



## Introduction

### Measurement and Improvement

The American Immunization Registry Association (AIRA) launched its community-driven immunization information system (IIS) Measurement and Improvement Initiative in mid-2015, with the dual goals of providing IIS with information to more fully align with IIS Functional Standards, while also developing a summary of where IIS are as an overall network in meeting standards and best practices. The initiative connects AIRA testing processes with IIS pre-production (or test) systems and shares actionable results with IIS. AIRA is continuing to connect and test with a growing number of IIS interfaces, with more than 3 quarters of the IIS community's pre-production systems currently connected. The data available are helping to guide individual IIS enhancements to align with standards, and the AIRA Measurement for Assessment and Certification Advisory Workgroup (MACAW) is seeing significant improvements in interoperability between IIS and electronic health record (EHR) systems across the community.

The first 2 stages of Testing and Discovery and IIS Assessment are well under way. This report shares the results of IIS that have been measured in Validation as the third stage of the voluntary, phased Measurement and Improvement process for IIS measurement. This stage recognizes those IIS aligning with standards while also acknowledging IIS progressing toward meeting standards. Transport is the first content area to move into Validation.

The following table presents the phased schedule for Measurement and Improvement, with emphasis on this current report on Transport Validation.

		Stages		
		Testing and Discovery Stage	Assessment Stage	Validation Stage
Content Area	Transport	→		
	Submission/ACK	→		
	Query/Response	→		
	CDS	→		
	Data Quality (6)	→		
	Functions			
	Policy			
	Security			

### Transport

Interoperability is a core function for IIS. Although there are many aspects to interoperability, message transport, or how messages get from system A to system B is an important building block for standardized data exchange. In 2011, the Centers for Disease Control and Prevention (CDC) convened an EHR-IIS Interoperability Expert Panel that recommended SOAP Web Services as the [IIS Transport standard](#), and CDC developed a common Web Services Definition Language (WSDL) to allow for easier IIS and EHR

adoption. This report provides results for the **complete** level of Transport Validation; results for the **basic** level can be found [here](#).

Summary information is presented for all measured IIS; individual results are available to authorized users in the [Aggregate Analysis Reporting Tool \(AART\)](#). An [overview document](#) is available that details the entire Measurement and Improvement Initiative.

## Methods

AIRA technical staff are responsible for implementing and conducting all testing efforts within the Measurement and Improvement Initiative. Current test methodology involves connecting with IIS pre-production systems through a web services interface, submitting test messages, and receiving back and analyzing test results. The National Institute of Standards and Technology (NIST) is partnering with AIRA in the testing process to develop conformance test tools in support of this initiative.

All measures and tests are developed by [MACAW](#) and approved by the AIRA board of directors. Transport measures were approved by the AIRA board in June 2016 for Assessment, and in December 2017 for Validation. Measures and test are based on the CDC's [IIS Functional Standards](#). For Transport, the Functional Standards and Operational Guidance Statements referenced include:

**FS 8.0:** The IIS exchanges data with health information systems in accordance with current interoperability standards endorsed by CDC for message content, format, and transport.

**OGS 8.1:** The IIS supports the Simple Object Access Protocol (SOAP) standard Interface, Web Services Definition Language (WSDL), or other transport solutions as endorsed by CDC.

The Validation stage uses the same (or a subset of) measures and tests that have been developed, vetted, and approved by the IIS community and AIRA board for IIS Assessment. Measures for each content area of Validation will be drawn from published IIS Assessment measures and tests. No new measures or tests will be introduced in the Validation stage that are not already measured and visible in the Assessment stage.

Transport Validation reports are updated twice a year, and an IIS can achieve Validation status during either half of the year. Once achieved, Validation is considered “active” for the calendar year. Validation will be retested and renewed in the first quarter of each subsequent calendar year.

## Measures

Validation is measured at 2 levels: basic and complete. The **complete** level of Transport Validation contains 3 measures:

1. *The IIS supports the Connectivity Test Operation as defined in the SOAP Standard Interface 1.2 specification, Web Services Definition Language (WSDL), as endorsed by CDC.*



Sixty-two IIS (which includes all 50 states, plus American Samoa, the Commonwealth of the Northern Mariana Islands, the District of Columbia, the Federated States of Micronesia, Guam, New York City, Philadelphia, Puerto Rico, the Republic of the Marshall Islands, the Republic of Palau, San Diego, and the Virgin Islands<sup>1</sup>) were encouraged to voluntarily be measured in Transport Validation. Of the 62<sup>2</sup> IIS, 50 (81%) had a CDC WSDL available and were measured.

Of those 50 IIS connected and measured, 45 (90%) were Validated or Validated with Minor Differences at the **complete** level for Transport. Another 5 IIS were measured but displayed Major Differences from the standard.

Ten additional IIS were not able to be measured at this time, while 2 opted not to be measured in Transport Validation. Transport Validation reports are updated twice per year, and an IIS can achieve Validation status during either half of the year. Once achieved, Validation is considered “active” for the calendar year. Validation will be retested and renewed in the first quarter of each subsequent calendar year.

Below are results for Transport Validation for 2021 in tabular form.

**Table: Transport Validation, Complete Level - 2021**

Validation Status and Definition	IIS
<p><b>Validated:</b> The IIS must Meet Measure 1 (Connectivity Test), Measure 2 (Submit Single Message), and Measure 3 (Security Fault).</p>	<p>Alabama, Alaska, American Samoa, Arkansas, Colorado, Connecticut, Delaware, Guam, Idaho, Illinois, Indiana, Kansas, Kentucky, Louisiana, Maine, Marshall Islands, Maryland, Massachusetts, Micronesia, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Mexico, New York City, North Carolina, N. Mariana Islands (CNMI), Ohio, Oklahoma, Oregon, Palau, Philadelphia, Rhode Island, South Carolina, Tennessee, Texas, Washington, Wisconsin, Wyoming</p>

<sup>1</sup> Note that four of the Pacific Islands were not initially targeted for measurement due to limited transport technology. As capabilities and ability to be measured expand, additional Pacific Islands are being included in this report.

<sup>2</sup> Note that the denominator for M&I participation increased from 58 to 62 in Q1 2021.

<b>Validated with Minor Differences:</b> The IIS must Meet Measure 1 (Connectivity Test) and Measure 2 (Submit Single Message), and Deviate in Measure 3 (Security Fault).	Iowa, New Jersey, North Dakota, Utah
<b>Major Differences:</b> The IIS fails to meet the requirements for Validated or Validated with Minor Differences.	Arizona, California, Florida, Georgia, San Diego
<b>Not Measured:</b> The IIS is not able to be tested at this time.	District of Columbia, Hawaii, Michigan, New Hampshire, Pennsylvania, Puerto Rico, South Dakota, Virginia, Virgin Islands, West Virginia
<b>Opted Out:</b> The IIS has chosen not to be measured.	New York State, Vermont

## Conclusion

Many IIS are continuing to implement functionality to fully conform with the IIS Functional Standards. It is impressive to see that of the 50 IIS measured, 45 of them (90%) were Validated or Validated with Minor Differences at the complete level for Transport. Published Validation reports offer transparency into the progress IIS are making to come into full alignment with our community-driven standards. AIRA staff are also available to provide technical assistance to IIS programs and vendors as requested.

For more background or information on the Measurement and Improvement Initiative, please visit [AIRA's webpage](#). Contact Kristi Siahaya with questions at [ksiahaya@immregistries.org](mailto:ksiahaya@immregistries.org).

## Appendix A: Glossary of Terms and Acronyms

**AART:** The Aggregate Analysis Reporting Tool, an application used to display and share results from the Measurement and Improvement process.

**Assessment Stage:** A more formal testing step to measure IIS systems using IIS community-selected measures and tests, to share those results for quality improvement, and to provide technical assistance to accelerate improvement. This is the second of 3 stages.

**Basic Level:** A level of Validation measurement that includes only essential measures to functionally meet this content area.

**Complete Level:** A level of Validation measurement that includes conformance to all measures approved for Validation.

**Content Area:** A category for measuring IIS functionality and capability within a specific functional area, made up of distinct measures and tests. Measures and tests will become more formalized as they progress into different stages.

**MACAW:** Measurement for Assessment and Certification Advisory Workgroup.

**Major Differences Status:** The IIS cannot support the measures because of additional requirements that conflict with the national standard; the IIS must make significant changes in 1 or more measures to align with standards.

**Measure:** A metric developed to measure how well an IIS aligns with IIS Functional Standards/Operational Guidance Statements or other recognized standard.

**Stage:** A distinct period of testing in the Measurement and Improvement process.

**Testing and Discovery Stage:** A step in testing IIS systems to gather preliminary and general information on community alignment with standards. Testing and Discovery precedes all stages.

**Validated Status:** The IIS has achieved full alignment with community-selected measures.

**Validated with Minor Differences Status:** The IIS has achieved full alignment with community-selected measures except for differences that (1) are allowed by the standard (e.g., constraints) or (2) are meeting requirements of local policy/law that do not conflict with standard requirements.

**Validation Stage:** A summary step to acknowledge IIS that are progressing toward or achieving alignment with community-selected measures and tests. A Validation designation is automatically achieved when an IIS meets the designated measures and tests in a specific content area (e.g., Transport, Submission/Acknowledgement, Query/Response, etc.).

## Appendix B: Planned Stages and Content Area of Measurement

The stages and content areas of measurement were developed by MACAW.

A stage is defined as distinct level of testing in the Measurement and Improvement process. The stages of measurement are defined as follows.

Stage	Definition
<b>Testing and Discovery Stage</b>	An initial step in testing IIS systems to gather preliminary and general information on community alignment with standards. Testing and Discovery precedes all stages.
<b>Assessment Stage</b>	A more formal testing step to measure IIS systems using IIS community-selected measures and tests, to share those results for quality improvement, and to provide technical assistance to accelerate improvement. This is the second of 3 stages.
<b>Validation Stage</b>	A summary testing step to acknowledge IIS that are progressing toward or achieving alignment with community-selected measures and tests. A Validation designation is automatically achieved when an IIS meets the designated measures and tests in a specific content area (e.g., Transport, Submission/Acknowledgment, Query/Response, etc.), but interim steps toward Validation are also recognized. Validation statuses include Validated, Validated with Minor Differences, Major Differences, Not Measured, and Opted Out. This is the third and final stage of measurement for each content area at this time.

Content areas for measuring IIS functionality and capability within a specific functional area are made up of distinct measures and tests. Measures and tests will become more formalized as they progress into different stages. The table below includes planned content areas of Assessment. The order may be subject to change.

Planned Content Area	Definition
<b>Transport Messaging</b>	Assessing alignment with standard protocols of SOAP/Web Services and specifications for the CDC WSDL for communications over a computer network.

<b>Planned Content Area</b>	<b>Definition</b>
<b>Submission/ Acknowledgment Messaging</b>	Assessing alignment with the Health Level Seven (HL7) 2.5.1 release 1.5 Implementation Guide and addendum for Immunization Messaging for Submission and Acknowledgment.
<b>Query/ Response Messaging</b>	Assessing alignment with the HL7 2.5.1 release 1.5 Implementation Guide and addendum for Immunization Messaging for Query and Response.
<b>Clinical Decision Support</b>	Assessing alignment with specifications for Clinical Decision Support for Immunizations, based on the Advisory Committee for Immunization Practices.
<b>Data Quality – tentatively planned to include 6 topic areas</b>	Assessing alignment with guidance and best practices from MIROW (Modeling of Immunization Registry Operations Workgroup) and AIRA Data Validation guides for testing new incoming and ongoing data, and existing (data at rest) patient and immunization data via HL7 and User Interface entry for completeness, accuracy, and timeliness. Assessing completeness for enrollment and submission of provider organizations within a jurisdiction. Assessing completeness for demographic records for a patient population within a jurisdiction. Assessing the ability to detect unique and redundant patient and vaccination records and resolve appropriately in accordance with standards and best practices.
<b>Functions</b>	Assessing the availability of specific functionality or capacity within the program or the system and its adherence to published standards or guidance (e.g. quality improvement initiatives).
<b>Policy</b>	Assessing the existence of policies and procedures that the program, or an individual in the program, is responsible for (e.g., a written disaster recovery plan).
<b>Security</b>	Assessing the existence of business rules or automated procedures that have been implemented to maintain the security of the system (e.g., ensuring data is backed up on a periodic basis).