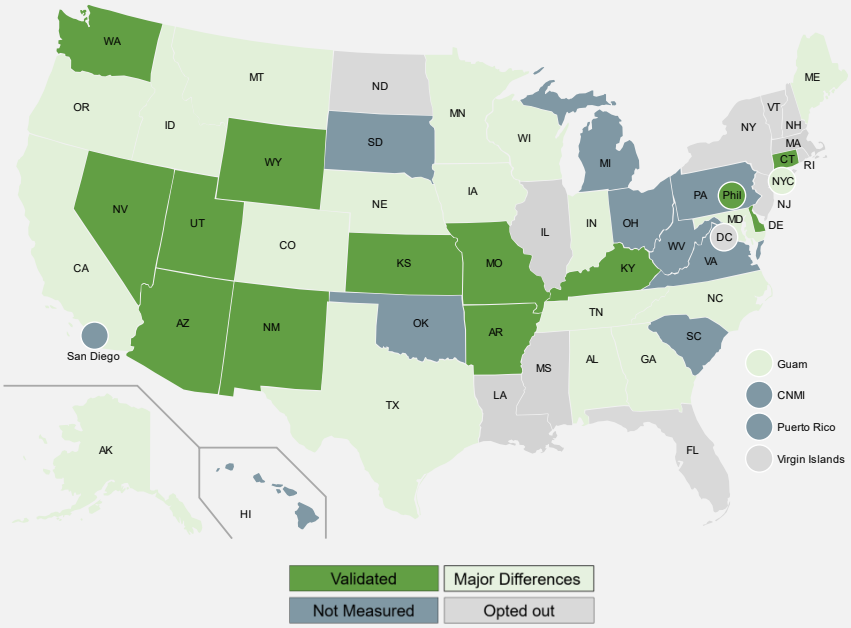
DATA QUALITY INCOMING / ONGOING VALIDATION

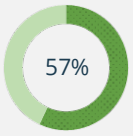
Complete Level

2022

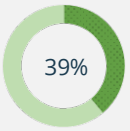
AIRA
AMERICAN IMMUNIZATION REGISTRY ASSOCIATION

M&I
MEASUREMENT & IMPROVEMENT





33 of 58 (57%) IIS were connected with the testing process and measured.



13 of 33 (39%) connected IIS were Validated or Validated with Minor Differences at the basic level for Data Quality Incoming/Ongoing.

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. 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.

Introduction

Measurement and Improvement

The American Immunization Registry Association (AIRA) launched its community-driven immunization information system (IIS) Measurement and Improvement (M&I) 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 & 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. This stage recognizes those IIS aligning with standards while also acknowledging IIS progressing toward meeting standards.

The following table presents the phased approach for Measurement and Improvement, including this current report on Data Quality Incoming/Ongoing (DQI) Validation.

Stages of Measurement

Content Area	Testing & Discovery Stage	Assessment Stage	Validation Stage
Transport	→	→	→
Submission/ACK	→	→	→
Query/Response	→	→	→
CDS	→	→	→
Data Quality Incoming/Ongoing (DQI)	→	→	→
Data at Rest (DAR)	→		

Data Quality Incoming/Ongoing

The technical requirements for data quality are documented in the *HL7 Version 2.5.1: Implementation Guide for Immunization Messaging, Release 1.5*[1] and addendum.[2] This is referred to as the "National IG" in the remainder of this document. Additional considerations for data quality are documented in the *Data Quality Assurance in Immunization Information Systems: Incoming Data*[3] and the *Data Quality Assurance in Immunization Information Systems: Selected Aspects*[4].

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.
This report provides results for the **complete** level of DQI Validation; results for the **basic** level can be found here.

Commented [SP1]: Tesha or Kristi to add a link here once the copy editing is done.

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.

All measures and tests are developed by MACAW and informed by the IIS community and AIRA board of directors. Measures and tests are based on the CDC's IIS Functional Standards. For Data Quality Incoming/Ongoing, the following overarching principle in the Functional Standards best describes the importance of Data Quality to the IIS:

> *As an IIS matures, the importance of data quality becomes more pronounced. Data quality is the cornerstone of successfully reaching all immunization-related goals. IIS Functional Standards related to data quality are woven into the Essential Infrastructure Functional Standards and are reflected in multiple goals in this document. This underscores the importance of thinking about and applying data quality in all aspects of access and use of IIS data and functionality.*

The Validation stage uses the same (or a subset of) measures and tests that have been developed, vetted, and informed 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.

[1] https://www.cdc.gov/vaccines/programs/iis/technical-guidance/downloads/hl7guide-1-5-2014-11.pdf
[2] https://www.cdc.gov/vaccines/programs/iis/technical-guidance/downloads/hl7guide-addendum-7-2015.pdf
[3] https://repository.immregistries.org/resource/data-quality-assurance-in-immunization-information-systems-incoming-data-1/
[4] https://repository.immregistries.org/resource/data-quality-assurance-in-immunization-information-systems-selected-aspects/

Validation reports are run quarterly, and an IIS can achieve Validation status during any quarter 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. This content area focuses on the IIS ability to detect data quality issues on a per-message basis across three categories: Patient Demographic Elements, Vaccination Event Elements, and Additional Aspects. The IIS will be presented with messages that contain intentional data quality errors (e.g., vaccination date before date of birth) and the IIS is expected to detect these errors. The IIS will also be assessed on the ability to retain (and return) vaccination events from submission to query without changing the meaning (e.g., NDC mapped to CVX, return key information about a vaccination event).

The **complete basic** level of Data Quality Incoming/Ongoing Validation contains 16 measures.

Patient Demographic Elements

1. The IIS detects data quality issues with patient name: first.
2. The IIS detects data quality issues with patient name: last.
3. The IIS detects data quality issues with patient date of birth.
4. The IIS detects data quality issues with patient gender.
5. The IIS detects data quality issues with patient address: state.
6. The IIS detects data quality issues with patient address: country.
7. The IIS detects data quality issues with race.
8. The IIS detects data quality issues with ethnicity.
9. The IIS detects data quality issues with patient multiple birth indicator and patient birth order.
10. The IIS detects data quality issues with patient telephone number and patient telephone number type.
11. The IIS detects data quality issues with responsible person name: first.
12. The IIS detects data quality issues with responsible person name: last.
13. The IIS detects data quality issues with responsible person relationship to patient.
14. The IIS detects data quality issues with patient ID and patient ID: type.

Vaccination Events Data Element

15. The IIS detects data quality issues with vaccine administration date.
16. The IIS detects data quality issues with dose level eligibility.
17. The IIS detects data quality issues with contraindications/precautions and contraindication/precaution observation date.

18. The IIS detects data quality issues with exemptions/refusals reasons and exemptions/refusals date.
19. The IIS detects data quality issues with vaccination event record type.
20. The IIS detects data quality issues with vaccine funding source.
21. The IIS detects data quality issues with vaccine product.
22. The IIS detects data quality issues with vaccine manufacturer name.
23. The IIS detects data quality issues with vaccine expiration date.
24. The IIS detects data quality issues with vaccine event ID.

Additional Aspects

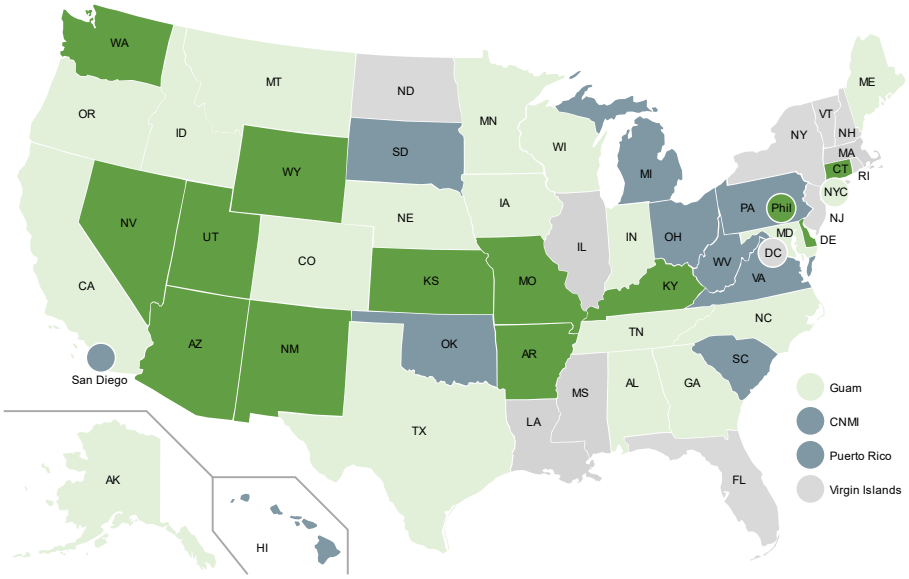
25. The IIS can map between coding systems
26. The IIS returns critical information about a previously submitted vaccination event.
27. The IIS returns the consolidated immunization history following an update.

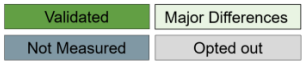
Visit the AIRA repository for more detailed information about Data Quality Incoming/Ongoing measures and tests.

Results

Below are results for DQI Validation for 2022. Unless an IIS declares otherwise, the functionality tested in pre-production is presumed to be available to end users in production.

Map: Data Quality Incoming/Ongoing Validation, Complete Level 2022





Fifty-eight IIS (comprising all 50 states, plus the Commonwealth of the Northern Mariana Islands, the District of Columbia, Guam, New York City, Philadelphia, Puerto Rico, San Diego, and the Virgin Islands[5]) were encouraged to voluntarily be measured in Data Quality Incoming/Ongoing Validation. Of the 58 IIS, 33 were connected with the testing process and measured. Of those measured, 13 (39%) were Validated at the complete level for Data Quality Incoming/Ongoing. Another 20 IIS were measured but displayed Major Differences.

Sixteen additional IIS were not able to be measured at this time, while 9 opted not to be measured in DQI Validation. Validation reports are run quarterly, and an IIS can achieve Validation status during any quarter 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 DQI Validation for 2022 in tabular form.

Table: Data Quality Incoming/Ongoing Validation, Complete Level 2022

Validation Status and Definition	IIS
Validated: The IIS must meet Measures 1-27.	Arkansas, Arizona, Connecticut, Delaware, Kansas, Kentucky, Missouri, New Mexico, Nevada, Philadelphia, Utah, Washington, Wyoming
Major Differences: The IIS does not meet 1 or more measures specified above.	Alaska, Alabama, California, Colorado, Georgia, Guam, Idaho, Indiana, Iowa, Maine, Maryland, Minnesota, Montana, Nebraska, North Carolina, New York City, Oregon, Tennessee, Texas, Wisconsin
Not Measured: The IIS is not able to be tested at this time.	CNMI, Hawaii, Illinois, Louisiana, Massachusetts, Michigan, Mississippi, Ohio, Oklahoma, Pennsylvania, Puerto Rico, San Diego, South Carolina, South Dakota, Virginia, West Virginia
Opted Out: The IIS has chosen not to be measured.	District of Columbia, Florida, New Hampshire, New Jersey, New York State,

[5] 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.

	North Dakota, Rhode Island, Vermont, Virgin Islands

Conclusion

Many IIS are continuing to implement functionality to fully conform with the IIS Functional Standards, particularly as it relates to full implementation of HL7 2.5.1, release 1.5. It is encouraging and shows progress as it relates to data quality.

Published Validation reports will 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 web page. Contact AIRA with questions at aart@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/Acknowledgment, Clinical Decision Support, etc.).

Appendix B: Planned Stages and Content Areas of Measurement

The stages and content areas of measurement were developed by MACAW. A stage is defined as a distinct level of testing in the Measurement and Improvement process. The stages of measurement are defined as follows:

Stage	Definition
Testing and Discovery Stage	An initial step in testing IIS systems to gather preliminary and general information on community alignment with standards. Testing and Discovery precedes all stages.
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.
Validation Stage	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, Clinical Decision Support, 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 for Assessment. The order may be subject to change.

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

Planned Content Area	Definition
Submission/ Acknowledgment Messaging	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.
Query/ Response Messaging	Assessing alignment with the HL7 2.5.1 release 1.5 Implementation Guide and addendum for Immunization Messaging for Query and Response.
Clinical Decision Support	Assessing alignment with specifications for Clinical Decision Support for Immunizations, based on the Advisory Committee for Immunization Practices.
Data Quality Incoming /Ongoing (DQI)	Assessing alignment with guidance and best practices from MIROW and AIRA Data Validation guides for testing incoming and ongoing patient and immunization data via HL7 VXU with the expectation of IIS to detect poor data quality. Measurement leverages both the acknowledgement (ACK) and QBP/RSP messages as a tool to support data quality.
Data at Rest (DAR)	Assessing alignment with guidance and best practices from MIROW and AIRA Data Validation guides for testing existing IIS patient and immunization data for completeness, validity, and timeliness regardless of how the data arrived at the IIS (e.g., HL7, vital records, User Interface)
Provider Participation	Assessing completeness for enrollment and submission of provider organizations within a jurisdiction
Patient Deduplication	Assessing the ability to detect unique and redundant patient records and resolve appropriately in accordance with standards and best practices
Vaccine Deduplication	Assessing the ability to detect unique and redundant immunization vaccination events for a patient and resolve appropriately in accordance with standards and best practices
Patient Saturation	Assessing completeness for demographic records for a patient population within a jurisdiction

Planned Content Area	Definition
Vaccine Saturation	Assessing completeness for vaccination records for a patient population within a jurisdiction (not coverage completion)
Functions	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).
Policy	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).
Security	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).