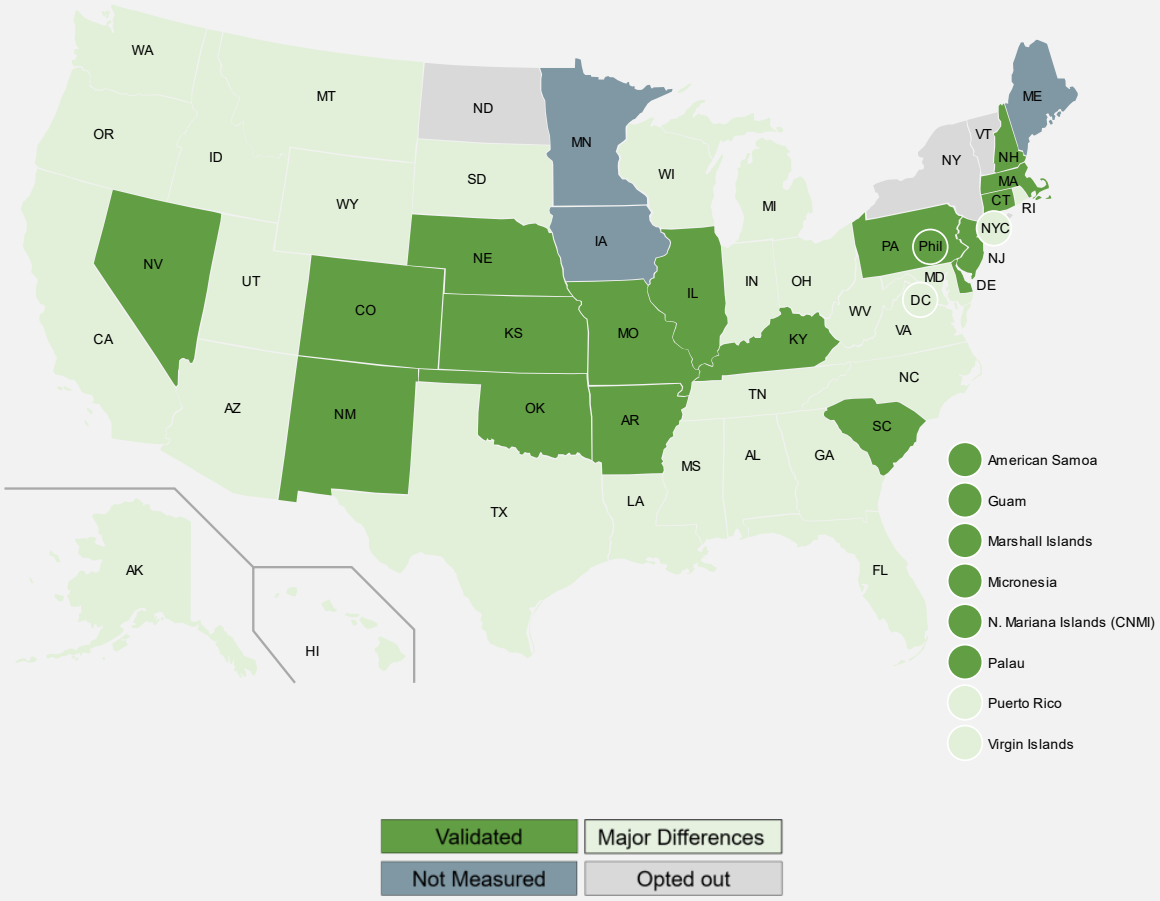
DATA QUALITY INCOMING/ ONGOING VALIDATION

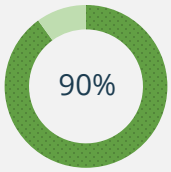
Basic Level

2024

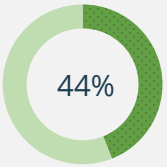
AIRA
AMERICAN IMMUNIZATION REGISTRY ASSOCIATION

M&I
MEASUREMENT & IMPROVEMENT





55 of 61 (90%) IIS were connected to the testing process and all measures assessed.



24 of 55 (44%) connected IIS were Validated at the basic level Data Quality Incoming/Ongoing.

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 align with IIS Functional Standards and developing a summary of IIS community alignment progress with best practices and standards. This report contains the results of IIS that have been measured within Validation, the final stage of the M&I process.

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Introduction

The American Immunization Registry Association (AIRA) launched its community-driven immunization information system (IIS) Measurement and Improvement (M&I) Initiative in mid-2015. The M&I Initiative provides IIS with information and guidance to align with the IIS Functional Standards. These standards are a set of specifications that describe the operations, data quality, and technology needed by IIS to support immunization programs, vaccination providers, and other immunization stakeholders.

M&I connects AIRA testing processes with IIS preproduction (or test) systems and/or analyzes de-identified data then shares results through the Aggregate Analysis Reporting Tool (AART). AIRA continues to test with a growing number of IIS interfaces, with over 90% of IIS programs currently participating. The initiative is demonstrating significant improvements in interoperability between IIS and electronic health record (EHR) systems across the community, as well as improvements in standards-based functionality.

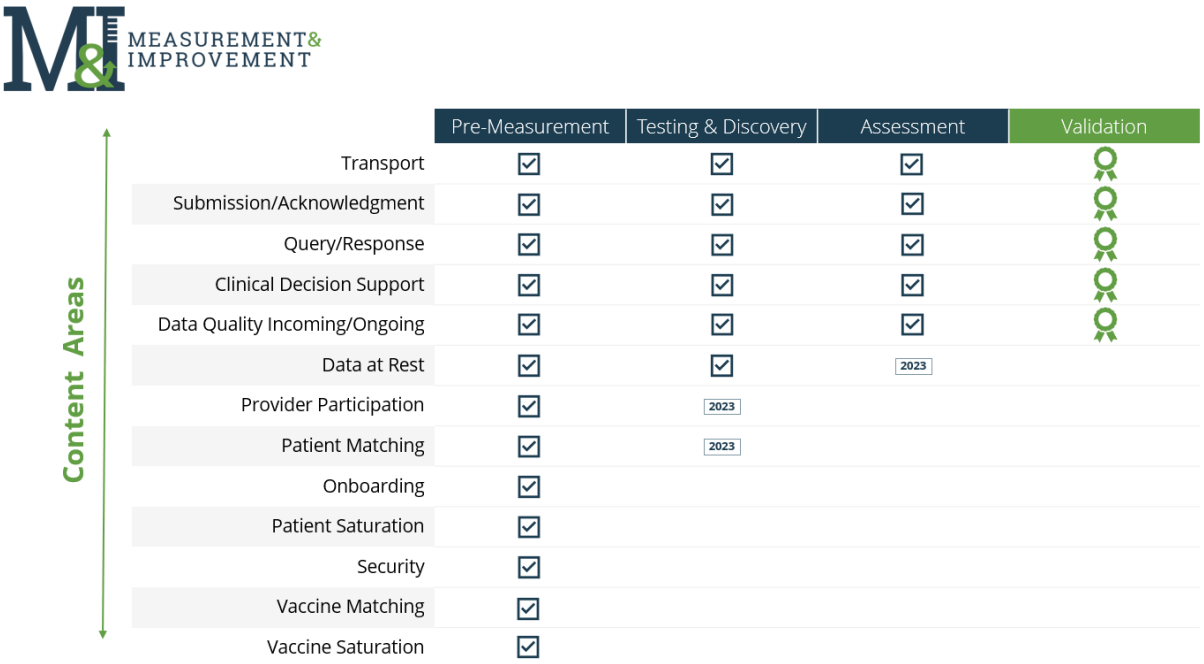
M&I is a three-stage process for IIS to measure their alignment with current standards:

- Testing and Discovery gathers preliminary information on community alignment with standards.
- IIS Assessment involves more formal testing to measure individual IIS using IIS community-selected measures and tests.
- Validation is a summary stage to acknowledge and share results for IIS that are progressing toward or achieving alignment with community-selected measures and tests.

Each content area for measuring IIS functionality and capability progresses through each stage. M&I stages and content areas are developed by the Measurement for Assessment and Certification Advisory Workgroup (MACAW), a panel of IIS subject matter experts.

M&I's third and final stage, Validation, uses the same measures and tests, or a subset thereof, that have been developed, vetted, and approved by the IIS community for IIS Assessment, the second stage of M&I. Validation is measured at two levels: basic and complete. No new measures or tests are introduced in the Validation stage that are not already measured and visible in the Assessment stage. An overview is available that details the M&I Initiative, its content areas, and associated stages of measurement.

The following table presents an overview of M&I content areas and their respective progress across M&I stages.



Data quality incoming/ongoing

The consolidation of immunization records from multiple sources is a primary function of immunization information systems (IIS). To ensure complete, accurate, and timely consolidated records, IIS must receive data from a high proportion of immunizers within their catchment area through standardized reporting channels. Messaging standards have been present across the IIS community for more than 20 years and have increasingly gained importance as electronic health record (EHR)-IIS interoperability has grown in necessity across health care. The primary standard for IIS messaging is the HL7 Version 2.5.1 Implementation Guide for Immunization Messaging, Release 1.5. As data are electronically exchanged, IIS must detect data-quality errors during submission to improve the overall quality of IIS data. Expectations for data quality are documented in *Data Quality Assurance in Immunization Information Systems: Incoming Data*, *Data Quality Assurance in Immunization Information Systems: Selected Aspects*, and *IIS Data Quality Practices – Monitoring and Evaluating Data Submissions*.

Methods

All measures and tests are developed by MACAW and informed by the IIS community. Measures and tests are based on the CDC's IIS Functional Standards. Visit the AIRA repository to review detailed measures and tests for data quality incoming/ongoing (DQI).

For DQI, 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.*

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 preproduction systems through a web services interface, submitting test messages, and receiving back and analyzing test results.

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

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.

This report provides results for the **basic** level of DQI Validation; results for the **complete** 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).

Measures

DQI focuses on the ability of the IIS to detect data quality issues on a per-message basis across three categories: patient demographic elements, vaccination event elements, and additional aspects.

The **basic** level of DQI Validation contains 18 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.
7. The IIS detects data quality issues with race.
8. The IIS detects data quality issues with ethnicity.
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.
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.

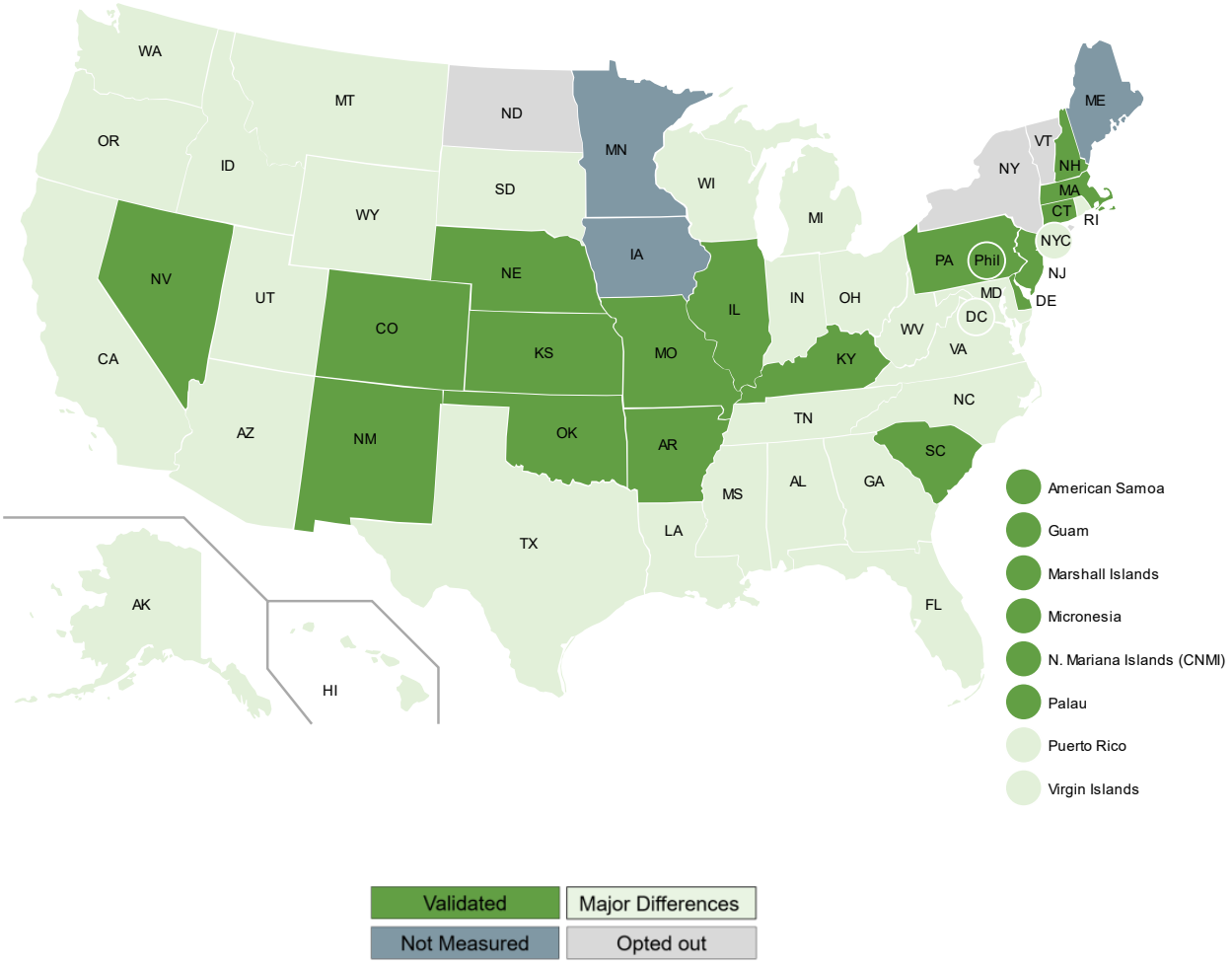
Additional aspects

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.

Results

Below are results for DQI Validation for 2024. Unless an IIS declares otherwise, the functionality tested in preproduction is presumed to be available to end users in production.

Map: Data Quality Incoming/Ongoing Validation, basic level 2024



The 61[1] IIS participating[2] in AIRA's M&I Initiative were encouraged to be formally measured in DQI Validation. Of the 61 participating IIS, **55 (90%)** were connected to the testing process, and all measures were assessed. Of those measured, **24 (44%)** were **Validated** at the basic level for DQI. Another 31 IIS were measured but displayed major differences. Three IIS were not able to be measured[3] at this time, while three opted not to be measured in DQI Validation.

[1] Note that the denominator for M&I participation decreased from 62 to 61 in Q2 2022, due to San Diego IIS's merge with California's state IIS.

[2] Includes all 50 states, 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, and the Virgin Islands.

[3] Note that "Not Measured" includes IIS who were not connected to the testing process and IIS whose results include one or more measures that could not be assessed.

Below are results for DQI Validation for 2024 in tabular form.

Table: Data Quality Incoming/Ongoing Validation, basic level 2024

Validation Status and Definition	IIS
Validated: The IIS meets Measures 1–5, 7–8, 14–15, 19–27.	American Samoa, Arkansas, Colorado, Connecticut, Delaware, Guam, Illinois, Kansas, Kentucky, Marshall Islands, Massachusetts, Micronesia, Missouri, N. Mariana Islands (CNMI), Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, Oklahoma, Palau, Pennsylvania, Philadelphia, South Carolina
Major Differences: The IIS does not meet one or more measures specified above.	Alabama, Alaska, Arizona, California, District of Columbia, Florida, Georgia, Hawaii, Idaho, Indiana, Louisiana, Maryland, Michigan, Mississippi, Montana, New York City, North Carolina, Ohio, Oregon, Puerto Rico, Rhode Island, South Dakota, Tennessee, Texas, US Virgin Islands, Utah, Virginia, Washington, West Virginia, Wisconsin, Wyoming
Not Measured: The IIS is not connected, or one or more measures could not be assessed for IIS.	Iowa, Maine, Minnesota
Opted Out: The IIS has chosen not to be measured.	New York (State), North Dakota, Vermont

Conclusion

Many IIS are continuing to implement functionality to fully conform with the IIS Functional Standards, particularly as relates to data-quality detections and full implementation of HL7 2.5.1, release 1.5. The results are encouraging and show progress relating to data quality. Published Validation reports offer insight into the progress IIS are making with community-driven standards alignment. AIRA staff are also available to provide technical assistance to IIS programs and vendors as requested.

Please visit AIRA's website for more background or other information on the M&I Initiative. Please direct questions and/or comments via AIRA's online technical assistance form.

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 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 three 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 one 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 another recognized standard.

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

Testing and Discovery Stage: A step in testing IIS to gather preliminary and general information on community alignment with standards. Testing and Discovery is the first of 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.).