with vaccinations
 - New randomly generated patient info
 - Vaccinations are historical
 - Typhoid vaccination added if no other vaccinations are on record
 - Sends QBP
 - All patient demographics
 - Expects RSP match with forecast
 - Will re-query every 10 seconds for up to a minute or so looking for a match
 - Reads results from OBX segments



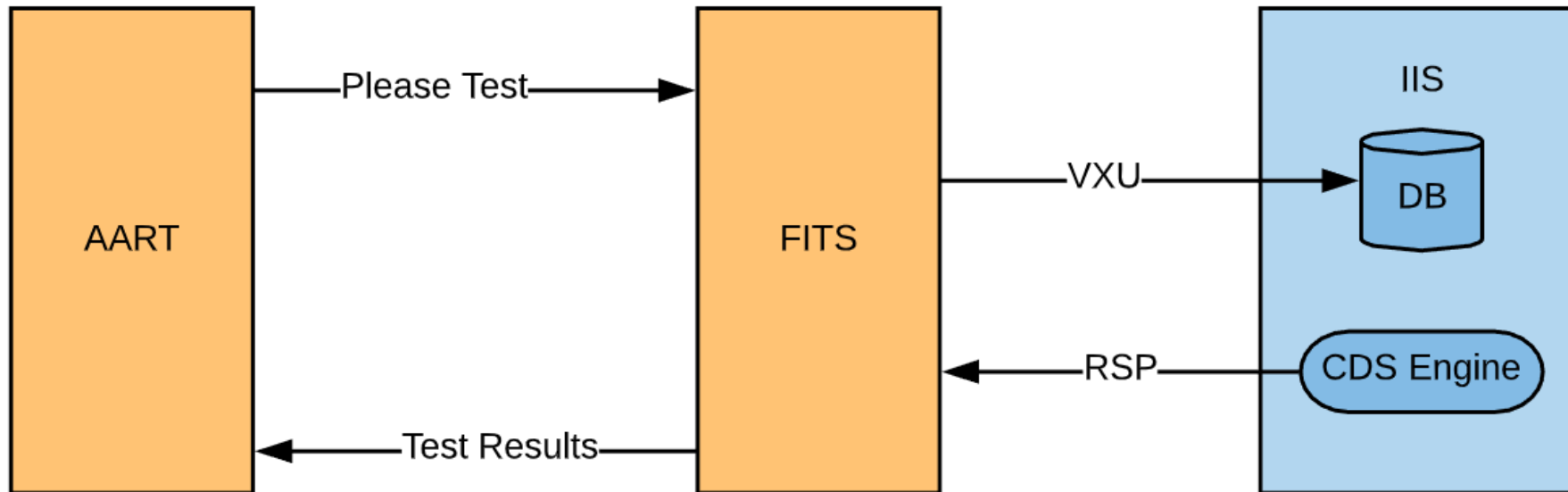
AART Connects to FITS

- AART executes tests through a direct connection to FITS
 - This process is repeated for 870+ test cases!



AART Connects to FITS

- AART must consolidate and filter the results
 - A single testing session with one IIS creates 10,000+ unique determinations



Reports

Using CDS Reports



AART

AART reports are a “Drill Down” model.
The more you click, the more detail you get.

CDS

Q2 2019

Concept	Age Group	Result	Passed	Failed Group Count
Evaluation Status	Supports Evaluation Status	Meets '1'	100%	
	Accuracy Peds Evaluation Status	Meets '2'	91%	
	Accuracy Adol Evaluation Status	Does Not Meet '3'	55%	2
	Accuracy Adult Evaluation Status	Does Not Meet '4'	23%	1
	Supports Earliest Date	Meets '5'	100%	
Earliest Date	Accuracy Peds Earliest Date	Does Not Meet '6'	78%	2
	Accuracy Adol Earliest Date	Does Not Meet '7'	55%	2
	Accuracy Adult Earliest Date	Does Not Meet '8'	52%	
	Supports Recommended Date	Meets '9'	100%	
Recommended Date	Accuracy Peds Recommended Date	Unknown from Standard '10'	64%	
	Accuracy Adol Recommended Date	Does Not Meet '11'	56%	2
	Accuracy Adult Recommended Date	Does Not Meet '12'	23%	1
	New or changed	Not Measured		

6: Accuracy Peds Earliest Date

The Earliest Date returned by the IIS matches the CDC CDSI expected value for routine age-based pediatric recommendations.

Test Outcome

High measure threshold was not met and at least one applicable group threshold was not met

Test Case Results			
Test Case	Test Case Title	Passed	
6.1	Accuracy Peds Earliest Date - DTaP	55%	
6.2	Accuracy Peds Earliest Date - HepA	44%	
6.3	Accuracy Peds Earliest Date - HepB	96%	
6.4	Accuracy Peds Earliest Date - Hib	100%	
6.5	Accuracy Peds Earliest Date - MMR	65%	
6.6	Accuracy Peds Earliest Date - Pneumococcal	96%	
6.7	Accuracy Peds Earliest Date - Polio	86%	
6.8	Accuracy Peds Earliest Date - Rotavirus	91%	
6.9	Accuracy Peds Earliest Date - Varicella	60%	
6.10	Accuracy Peds Earliest Date - Flu	100%	

6.5: Accuracy Peds Earliest Date - MMR

Test Outcome

IIS met 65% of the test cases which meets the 65% minimum threshold.

Results Meets '6.5' 65%

FITS Test Id	FITS Description	Results
2013-0523	#1 at 15 months	Meets
2013-0540	MMR # 1 at 12 months-5 days	Meets
2013-0541	MMR # 1 at 12 months-4 days	Does Not Meet
2013-0542	MMR # 1 at 12 months	Does Not Meet
2013-0543	Newborn forecasting	Meets
2013-0545	MMR and VZ given at age 12 months	Does Not Meet
2013-0547	VZ to MMR interval 28-1 day = invalid MMR	Meets
2013-0548	VZ given at age 12 mo; MMR at age 12 mo+28 days	Meets
2013-0549	Dose 1 MMRV at 12 m-5 days	Meets
2013-0550	Dose 1 MMRV at 12 m-4 days	Does Not Meet

2013-0545 MMR and VZ given at age 12 months

Conforms Status	Does Not Meet
Test Run Status	Finished
Evaluation Date	03/31/2019
Birth Date	03/31/2018
FITS Group Name	MMR
Measure Type	Accuracy
Measure Criterion	ED

Evaluations

Date	Vaccine	Expected	Actual	FITS Status
03/31/2019	MMR (03)	VALID	VALID	Pass
03/31/2019	varicella (21)	VALID	VALID	Pass

Forecasts

MMR (03)	Expected	Actual	FITS Status
Series Status	Not complete		Unknown
Earliest Date	05/01/2019	04/28/2019	Fail
Recommended Date	03/31/2022	03/31/2022	Pass
Past Due Date	04/27/2025	03/31/2025	Warning



Opening an Assessment Report

AIRA Sandbox Dashboard

Assessment



Validation

Transport



Submission and Acknowledgement



Query and Response



CDS



See Discovery Reports

Transport - Complete



Submission and Ack Basic



Query and Response Basic



AVAILABLE
2020

Concept	Age Group	Result		Passed	Failed Group Count
Evaluation Status	Supports Evaluation Status	Meets '1'	100%	<div><div></div></div>	
	Accuracy Peds Evaluation Status	Meets '2'	91%	<div><div></div></div>	
	Accuracy Adol Evaluation Status	Does Not Meet '3'	55%	<div><div></div></div>	2
	Accuracy Adult Evaluation Status	Does Not Meet '4'	23%	<div><div></div></div>	1
Earliest Date	Supports Earliest Date	Meets '5'	100%	<div><div></div></div>	
	Accuracy Peds Earliest Date	Does Not Meet '6'	78%	<div><div></div></div>	2
	Accuracy Adol Earliest Date	Does Not Meet '7'	55%	<div><div></div></div>	2
	Accuracy Adult Earliest Date	Does Not Meet '8'	52%	<div><div></div></div>	1
Recommended Date	Supports Recommended Date	Meets '9'	100%	<div><div></div></div>	
	Accuracy Peds Recommended Date	Deviates From Standard '10'	84%	<div><div></div></div>	
	Accuracy Adol Recommended Date	Does Not Meet '11'	56%	<div><div></div></div>	2
	Accuracy Adult Recommended Date	Does Not Meet '12'	28%	<div><div></div></div>	1
New or Changed		Not Measured			

Looking at a Measure

Concept	Age Group	Result		Passed	Failed Group Count
Evaluation Status	Supports Evaluation Status	Meets '1'	100%		
	Accuracy Peds Evaluation Status	Meets '2'	91%		
	Accuracy Adol Evaluation Status	Does Not Meet '3'	55%		2
	Accuracy Adult Evaluation Status	Does Not Meet '4'	23%		1
Earliest Date	Supports Earliest Date	Meets '5'	100%		
	Accuracy Peds Earliest Date	Does Not Meet '6'	78%		2
	Accuracy Adol Earliest Date	Does Not Meet '7'	55%		2
	Accuracy Adult Earliest Date	Does Not Meet '8'	52%		1
Recommended Date	Supports Recommended Date	Meets '9'	100%		
	Accuracy Peds Recommended Date	Deviates From Standard '10'	84%		
	Accuracy Adol Recommended Date	Does Not Meet '11'	56%		2
	Accuracy Adult Recommended Date	Does Not Meet '12'	28%		1
New or Changed		Not Measured			

6: Accuracy Peds Earliest Date

The Earliest Date returned by the IIS matches the CDC CDSi expected value for routine age-based pediatric recommendations.

Test Outcome

High measure threshold was not met and at least one applicable group threshold was not met

Test Case Results				
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6.1	Accuracy Peds Earliest Date - DTaP	55%		
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6.4	Accuracy Peds Earliest Date - Hib	100%		
6.5	Accuracy Peds Earliest Date - MMR	65%		
6.6	Accuracy Peds Earliest Date - Pneumococcal	96%		
6.7	Accuracy Peds Earliest Date - Polio	86%		
6.8	Accuracy Peds Earliest Date - Rotavirus	91%		
6.9	Accuracy Peds Earliest Date - Varicella	60%		
6.10	Accuracy Peds Earliest Date - Flu	100%		



Looking at Tests for a Measure

6: Accuracy Peds Earliest Date

The Earliest Date returned by the IIS matches the CDC CDSi expected value for routine age-based pediatric recommendations.

Test Outcome

High measure threshold was not met and at least one applicable group threshold was not met

Test Case Results			
Test Case	Test Case Title		Passed
6.1	Accuracy Peds Earliest Date - DTaP	55%	
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6.3	Accuracy Peds Earliest Date - HepB	96%	
6.4	Accuracy Peds Earliest Date - Hib	100%	
6.5	Accuracy Peds Earliest Date - MMR	65%	
6.6	Accuracy Peds Earliest Date - Pneumococcal	96%	
6.7	Accuracy Peds Earliest Date - Polio	86%	
6.8	Accuracy Peds Earliest Date - Rotavirus	91%	
6.9	Accuracy Peds Earliest Date - Varicella	60%	
6.10	Accuracy Peds Earliest Date - Flu	100%	

6.5: Accuracy Peds Earliest Date - MMR

Test Outcome

IIS met 65% of the test cases which meets the 65% minimum threshold.



FITS Test Id	FITS Description	Results
2013-0523	#1 at 15 months	Meets
2013-0540	MMR # 1 at 12 months-5 days	Meets
2013-0541	MMR # 1 at 12 months-4 days	Does Not Meet
2013-0542	MMR # 1 at 12 months	Does Not Meet
2013-0543	Newborn forecasting	Meets
2013-0545	MMR and VZ given at age 12 months	Does Not Meet
2013-0547	VZ to MMR interval 28-1 day = invalid MMR	Meets
2013-0548	VZ given at age 12 mo; MMR at age 12 mo+28 days	Meets
2013-0549	Dose 1 MMRV at 12 m-5 days	Meets
2013-0550	Dose 1 MMRV at 12 m-4 days	Does Not Meet



Looking at Test Case Details

6.5: Accuracy Peds Earliest Date - MMR

Test Outcome

IIS met 65% of the test cases which meets the 65% minimum threshold.



FITS Test Id	FITS Description	Results
2013-0523	#1 at 15 months	Meets
2013-0540	MMR # 1 at 12 months-5 days	Meets
2013-0541	MMR # 1 at 12 months-4 days	Does Not Meet
2013-0542	MMR # 1 at 12 months	Does Not Meet
2013-0543	Newborn forecasting	Meets
2013-0545	MMR and VZ given at age 12 months	Does Not Meet
2013-0547	VZ to MMR interval 28-1 day = invalid MMR	Meets
2013-0548	VZ given at age 12 mo; MMR at age 12 mo+28 days	Meets
2013-0549	Dose 1 MMRV at 12 m-5 days	Meets
2013-0550	Dose 1 MMRV at 12 m-4 days	Does Not Meet

2013-0545 MMR and VZ given at age 12 months

Conforms Status	Does Not Meet
Test Run Status	Finished
Evaluation Date	03/31/2019
Birth Date	03/31/2018
FITS Group Name	MMR
Measure Type	Accuracy
Measure Criterion	ED

Evaluations

Date	Vaccine	Expected	Actual	FITS Status
03/31/2019	MMR (03)	VALID	VALID	Pass
03/31/2019	varicella (21)	VALID	VALID	Pass

Forecasts

MMR (03)	Expected	Actual	FITS Status
Series Status	Not complete		Unknown
Earliest Date	05/01/2019	04/28/2019	Fail
Recommended Date	03/31/2022	03/31/2022	Pass
Past Due Date	04/27/2025	03/31/2025	Warning



Secondary Method for viewing results

- Interactive CDS Results Explorer
- Unique to CDS (not available for other content areas)
- Allows for viewing pre-filtered failed tests for triage
- Able to copy/paste into Excel for further analysis/workflow



Navigating to the Results Explorer

AIRA Sandbox Dashboard

Assessment



Validation

Transport



1st half 2020

Submission and Acknowledgement



Q3 2019

Query and Response



Q3 2019

CDS



Q2 2019

See Discovery Reports

Transport - Complete



2020

Submission and Acknowledgement Basic



2019

Query and Response Basic



2019



Validated



Validated



Major Differences



AVAILABLE 2020

Explore Results

See the results quickly with this interactive test case explorer.

Interactive CDS Results Explorer

CDS Results Summary

The following table summarizes the overall results of the 12 CDS Assessment Measures.

Concept	Age Group	Result		Passed	Failed Group Count
Evaluation Status	Supports Evaluation Status	Meets '1'	100%		
	Accuracy Peds Evaluation Status	Meets '2'	91%		
	Accuracy Adol Evaluation Status	Does Not Meet '3'	55%		2
	Accuracy Adult Evaluation Status	Does Not Meet '4'	23%		1
	Supports Earliest Date	Meets '5'	100%		

Interactive Results Explorer

Concept	Age Group	Result		Passed	DTAP	FLU	HIB	HPV	HepA	HepB	MCV	MMR	PCV	POL	ROTA	VAR	ZOSTER
Evaluation Status	Supports Evaluation Status	Meets '1'	100%														
	Accuracy Peds Evaluation Status	Meets '2'	91%														
	Accuracy Adol Evaluation Status	Does Not Meet '3'	55%														
	Accuracy Adult Evaluation Status	Does Not Meet '4'	23%														
Earliest Date	Supports Earliest Date	Meets '5'	100%														
	Accuracy Peds Earliest Date	Does Not Meet '6'	78%														
	Accuracy Adol Earliest Date	Does Not Meet '7'	55%														
	Accuracy Adult Earliest Date	Does Not Meet '8'	52%														
Recommended Date	Supports Recommended Date	Meets '9'	100%														
	Accuracy Peds Recommended Date	Deviates From Standard '10'	84%														
	Accuracy Adol Recommended Date	Does Not Meet '11'	56%														
	Accuracy Adult Recommended Date	Does Not Meet '12'	28%														
New or Changed		Not Measured															



Pre-Filtered to Show Failed Test Cases

Measure	Meets	Deviates	Not Meet	Not Measured	Total
M6: Accuracy Peds Earliest Date	13	0	7	0	20

Compare with other IIS

Tests Included - For Vaccine Group: MMR

FITS Id	FITS Name	Conforms Status	Comparing	Expected	Actual
2013-0541	MMR # 1 at 12 months-4 days	Does Not Meet	ED	05/04/2019	04/28/2019
2013-0542	MMR # 1 at 12 months	Does Not Meet	ED	05/01/2019	04/28/2019
2013-0545	MMR and VZ given at age 12 months	Does Not Meet	ED	05/01/2019	04/28/2019
2013-0550	Dose 1 MMRV at 12 m-4 days	Does Not Meet	ED	05/04/2019	04/28/2019
2013-0556	MMR to MMRV interval 24 days=not valid MMR # 2	Does Not Meet	ED	04/28/2019	-
2013-0570	Dose 2 at age 13 mo -5 days	Does Not Meet	ED	04/28/2019	-
AART-MMR-2	Dose 1 at 12 months	Does Not Meet	ED	05/01/2019	04/28/2019

2013-0545 MMR and VZ given at age 12 months

Conforms Status	Does Not Meet
Test Run Status	Finished
Evaluation Date	03/31/2019
Birth Date	03/31/2018
FITS Group Name	MMR
Measure Type	Accuracy
Measure Criterion	ED

Evaluations

Date	Vaccine	Expected	Actual	FITS Status
03/31/2019	MMR (03)	VALID	VALID	Pass
03/31/2019	varicella (21)	VALID	VALID	Pass

Forecasts

MMR (03)	Expected	Actual	FITS Status
Series Status	Not complete		Unknown
Earliest Date	05/01/2019	04/28/2019	Fail
Recommended Date	03/31/2022	03/31/2022	Pass
Past Due Date	04/27/2025	03/31/2025	Warning



Extract to Excel

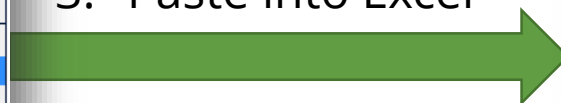
Measure	Meets	Deviates	Not Meet	Not Measured	Total
M6: Accuracy Peds Earliest Date	13	0	7	0	20

Compare with other IIS

Tests Included - For Vaccine Group: MMR

FITS Id	FITS Name	Conforms Status	Comparing	Expected	Actual
2013-0541	MMR # 1 at 12 months-4 days	Does Not Meet	ED	05/04/2019	04/28/2019
2013-0542	MMR # 1 at 12 months	Does Not Meet	ED	05/01/2019	04/28/2019
2013-0545	MMR and VZ given at age 12 months	Does Not Meet	ED	05/01/2019	04/28/2019
2013-0550	Dose 1 MMRV at 12 m-4 days	Does Not Meet	ED	05/04/2019	04/28/2019
2013-0556	MMR to MMRV interval 24 days=not valid MMR # 2	Does Not Meet	ED	04/28/2019	-
2013-0570	Dose 2 at age 13 mo -5 days	Does Not Meet	ED	04/28/2019	-
AART-MMR-2	Dose 1 at 12 months	Does Not Meet	ED	05/01/2019	04/28/2019

1. Highlight all Cells
2. Copy
3. Paste into Excel



	A	B	C	D	E	F
1	FITS Id	FITS Name	Conforms Status	Comparing	Expected	Actual
2	2013-0541	MMR # 1 at 12 months-4 days	Does Not Meet	ED	5/4/2019	4/28/2019
3	2013-0542	MMR # 1 at 12 months	Does Not Meet	ED	5/1/2019	4/28/2019
4	2013-0545	MMR and VZ given at age 12 months	Does Not Meet	ED	5/1/2019	4/28/2019
5	2013-0550	Dose 1 MMRV at 12 m-4 days	Does Not Meet	ED	5/4/2019	4/28/2019
6	2013-0556	MMR to MMRV interval 24 days=not valid MMR # 2	Does Not Meet	ED	4/28/2019	-
7	2013-0570	Dose 2 at age 13 mo -5 days	Does Not Meet	ED	4/28/2019	-



CDS Discovery

- Very similar look/feel to HL7 Discovery (Pentagon Report)
- Same “Drill Down” Approach
- Sides of Pentagon are:
 - Pediatric
 - Adolescent
 - Adult
 - Seasonal (only ran in Q4 and Q1 each year)
 - Confidence (measures general understanding of interface)



Join Us Next Month!

- Wednesday, April 22
 - 4:00 – 5:00 pm, ET



Contact Information

If you have any questions or comments:

- Nathan Bunker nbunker@immregistries.org

Thank you!

