AIRA
AMERICAN IMMUNIZATION REGISTRY ASSOCIATION

Clinical Decision Support Assessment

Aggregate Report

2025 – Quarter 4

M&I
MEASUREMENT & IMPROVEMENT

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Introduction

Overview: The measurement process for Clinical Decision Support (CDS) uses the National Institute of Standards and Technology (NIST) Immunization Test Suite Validation Tool. This tool provides consistent conformance-based results for all measured IIS. In addition, the technical requirements for CDS are documented in the HL7 Version 2.5.1: Implementation Guide for Immunization Messaging, Release 1.5 and addendum. This is referred to as the National IG.

Immunization Information Systems (IIS) help health care providers determine which vaccines a patient needs by using clinical decision support (CDS) tools. These tools follow recommendations from the Advisory Committee on Immunization Practices (ACIP), which updates vaccine guidelines throughout the year. To make sure these tools give consistent recommendations, the CDC's Immunization Information Systems Support Branch (IISSB) created the Clinical Decision Support for Immunization (CDSi) Project. This project develops standard tools for each vaccine-preventable disease based on the latest ACIP guidelines.

Background: CDS moved into the Measurement and Improvement (M&I) stage of Assessment in 2020. This report contains the aggregate results of the IIS remeasurement completed in **Quarter 4 of 2025**. IIS can access their individual measurement reports in AART.

Measures: Measurement for Assessment and Certification Workgroup (MACAW), the advisory body for M&I, approved measures and tests for CDS Assessment in February 2020. The detailed measures and tests document is located on the AIRA repository. Measures and tests are based on the IIS Functional Standards v5.0. CDS measures and tests are specifically based off the following:

- **Functional Standard C5.0**: Manage interfaces for exchange and integration of data electronically between the IIS and other information systems in accordance with federal and jurisdictional standards.
- **Guidance Statement C5.1**: The IIS exchanges data in accordance with current interoperability standards endorsed by CDC for message content, format, and transport.
- **Functional Standard D6.0**: The IIS supports pediatric, adolescent, and adult immunization forecasts consistent with Advisory Committee on Immunization Practices (ACIP) recommendations.
- **Guidance Statement D6.1**: The IIS establishes and maintains Clinical Decision Support (CDS) functionality consistent with ACIP recommendations.

- **Guidance Statement D6.2**: The IIS establishes and maintains Clinical Decision Support functionality in alignment with CDSi resources published on the CDC website.
- **Functional Standard E7.0**: The IIS ensures authorized users have access to patient demographic and vaccination data based on user roles and permissions.
- **Guidance Statement E7.5**: The IIS supports authorized IIS partners' and providers' appropriate access to data in the IIS for public and population health purposes (e.g. childcare, schools, college, health plans, clinics).

Testing method: To assess IIS CDS responses, AART utilizes the NIST Forecasting for Immunization Test Suite (FITS). FITS checks whether the IIS provides accurate evaluated immunization histories and forecasts, updates CDS logic in a timely manner, and uses status indicators consistent with ACIP guidelines.

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

Summary Results

IIS Participation - Sixty-one (61) IIS were encouraged to be measured in the CDS Assessment. Of the 61 participating IIS,[1] **58 (95%)** could be measured and are included in this report.

IIS were unable to be measured for the following reasons:

- Two IIS are currently unavailable for measurement, either due to system downtime or because AIRA is not actively connected.
- One IIS is currently unmeasurable for Clinical Decision Support (CDS) functionality: they either do not include a CDS response to query messages or the CDS responses do not conform to HL7 standards.

CDS Concepts Supported

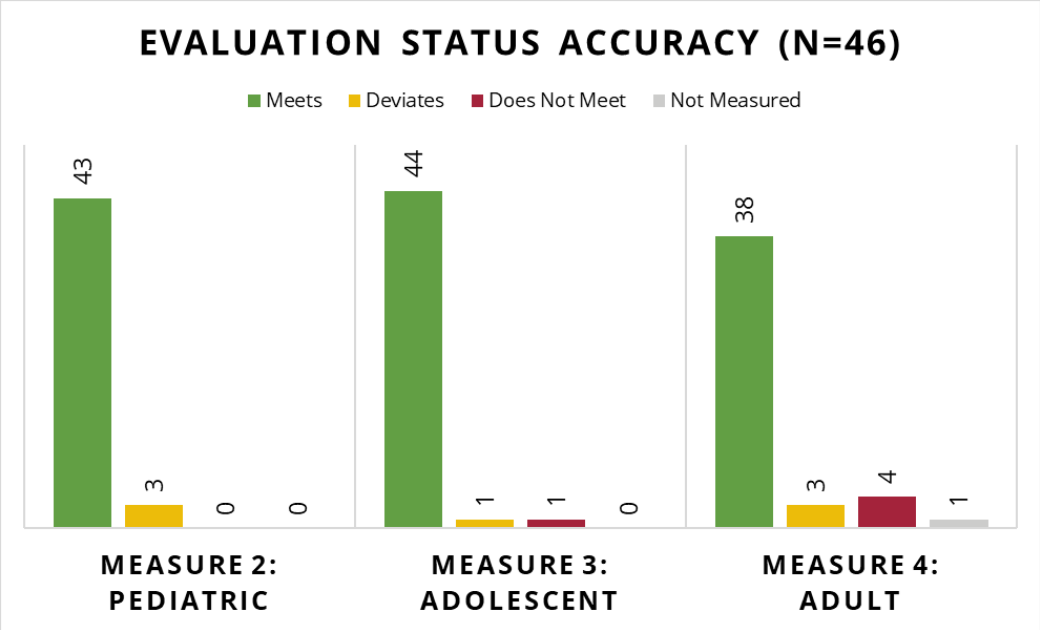
Measures 1, 5, and 9 assess which CDS concepts are supported as part of an IIS HL7 interface. Of the 58 IIS that were assessed, the following table shows how many IIS support the CDS concepts.

[1] 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.

CDS Concept	Supports (N=58)
Measure 1: Evaluation Status *Did the dose count?*	**46**
Measure 5: Earliest Date *When could the next dose be given?*	**57**
Measure 9: Recommended Date *When should the next dose be given?*	**58**

Evaluation Status Accuracy Results

Measures 2 (pediatric), 3 (adolescent), and 4 (adult) measure the accuracy of the evaluation status when it is returned by the IIS. Forty-six IIS (see Measure 1 above) supported evaluation status and were measured for their alignment with the CDSi expectations.



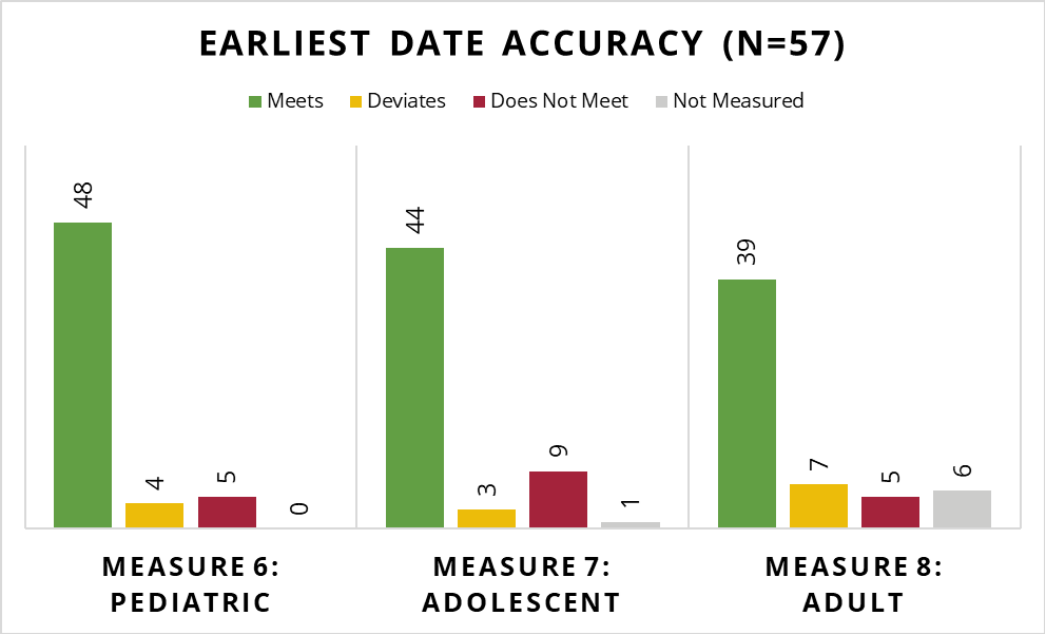
Of the **46 IIS assessed for evaluation status**, the following high-level observations provide additional context for reading and interpreting the evaluation status accuracy graph:

- **Adult Measure:**
  - **Not measured:** One IIS showed support for evaluation status but did not return it consistently across all vaccine families. As such, IIS accuracy could not be measured.

- **Vaccine family threshold:** One IIS was downgraded from "deviates" to "does not meet" because at least one vaccine family was below the vaccine family threshold.

Earliest Date Accuracy Results

Measures 6 (pediatric), 7 (adolescent), and 8 (adult) measure the accuracy of the earliest date when it is returned by the IIS. Fifty-seven IIS (see Measure 5 above) supported earliest date and were measured for their alignment with the CDSi expectations.



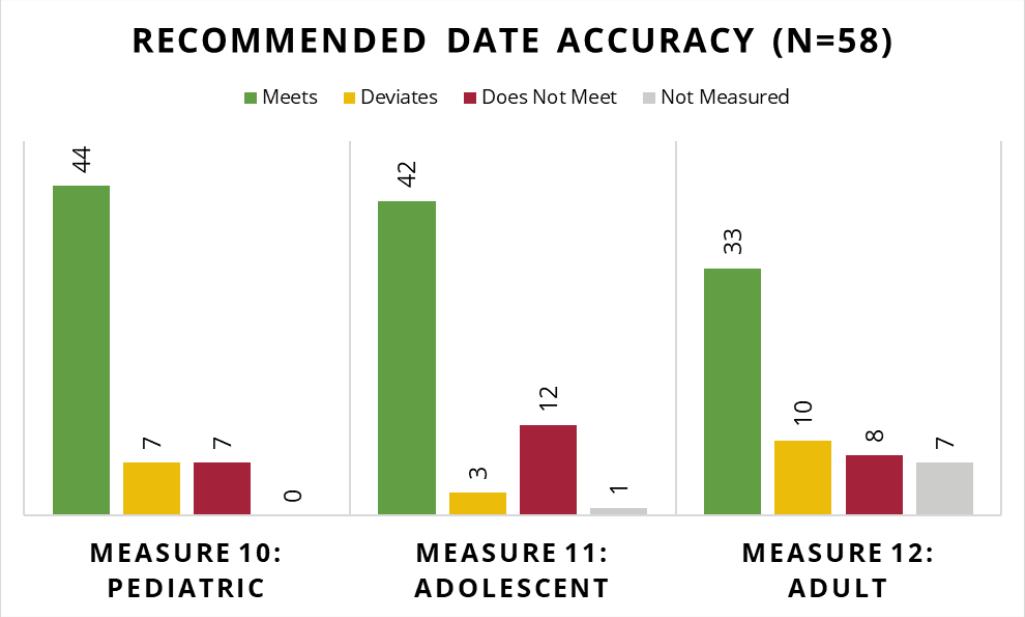
Of the 57 IIS assessed for earliest date, the following high-level observations provide additional context for reading and interpreting the earliest date accuracy graph:

- **Pediatric measure:**
  - **Vaccine family threshold:** Four IIS were downgraded from "deviates" to "does not meet" because at least one vaccine family was below the vaccine family threshold.
- **Adolescent measure:**
  - **Not measured:** One IIS showed support for earliest date but did not return it consistently across all vaccine families. As such, IIS accuracy could not be measured.
  - **Vaccine family threshold:** One IIS was downgraded from "deviates" to "does not meet" because at least one vaccine family was below the vaccine family threshold.
- **Adult measure:**

- **Not measured:** Six IIS showed support for earliest date but did not return it consistently across all vaccine families. As such, IIS accuracy could not be measured.

Recommended Date Accuracy Results

Measures 10 (pediatric), 11 (adolescent), and 12 (adult) measure the accuracy of the recommended date when it is returned by the IIS. Fifty-three IIS (see Measure 9 above) supported recommended date and were measured for their alignment with the CDSi expectations.



Of the 58 IIS assessed for recommended date, the following high-level observations provide additional context for reading and interpreting the recommended date accuracy graph:

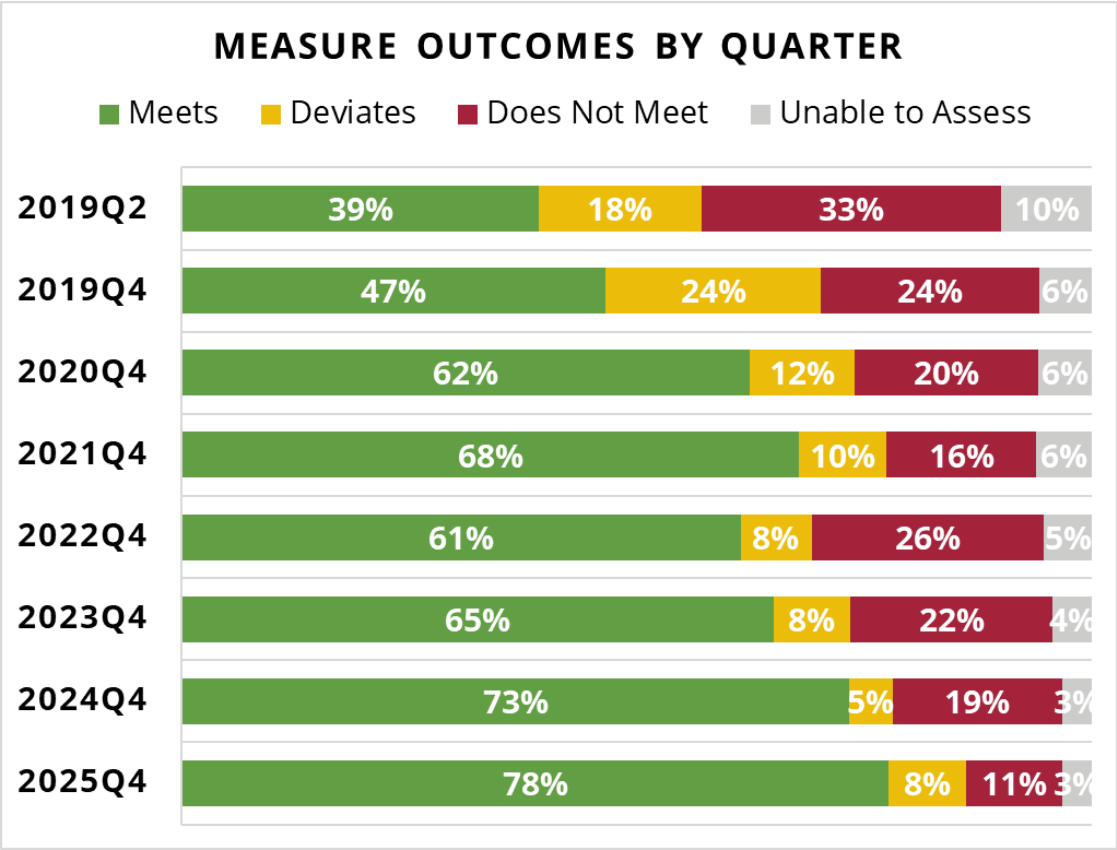
- **Pediatric measure:**
  - **Vaccine family threshold:** One IIS were downgraded from "deviates" to "does not meet" because at least one vaccine family was below the vaccine family threshold.
- **Adolescent measure:**
  - **Not measured:** One IIS showed support for recommended date but did not return it consistently across all vaccine families. As such, IIS accuracy could not be measured.
  - **Vaccine family threshold:** Three IIS were downgraded from "deviates" to "does not meet" because at least one vaccine family was below the vaccine family threshold.
- **Adult measure:**

- **Not measured:** Seven IIS showed support for recommended date but did not return it consistently across all vaccine families. As such, IIS accuracy could not be measured.

Summary of Progress

IIS are continuing to implement functionality to align with ACIP recommendations. Community progress will be monitored using two key indicators: (1) aggregate outcome for all measures and (2) reduction in vaccine family threshold failures. The following graph shows quarterly outcomes for all CDS measures.

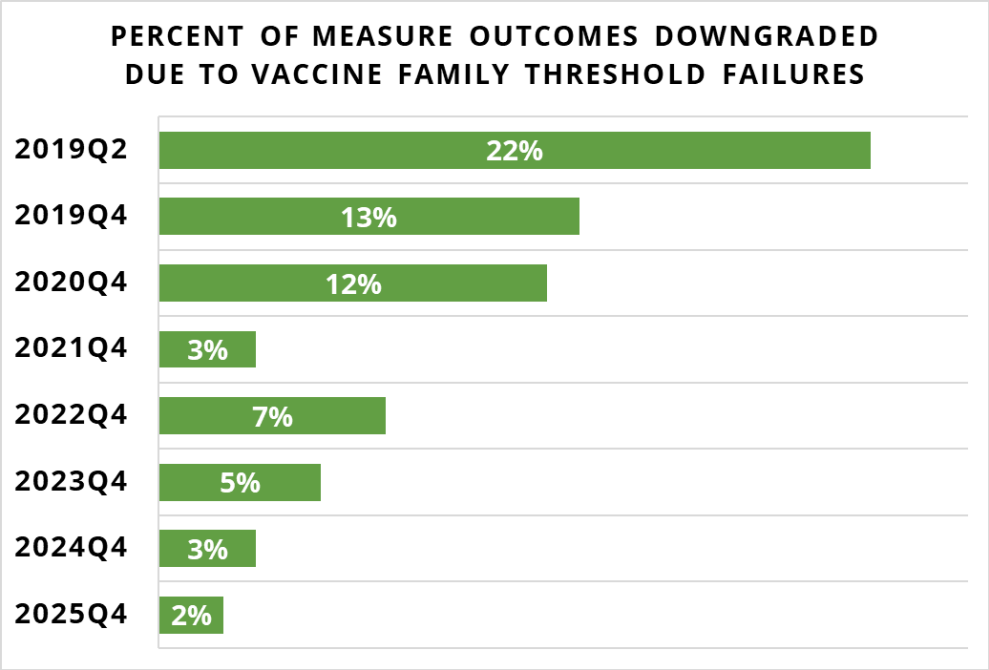
In the baseline measurement (Q2 2019), 39% of all measures had an outcome of "meets."



In **Quarter 4 2025, 78%** of all measures had an outcome of "meets." Quarter-to-quarter comparisons will likely result in dips due to the nature of evolving and new ACIP recommendations as well as increases in the number of IIS being measured in the content area. However, in the long term we expect to see increases in IIS meeting all CDS measures, indicating positive progress across the community.

Downgrades due to vaccine family threshold failures

The following graph shows quarterly results related to vaccine family failures that resulted in a measure outcome downgrade.[2]



In the baseline measurement (Q2 2019), 22% of measure outcomes were downgraded because the IIS performed poorly on at least one vaccine family. In **Quarter 4 2025, 2%** of measure outcomes were downgraded because the IIS performed poorly on at least one vaccine family. We expect to continue to see decreases in these percentages over time, indicating positive movement across the community.

Questions and/or Comments

Please direct questions and/or comments via AIRA's Technical Assistance Request form.

[2] The threshold for "deviates" was raised from 65% to 80% in Q1 2021. The majority of IIS that had issues with vaccine family thresholds now fall into "does not meet." Therefore, they do not have to be downgraded.

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Appendix A: Report Limitations and General Recommendations

Limitations of Report

- **Comparison across time:** Unlike other M&I content areas, such as Transport and Query/Response Assessment, CDS Assessment is more challenging to compare across time because ACIP recommendations continually evolve. Each quarter, test cases are modified to match the evolving ACIP recommendations. At a high level, trends can be seen, but it is also highly possible that any impact on measurement from quarter to quarter could be due to recommendation changes and not necessarily CDS engine changes. However, looking over several quarters should provide a much better view of the progress IIS are making to align with ACIP recommendations.
- **Requirements to be measured:** For an IIS to be able to be measured, the IIS must be able to do the following three things. Some IIS were able to meet some, but not all, of these requirements, so they were unable to be measured. The IIS must:
    1. Be able to accept a basic HL7 VXU message with historical vaccination events, which loads the test case scenario into the IIS
    2. Fully process the VXU and make the patient available for querying within 60 seconds
    3. Respond to the query and include well formed CDS in the RSP
- **Vaccine matching:** Currently, HL7 version 2 (v2) is the only standards-based way to measure CDS engines. Although an overall effective method, it doesn't entirely isolate the CDS engine. The HL7 v2 processing rules sometimes interfere with testing CDS. Vaccine-matching business rules may merge two vaccination events that the CDS test cases intend to be unique. When this is discovered, the test case must be left unmeasured. This is not to suggest the vaccine matching within an IIS is inaccurate but, rather, that some things cannot be tested until a direct interface to the CDS engine exists void of external business processing.
- **CDS engine scope:** Not all jurisdictions or IIS CDS engines provide evaluation or forecasts for all ages. In these cases, the IIS will not be assessed on measures outside of their scope of CDS.
- **Test case focus:** This testing focuses on age groups and specific vaccine families within those age groups. It does not focus on entire patient forecasts across all age groups. The *IIS Functional Guide Vol. 1: Query and Response* does address this issue and should be reviewed by all implementers outside of this CDS Assessment effort.

General Recommendations

1. Continued education and direction
    a. Both are needed on CDS recommendations. ACIP recommendations change regularly, and it is imperative that IIS remain aligned with those recommendations.
2. Evaluation status support
    a. Evaluation status is not returned nearly as often as the forecasted dates. Returning the evaluation status and evaluation reason (not assessed) can help clinical staff understand why a dose may need to be repeated. From an assessment standpoint, the evaluation status can also help identify where misalignment exists and where corrective action is needed.
3. Targeted focus on improvement
    a. Many IIS had one or two vaccine families that were problematic and dropped their measures lower than expected. In many cases, the IIS could focus on those vaccine families to quickly move closer to alignment with ACIP recommendations.