MIROW MINI-GUIDE

Data Quality Assurance

in Immunization
Information Systems

Recommendations of the AIRA
Modeling of Immunization Registry
Operations Workgroup (MIROW)
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AIRA
AMERICAN IMMUNIZATION
REGISTRY ASSOCIATION

IIS data quality is the degree to which data sent to or stored in an IIS meets current standards, supports clinical decision-making needs, and can be used to answer key public health questions with high confidence. IIS data should reflect the actual vaccination events that occur.

IMPORTANCE OF IMMUNIZATION INFORMATION SYSTEM DATA QUALITY

IIS provide tremendous value to public health by consolidating immunization information from multiple sources. The quality of IIS records is a decisive factor for improving the health of patients, the operation of health care clinics, the response to outbreaks and pandemics, and public health decision-making at the national and local levels. To meet the goal of high data quality, IIS programs must develop and implement a wide range of processes and tools to support data quality.

This mini guide serves as a summary introduction to the more detailed, full guide, available at **https://www.immregistries.org/mirow**.

The guide includes 25 principles and 78 business rules that document consensus-based best practice guidelines. Several of those best practices will be referenced in this mini-guide. Principles will be referenced as P##, and business rules will be referenced as BR###.

KEY RECOMMENDATIONS

- Assess data quality in relation to the seven data quality characteristics outlined in the Immunization Information Systems (IIS) Data Quality Blueprint[1] developed by the Centers for Disease Control and Prevention (CDC).
- Use multiple approaches to ensure and support high data quality, including using programmatic and technical resources.
- Adoption of business rules should be uniform in all IIS programs; however, the selection of violation actions for business rules should be flexible and jurisdiction specific.
- Consider data quality throughout the process of receiving and managing data—from onboarding provider organizations to use data exchange, to receiving incoming data submissions, to evaluating data at rest.
- Prioritize the quality of data elements that have a high interest for public health and safety, technical processes, and/or vaccine accountability.
- Educate provider organizations on specific methods and activities that support submitting high-quality data to the IIS, regularly monitoring data quality, and resolving data quality issues that occur.

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[1] https://www.cdc.gov/vaccines/programs/iis/about.html

This full guide includes information on:

- Key concepts related to data quality
- Data quality considerations during the provider onboarding process and for managing incoming data submissions
- Best practices for monitoring and evaluating data at rest and implementing provider organization management
- Principles and business rules to guide data quality assurance activities
- Implementation considerations

A goal of the guide is to provide a comprehensive road map to IIS data quality assurance. There are currently resources on individual aspects of data quality, but it can be hard to understand the overall landscape. While the guide does not explore the breadth of data quality issues in detail, it does provide references to resources where more information can be found. Other resources include:

- Immunization Information Systems (IIS) Data Quality Blueprint[2]

- *Onboarding Consensus-Based Recommendations*[3]

- *Data Validation Guide for the IIS Onboarding Process*[4]

- *IIS Data Quality Practices – Monitoring and Evaluating Data Submissions*[5]

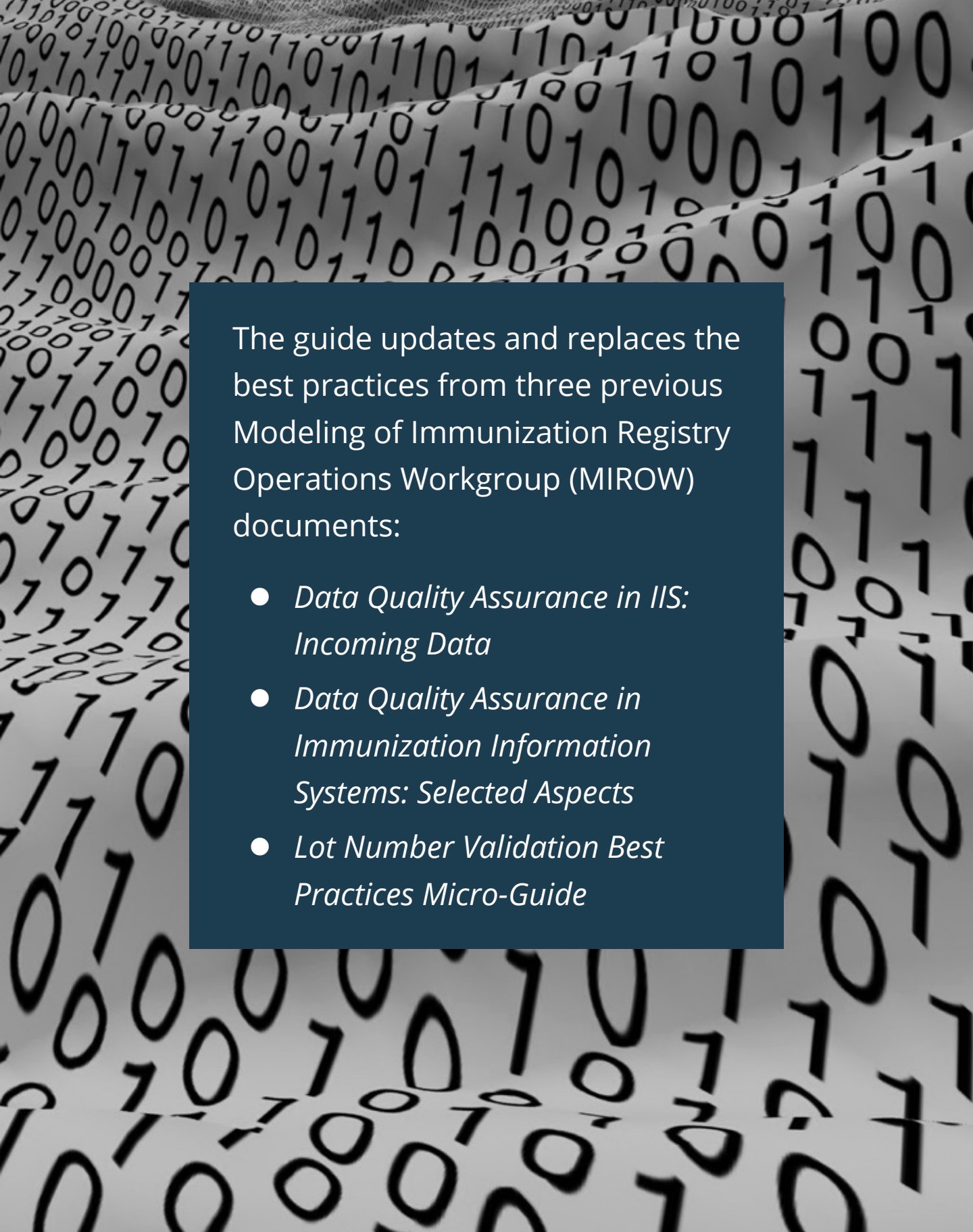- *IIS Data Quality Practices – To Monitor and Evaluate Data at Rest*[6]

[2] https://www.cdc.gov/vaccines/programs/iis/about.html
[3] https://repository.immregistries.org/resource/onboarding-consensus-based-recommenda-tions/
[4] https://repository.immregistries.org/resource/data-validation-guide-for-the-iis-onboarding-pro-cess/
[5] https://repository.immregistries.org/resource/iis-data-quality-practices-monitoring-and-evalu-ating-data-submissions/
[6] https://repository.immregistries.org/resource/iis-data-quality-practices-to-monitor-and-evalu-ate-data-at-rest/

The guide updates and replaces the best practices from three previous Modeling of Immunization Registry Operations Workgroup (MIROW) documents:

- *Data Quality Assurance in IIS: Incoming Data*

- *Data Quality Assurance in Immunization Information Systems: Selected Aspects*

- *Lot Number Validation Best Practices Micro-Guide*

DATA QUALITY CHARACTERISTICS

As mentioned, the best practice recommendations made in the guide support the Immunization Information Systems (IIS) Data Quality Blueprint.[7]

MAIN CHARACTERISTICS

- **Availability:** IIS data can be readily used by authorized users to inform IIS and immunization program activities.

- **Completeness:** The IIS contains all (historic and new) vaccination and demographic records for persons residing in the jurisdiction, and all vaccination and demographic records contain complete data fields.

- **Timeliness:** Patient records are established, and vaccination events are recorded
  in the IIS within specified time frames.

- **Validity:** Vaccination and demographic records in the IIS conform with generally accepted standards (e.g., Advisory Committee on Immunization Practices recommendations, United States Postal Service standards).

AVAILABILITY   **COMPLETENESS**   **TIMELINESS**   **VALIDITY**

[7] https://www.cdc.gov/vaccines/programs/iis/about.html

ENABLING CHARACTERISTICS

- **Accuracy:** The IIS correctly reflects the demographic information of patients and data related to all aspects of their vaccination events.

- **Consistency:** The IIS receives, stores, and processes data in accordance with established standards.

- **Uniqueness:** Each patient and their corresponding vaccinations are recorded only once in the IIS.

ACCURACY   **CONSISTENCY**   **UNIQUENESS**

When improving data quality in an IIS, IIS programs should think holistically about the seven data quality characteristics. A focus on one characteristic without consideration of the impacts on the other characteristics can lead to unintended consequences. IIS programs should attempt to improve the data quality for all seven characteristics.

IIS-Authorized Organization (IIS-AO)

An organization that has an agreement with an IIS that allows for the submittal and/or retrieval of IIS information.

PHASES OF DATA QUALITY

Data quality should be ensured throughout the reporting and processing of immunization information and is the responsibility of both the IIS program and IIS-authorized organizations (IIS-AOs) submitting data. The guide focuses on three phases of data quality in an IIS: the onboarding of IIS-AOs, the submission of incoming data, and the review of data at rest within the IIS.

Data quality in an IIS should be accomplished via multiple approaches and use both programmatic and technical resources (P01). The three phases of data quality provide programmatic and technical options for preventing, identifying, and resolving data quality issues. In onboarding, IIS-AO staff can receive training about best practices for data quality. During incoming data submission, data validation provides a technical process for rejecting or flagging issues. Lastly, data at rest analysis supports identification of data quality issues in IIS data which the IIS program and IIS-AO can remedy.

ONBOARDING

"Onboarding" describes the process and activities related to establishing electronic data exchange between an IIS-AO's EHR system and a jurisdiction's IIS. While the entire onboarding process is an opportunity to ensure high-quality data through education and training (P14), the data quality review period is an opportunity to review and improve an IIS-AO's data quality. The primary purpose of the data quality review is to examine the data-submission issues related to:

- Data quality of patient records
- Data needed for the Vaccines for Children (VFC) program, vaccine management, decrementing of inventory, and other important functions of the IIS and immunization programs
- Verifying that submissions align with the IIS-AO's provider organization type (e.g., pediatrics)

The data quality review looks for issues with the content of the message. It typically relies on reviewing data quality and inventory reports based on production EHR data in the IIS interface and, in some cases, manual comparison of selected patient records between the EHR and IIS. Some portions of the data quality review process can be automated using a data quality report or a data quality analysis tool.
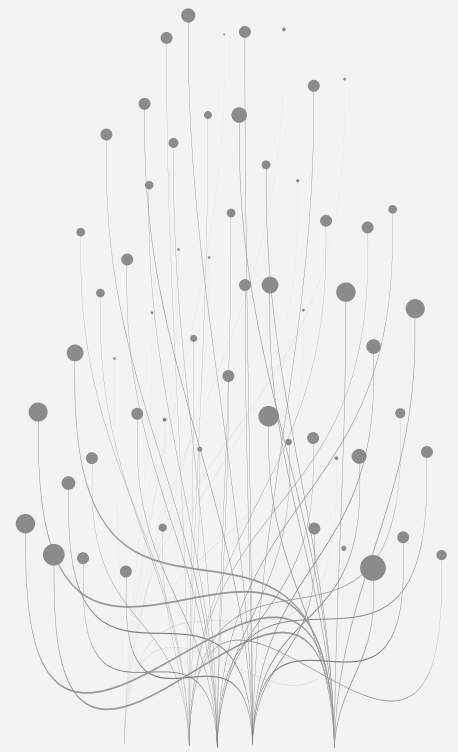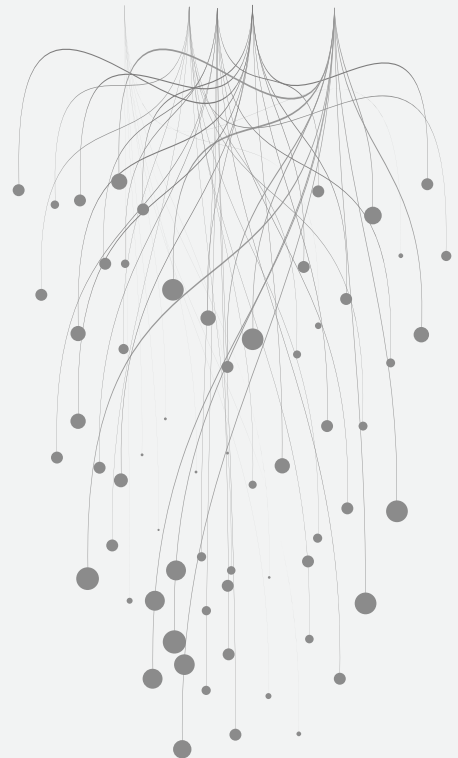
Depending on the formatting and content of the submission, the IIS may:

- Accept the entire submission and all included data elements

- Accept the submission but reject data elements that have errors

- Reject the entire submission

SUBMISSION OF INCOMING DATA

Once an IIS-AO has been onboarded and is sending data to the IIS, there are processes that should be in place to uphold the quality of incoming data. The guide includes a process model and outlines the steps involved in an IIS's validation of a submission.

During the validation of a submission, the IIS electronically validates the submission based on rules developed by the IIS program. The submission should contain the mandatory set of data elements to be accepted by the IIS (P05, BR001).

The IIS can validate individual data elements by confirming that the value that is submitted for a data element meets the data quality requirements for that data element. For example, a patient first name and a patient last name in a demographic record should each be at least two characters long (BR148). The IIS can also perform cross-field validation, which compares two or more different data elements for incongruencies to identify if one or more of the data elements is potentially documented in error. For example, a vaccination event date should not be before (less than) the patient's date of birth (BR111).

DATA AT REST

Comprehensive data quality reviews can be performed to assess and improve the quality of data at rest within the IIS. This is also an opportunity to identify issues that IIS-AOs can resolve in their messages that are being sent to the IIS or their processes to improve the quality of data that is submitted to the IIS.

One of the most effective ways to look at large volumes of data for potential issues is aggregate data review. Performing aggregate data review can be time-intensive and challenging; however, this analysis allows for the identification of large-scale patterns and/or important trends.

The process of using data for analysis, evaluation, and immunization coverage improvement leads to identifying and fixing data quality issues which might not otherwise be identified or resolved.

Data quality plans should also be developed to describe the activities needed for analyzing data and ensuring that data reviews are happening regularly, as well as communicating to IIS-AOs about the review findings.
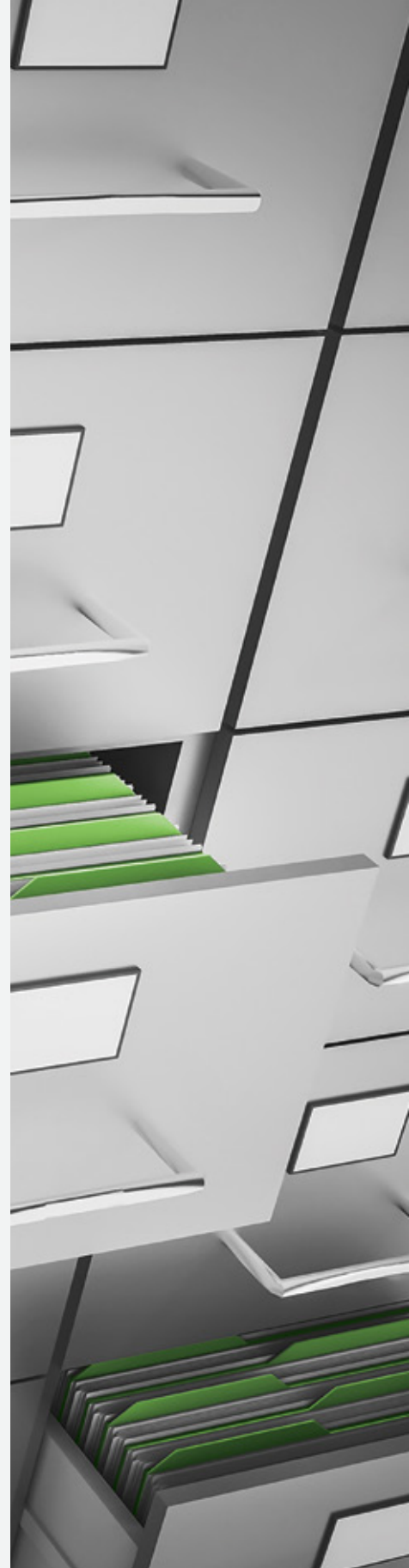
Provider organization management is the process of accurately documenting information about IIS-AOs in an IIS.

PROVIDER ORGANIZATION MANAGEMENT

Provider organization management is an important component of data quality because it supports efficient and accurate identification of where data originated and where data quality issues transpired. The process encompasses the full life span of an IIS-AO, from initial authorization in the IIS through deauthorization.

There are four stages of provider organization management:

- Authorization
- Ongoing documentation and support
- Deauthorization
- Reauthorization

IIS programs should document and be consistent in the approaches followed for provider organization management. Since many IIS program staff are involved in tracking and documenting changes to IIS-AOs, it is valuable to create clear procedures for the common stages of provider organization management.

LEARN MORE ABOUT DATA QUALITY ASSURANCE IN IIS

This mini-guide provides an overview of the in-depth information related to these best practices found in the full Data Quality Assurance in Immunization Information Systems best practice guide. To download, visit the AIRA website at: https://www.immregistries.org/mirow.

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