



AIRA

AMERICAN IMMUNIZATION
REGISTRY ASSOCIATION

Patient Matching Single Organization— HL7

Aggregate Assessment Report
2025 – 4th Quarter

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Introduction

Overview Best practices for Patient Matching are summarized in the Centers for Disease Control and Prevention's [Immunization Information Systems Patient-level De-duplication Best Practices](#).

A key role of immunization information systems (IIS) is combining vaccination records from many sources to create complete and accurate histories. To do this well, IIS need data from most immunizers in their area, sent through standardized electronic channels. For over 20 years, the IIS community has used messaging standards, which have become even more important with the rise of electronic health record (EHR) integration. As data is electronically exchanged, IIS must attempt to match incoming patient records from a provider with existing records already in their database. Additionally, when IIS are queried for a patient's immunization records, they must accurately locate an existing IIS patient's record using the supplied query parameters. This can be challenging when the demographic information varies between an IIS and an EHR from the same patient's record.

Background: Patient Matching Single Organization – HL7 moved into the [Measurement and Improvement \(M&I\)](#) stage of [Assessment](#) in 2025. This report contains the aggregate results of the IIS remeasurement completed in **Quarter 4 of 2025**. IIS can access their individual measurement reports in the [Aggregate Analysis Reporting Tool AART](#).

Measures: The Measurement for Assessment and Certification Workgroup ([MACAW](#)), the advisory body for M&I, approved measures and tests for Patient Matching Single Organization – HL7 in January 2025. The detailed measures and tests document is located on the [AIRA Repository](#). Measures and tests are based on the [IIS Functional Standards v5.0](#). Patient Matching measures and tests are specifically based off the following:

- **Functional Standard B4.0:** The IIS validates patient demographic and vaccination data.
- **Guidance Statement B4.1:** The IIS supports the identification, prevention, and resolution of duplicate and fragmented patient demographic and vaccination data in accordance with policies and procedures.

Testing Method: For Patient Matching Single Organization – HL7 testing, each measure is isolated to one aspect of patient matching (e.g., changing first name spelling). Both submission and query test messages are sequenced in the same manner and use identical patient pairs. Note these tests are sent by the same organization and include the same medical record number (MRN) – this a major limitation of the current content area's methodology. A recent expansion resolves this limitation but is currently treated as a

separate content area: Patient Matching Multiple Organizations – HL7. As such, its results are not covered in this document.

Submission - AIRA submits two unsolicited vaccine update HL7 2.5.1 messages (VXUs) that reflect the condition described in the measure. The first message includes a dose of hepatitis A vaccine, and the second message includes a dose of hepatitis B vaccine. For submission measures, the responses from the IIS are expected to include both hepatitis A and B vaccine doses proving the VXU records were consolidated, and this patient's record will be retrieved when querying using the demographics and information from either VXU1 or VXU2.

Query - Following the VXUs, two queries (QBP – query by parameter message) will be sent for the patient, one for each variation of the patient's details represented in the VXUs. For query measures, the IIS is expected to consolidate the information from both VXUs into a single patient's record. The responses from the IIS are expected to include both hepatitis A and B vaccine doses proving the VXU records were consolidated, and this patient's record will be retrieved when querying using the demographics and information from both VXU1 or VXU2. Alternatively, IIS may respond to one query with an exact match that includes a consolidated vaccination record and the other query with a single inexact match.

Possible Results: IIS can achieve one of three possible results in both test and measure outcomes – **meets, does not meet, or not measured.**

Summary Results

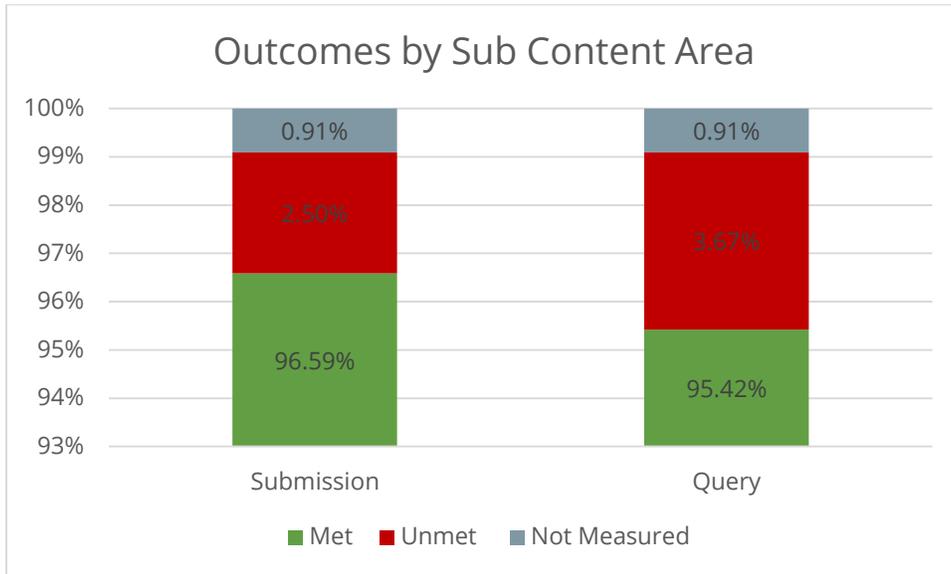
Sixty-one (61) IIS were encouraged to be measured in the Patient Matching - HL7 Assessments. Of the 61 encouraged IIS,¹ **60 (98%)** could be measured and are included in this report. One IIS was unable to be tested due to technical reasons.

Measure Summary Results by Sub Content Area

Submission measures assess the ability to consolidate a single record from two similar incoming records. Query Measures assess the ability to find the same consolidated record in the IIS using two similar queries. By combining the results for each content area's measures one can understand how well IIS consolidate incoming information and respond to queries where patient demographics vary. According to the results below, IIS perform well in both areas of patient matching: consolidation (submission) and search response (query). Overall, participating IIS did slightly better at consolidating (submission) than returning matched patients (query). During the fourth quarter of 2025, nearly 97% (96.59%)

¹Includes 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.

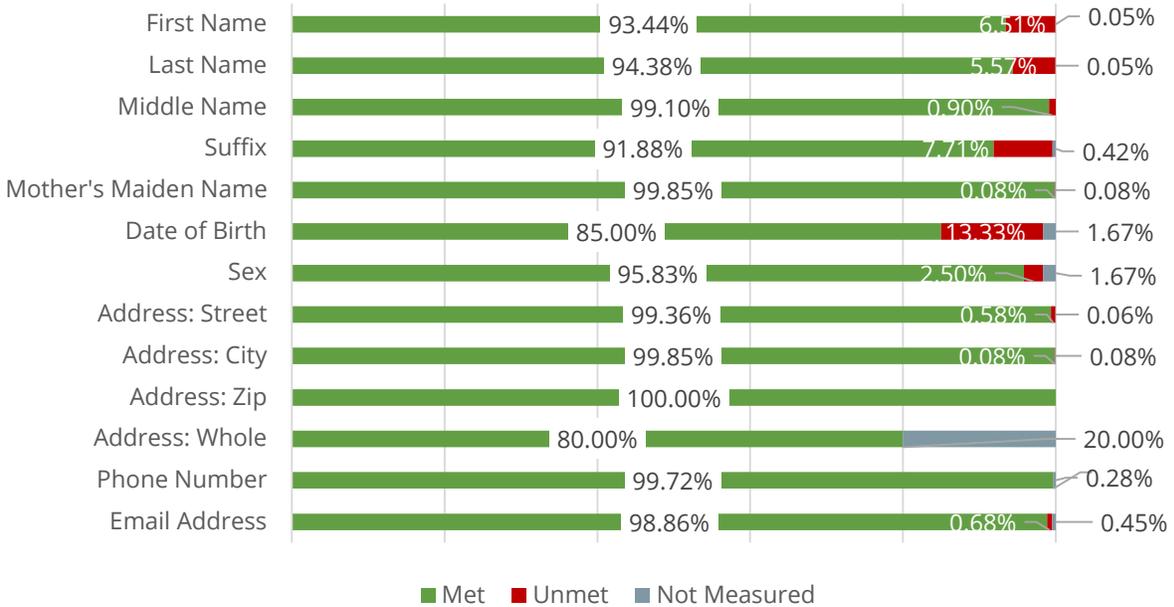
of the time IIS met submission measure expectations, and just over 95% (95.42%) of the time IIS met query measure expectations.



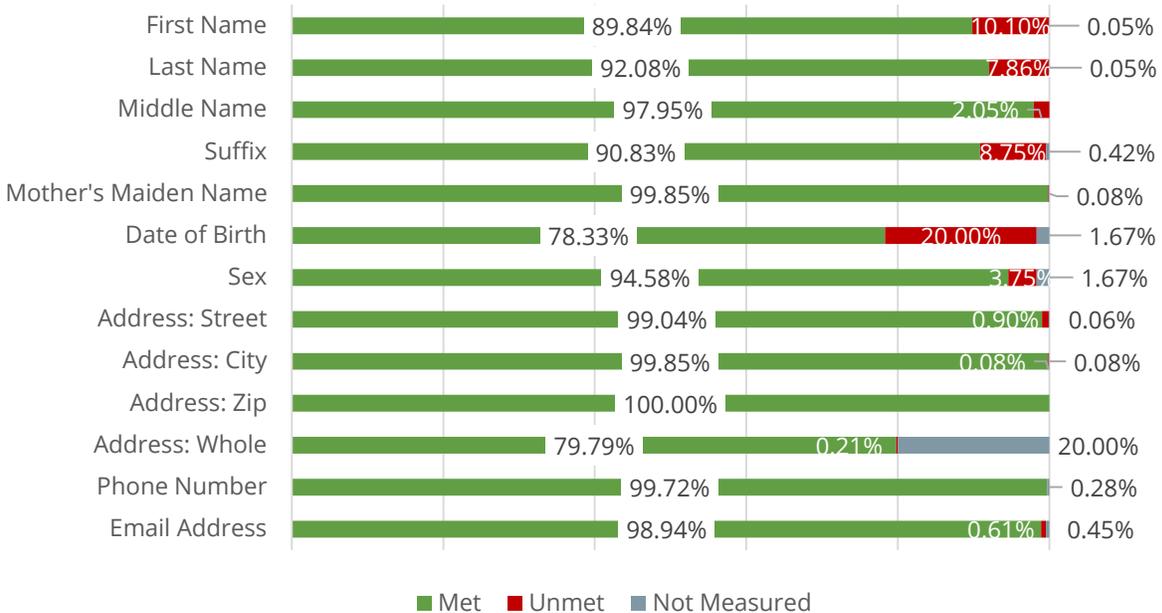
Measure Summary Results by Sub Content Area and Field of Interest

Within a content area, the field of interest (i.e., the field changing between VXUs) plays a key role in automatic consolidation and identifying potential matches. Below are the outcomes by sub content area and field of interest.

Submission Outcomes by Field of Interest



Query Outcomes by Field of Interest

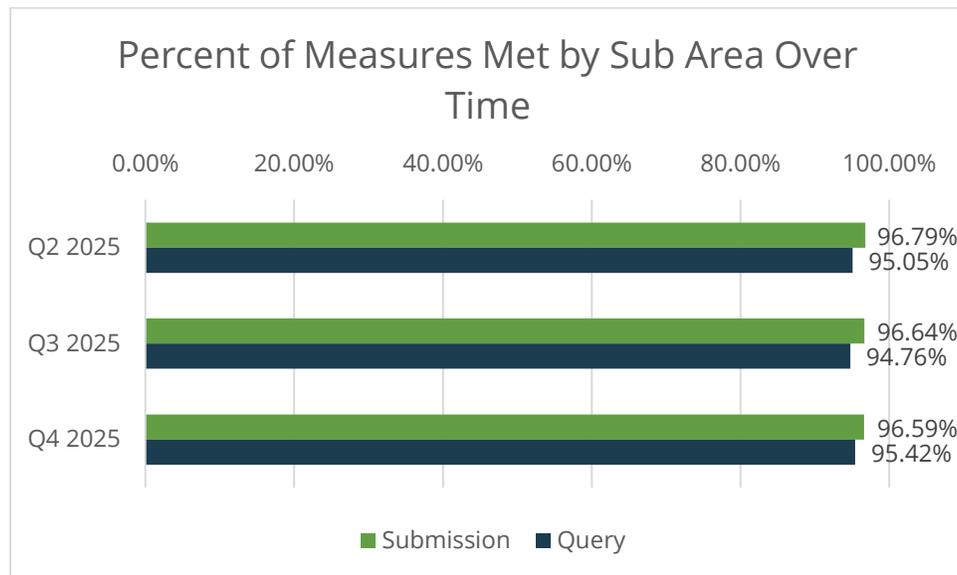


Notable Findings and Limitations Across Submission and Query Measures

- Date of Birth - Unlike other fields of interest measure groups that have multiple measures, there is a single date of birth measure. This may account for the relatively high number of IIS not meeting the measure “group” expectation.
- Changing the contact fields (address, phone number, and email address) did not have a negative impact on patient matching with all IIS consistently matching the patient regardless of contact field change.
- Whole Address – a significant number of IIS could not be evaluated when removing a patient’s address as it is a required field for these jurisdictions.

Summary of Progress

After three quarters of measurement, no significant changes have been observed. IIS continue to perform well at Patient Matching Single Organization – HL7 measures by meeting 96% of all measures. Performance is slightly better for submission measures than query measures as shown in the bar chart below.



Questions and/or Comments

Please direct questions and/or comments via AIRA’s [Technical Assistance Request form](#).

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Appendix A: Report Limitations and General Recommendations

Report Limitations

As with any report, limitations exist and should be understood. The known limitations of this report are listed below:

- Changing contact information (address fields, phone number or email) when others are held constant did not have a negative impact.
- Unlike other fields of interest measure groups, there is a single date of birth measure. This may account for the relatively high number of IIS not meeting the measure group's expectation.
- Some measures intentionally test areas which will result in a locally rejected HL7 VXU message. When this happens, patient matching cannot be measured, and the results will show up as Not Measured.
- All scenarios at this point focus on two patients who should have been merged into one consolidated record.
- All scenarios within Patient Matching Single Organization use patients from the same sending organization. For IIS that heavily (or entirely) leverage the combination of MRN and sending organization to automatically match patients, the current testing method will not uncover demographic-based patient matching challenges. Further work is underway to explore extending the testing method to include multiple sending organizations to remove this possible MRN limitation.
- This testing is not sufficient for calculating F-score, sensitivity, specificity, or other known patient matching scores.
- There may be additional limitations to this report that we will discover as jurisdictions interact with this report.

General Recommendations

- Report readers are reminded that this content will likely expand in the future and that the content area is not currently designed to test edge cases (e.g., Twins with the same name).
- IIS should carefully explore their failed query measures where the corresponding submission measure passed. This indicates good record consolidation but indicates a possible search issue in finding a patient when demographics are not exactly the same as the values known by the IIS.