

The '411' of MIROW: Navigation to Implementation

Presentation Objective

- This session will provide
 - A detailed overview of best practice guides for immunization information systems operations
 - User testimonials about leveraging these guides in various jurisdictions

Directory of Presentation Slides

Topic	Slides
MIROW background, process, documents	4-11
Vaccine Level Deduplication in IIS Guide	12-29
Data Quality Assurance: Incoming Data, Selected Aspects	30-46
Management of Patient Active/Inactive Status in Immunization Information Systems	47-65
What's Next for MIROW Guide Development?	66-68

What is MIROW?

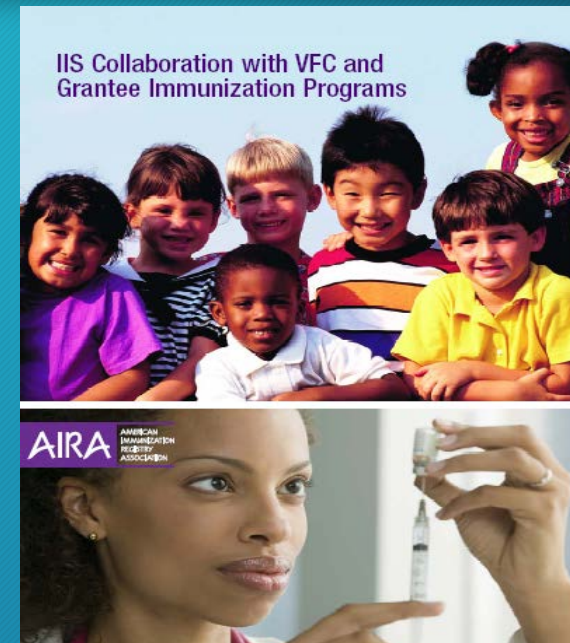
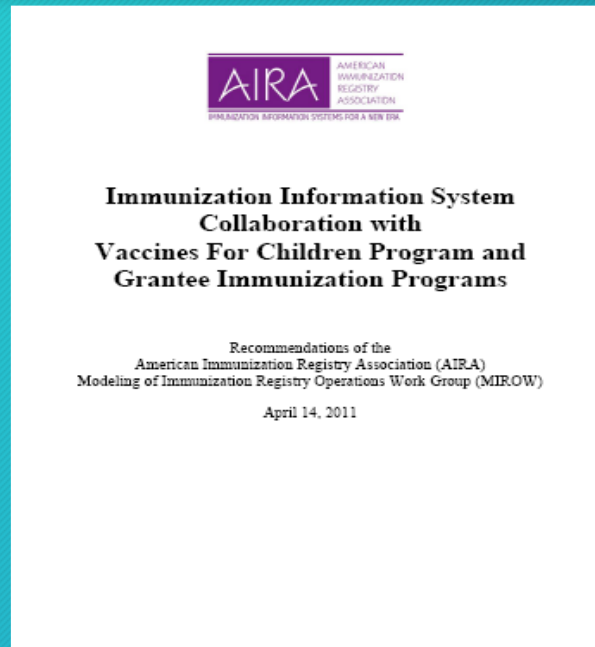
- The Modeling of Immunization Registry Operations Workgroup
 - Formed in 2005
 - AIRA in partnership IISB at the CDC
- Objective
 - Develop and promote IIS Best Practices
- Goal
 - Provide the basis and support for uniform alignment of IIS processes



Inconsistency among IIS negatively affects overall data quality, comparability, operational cost, and usefulness of information.

MIROW Documents

Complete Guide
- 100+ pages



Mini-guide (brochure)
4 to 8 pages

Download MIROW documents at:

AIRA web site: <http://www.immregistries.org/pubs/mirow.html>

CDC web site:

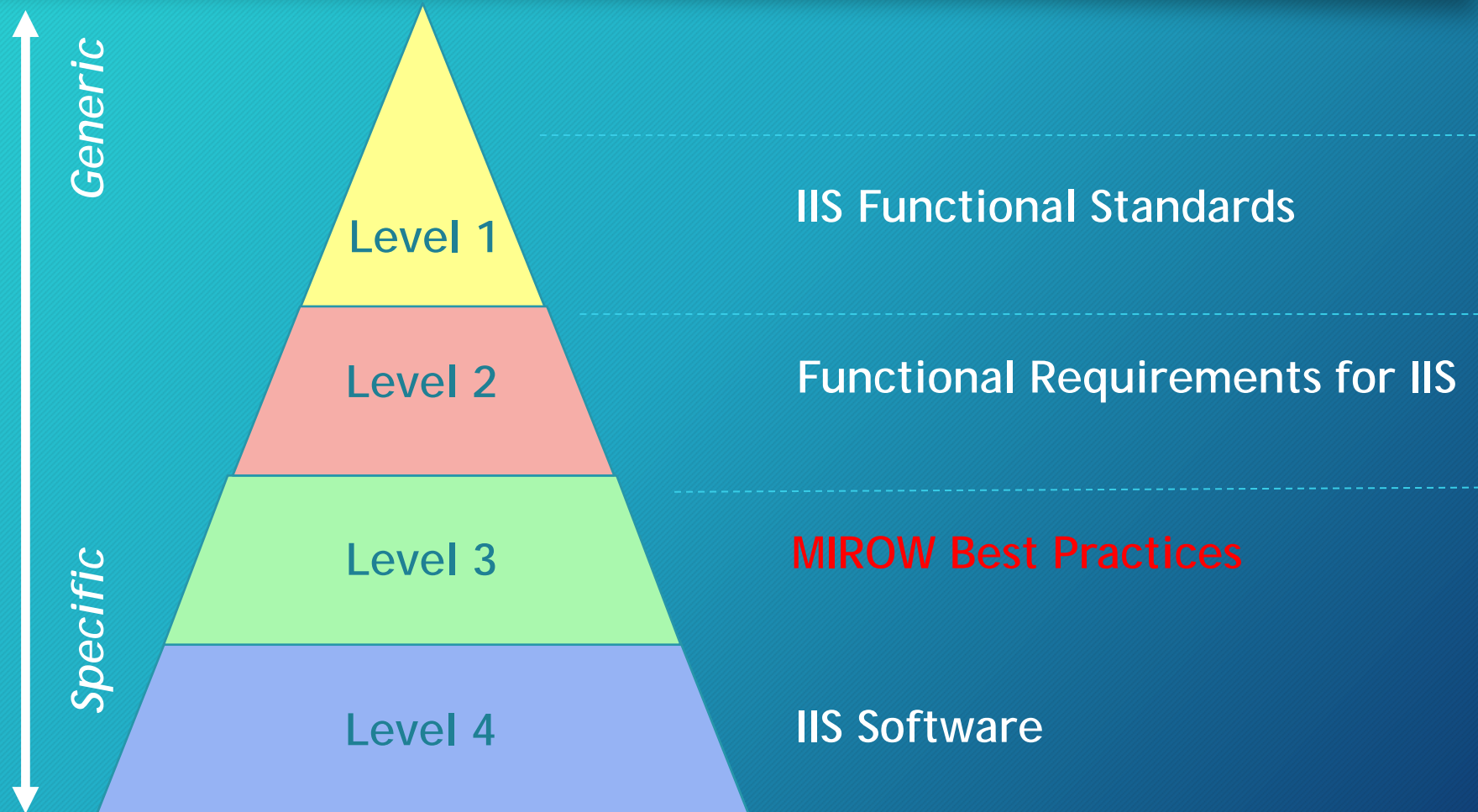
www.cdc.gov/vaccines/programs/iis/activities/mirow.html

Typical Structure of the MIROW Documents

- Principles: provide a high level direction that helps to guide the development of business rules
- Business rules: represent specific requirements and decision-making logic for various aspects of the topic
- Domain Model: describes the main concepts, terms, and definitions related to the topic

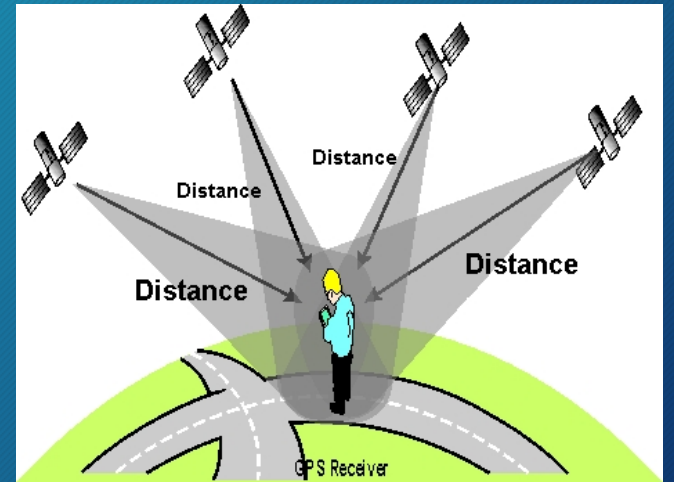


MIROW Efforts in Context

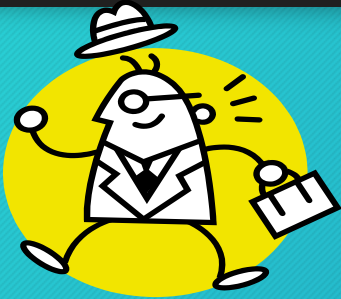


How MIROW Works

- Oversight from the MIROW Steering Committee
- Business analysis and development process support provided by IISB/CDC
- Organizational support for in-person meetings from AIRA staff
- Facilitation support for in-person meetings provided by external consultants
- Volunteering subject matter experts from the IIS community
- MIROW Steering Committee is working on developing a new process in response to the changing landscape



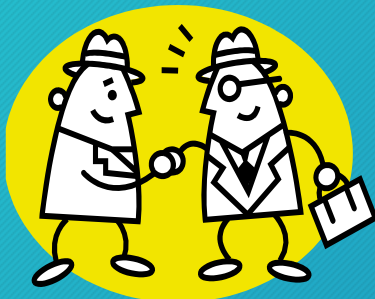
The MIROW Process



Brainstorming



Discussing



Reaching
Consensus

Consensus = *"I can live with that and support it"*

The Buy-In!



The MIROW Process - YES!



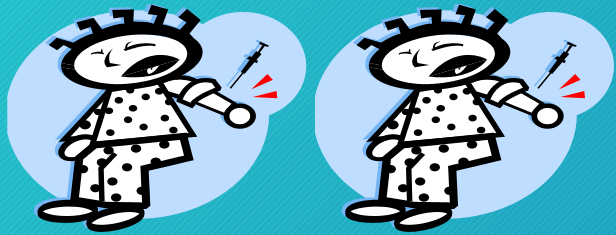
Vaccination Level Deduplication in Immunization Information Systems

Deduplication can be Daunting



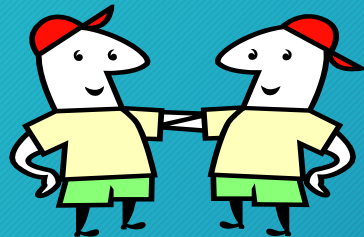
Deduplication: Scope of the Guide

- Deduplication of immunization records is a two-fold problem that includes deduplication
 - at the vaccination event level (e.g. two records describe the same immunization)



This is in scope

- at the demographic/patient level (e.g. two records describe the same patient)



This is out of scope

Why Vaccine Deduplication?

- Create and maintain an accurate and timely record of an individual's immunizations
- More accurately forecast vaccine administration in accordance with Advisory Committee on Immunization Practices (ACIP) recommendations



Changes in Data Coming into the IIS

- IIS often receive vaccination data from multiple sources
- Frequently contain multiple records for the same vaccination event.
- Do similar records = same vaccination event?
- What to do with these duplicates?



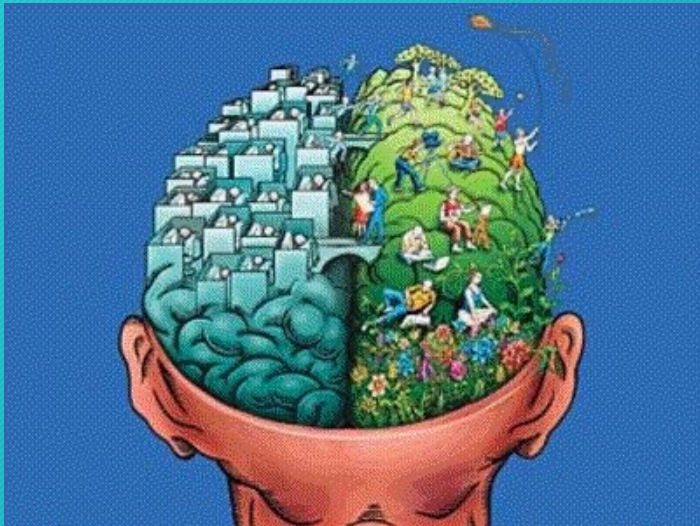
Incoming Data Issues



"Can I borrow those kittens for an hour? I want to freak out the people who had me spayed."

Why is this guide important?

- Inconsistency across immunization information systems (IIS)
- Uniform alignment of the vaccination level deduplication processes across different immunization information systems



Vaccination level deduplication can be addressed in three phases:

Phase 1. SELECTION: Identify and group multiple vaccination records that potentially belong to the same vaccination event.

Phase 2. EVALUATION: Evaluate pairs of potentially duplicate immunization records for match/differ decisions.

■ Results in three possible outcomes:

- ◆ records match (are duplicates)
- ◆ they differ
- ◆ don't know

Phase 3. RESOLUTION: Produce a 'BEST' record to represent the vaccination.

Consistency



Second dates are trickier. They ask the same questions as on the first date, looking for inconsistencies.

Selection Phase: Principles and Business Rules

- P04 We would like to be more inclusive than exclusive.
- BR02 A record for the vaccination event must be compared with all and any of the vaccination event records with the same Vaccine - Family/Group.
- BR03 Identical records should not be selected for deduplication.



Evaluation Phase: Principles and Business Rules (Excerpt)

- P11: If vaccination encounter dates are different in records under evaluation, the proximity of these dates has to be taken in consideration.
- BR09: Records selected for evaluation at the Selection phase should be considered different until proven to be duplicates.
- BR10: If vaccine lot numbers are different in evaluated records, these records are most likely to be different (not duplicates).

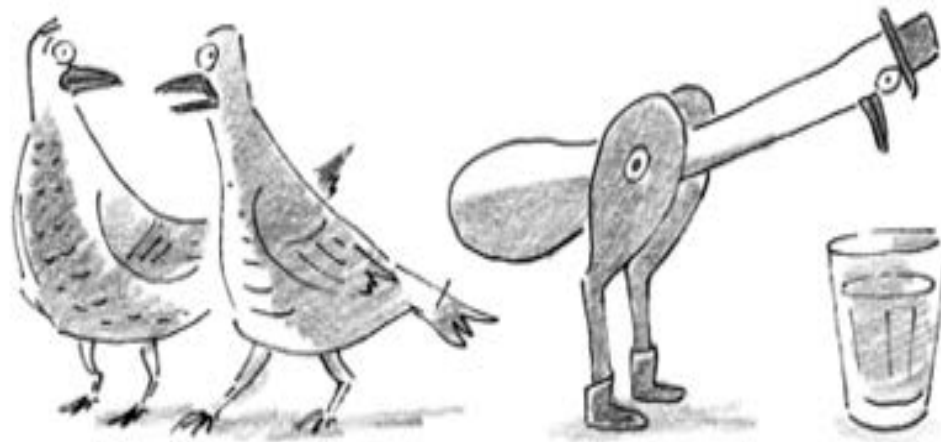


Resolution Phase: Principles and Business Rules (excerpt)

- P15 Business Rules should be applied completely, in a specified sequence.
- BR21 The record with more complete data should be selected.
- BR22 The record with more specific data should be selected.
- BR25 Records with an earlier or later date should be selected consistently within a particular IIS.



Resolution: Not a Duplicate Record



M. Allen

*"Try to forget him. He's focussed on one thing,
and it's not you and it never will be you."*

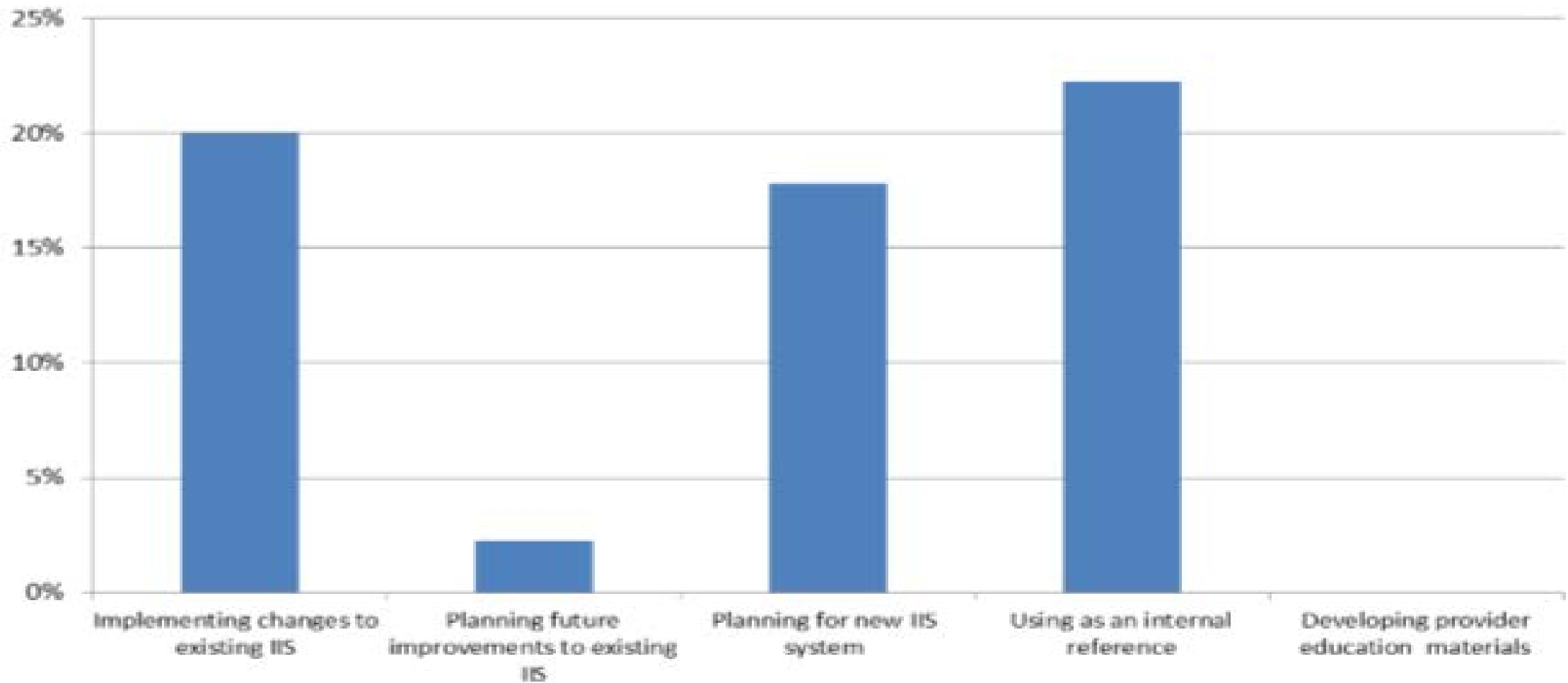
Testimonials: Direct Uses of the Guide*

- 16/25 indicated the guide was helpful
- 9 programs used guide to develop/refine existing vaccination-level deduplication algorithm
- 1 program used guide for potential future changes
- 8 programs used guide in planning features of a new IIS
- 3 programs used guide as internal reference on best practices
- 3 programs used guide to develop manual deduplication decision-making processes



*Immunization Registry Operational Guidelines Evaluation - Final Report

Figure 2: Direct Uses of Vaccination-Level Deduplication Guide (n=45)



Use of Guide in Massachusetts

- MIIIS Developers use all MIROW Guides when starting any requirements effort
- Used Guide when defining deduplication algorithm
 - Sequential Approach to Evaluation
- Applied guidelines in the Guide to assign confidence level to a record
- MIIIS Staff applied most principles and business rules in developing its process for de-duplicating vaccinations
- MIIIS applies a 10-day window for deduplication



Vaccination Level Deduplication in IIS - Reading Paths

Program Managers

- Executive Summary
- Chapter 2: Process Overview
- Chapter 7: Conclusions
- Appendix B: Merging Data from Duplicate Records

Immunization Program Staff

- Chapter 2: Process Overview
- Chapter 3: Selection Phase
- Chapter 4: Evaluation Phase
- Chapter 5: Resolution Phase
- Chapter 6: Additional Miscellaneous Recommendations
- Appendix B: Merging Data from Duplicate Records

Technical Developers

- Appendix A: Domain Model
- Chapter 2: Process Overview
- Chapter 3: Selection Phase
- Chapter 4: Evaluation Phase
- Chapter 5: Resolution Phase
- Appendix B: Merging Data from Duplicate Records

Don't be Complacent!



"I finally feel I can accept the things I'm too lazy to change."

Data Quality Assurance:
Incoming data
Selected aspects

Why Data Quality Assurance?

- Electronic data exchange and the ongoing Meaningful Use initiative
- Resulting increase in IIS-EHR collaborations
- IIS and IIS partners need data quality assurance guidelines



Data Quality Assurance MIROW Guides

	Chapter 3: DQA: Incoming data	Chapter 7: DQA: Selected Aspects
Publication date	February 2008	May 2013
Main topic areas	<ul style="list-style-type: none">• Develop principles and business rules for incoming DQA• Describe healthcare providers' precertification process	<ul style="list-style-type: none">• Develop domain model & diagram• Reporting facility identification management• Review & update business rules from Chapter 3
Number of principles	13	2
Number of business rules	32	27 + 27 updated business rules from Chapter 3
Number of general recommendations	0	7

DQA: Incoming data

Steps to pre-certifying submitters

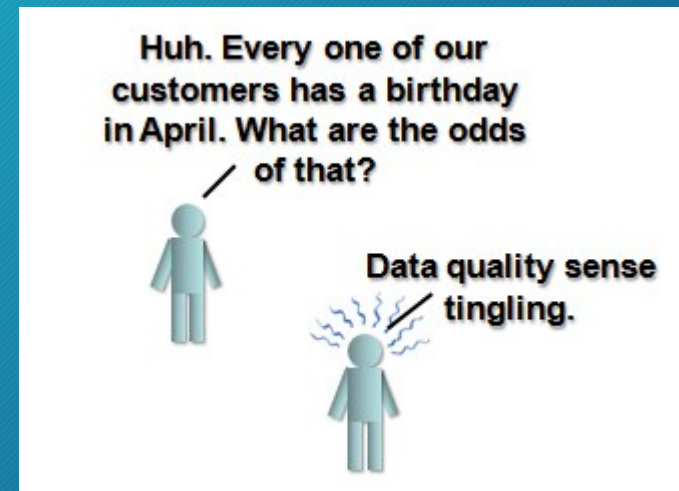
1. Submitter produces a sample file
2. IIS examines the sample file
3. IIS staff person compares the sample file to the medical chart
4. IIS periodically examines a subset of IIS data



DQA: Incoming data

Pre-load validation

- Inspect incoming data reported by certified submitters to ensure high quality BEFORE loading it into the system
- Thirteen principles used to validated immunization data
 - Consistency principle
 - Accuracy principle



DQA: Selected aspects

- Facility identification management
- Roles of organizations
 - Vaccinator
 - Recorder
 - Submitter

DQA: Selected aspects

- Principles for facility identification management:
 - IIS should be consistent in the approaches followed for facility identification management. (P801)
 - IIS should clearly document the approaches followed for facility identification management (P802)
- HL7 considerations
 - Enable submission of two organizations per message
 - Recommended use of MSH-22: responsible sending organization

Data Quality Assurance



Data Quality Assurance: Incoming data Reading Paths

Program Managers

- Chapter 1: Executive Summary
- Chapter 2: Process Overview
- Conclusions
- Appendix B: Data Quality Framework - Completeness, Accuracy, and timeliness

Immunization Program Staff

- Chapter 3: ACIP Recommendations Considerations
- Chapter 4: Principles
- Chapter 5: Business Rules*
- Chapter 6: Precertification and Providers' Profiles
- Chapter 7: Barriers to Implementation
- Appendix B: Data Quality Framework - Completeness, Accuracy, and timeliness

Technical Developers

- Appendix A: Domain Model
- Chapter 4: Principles
- Chapter 5: Business Rules*
- Appendix F: A possible statistical approach

* Some business rules in Chapter 5 have been updated in the DQA: selected aspects guide.

Data Quality Assurance: Selected Aspects - Reading Paths

Program Managers

- Executive Summary

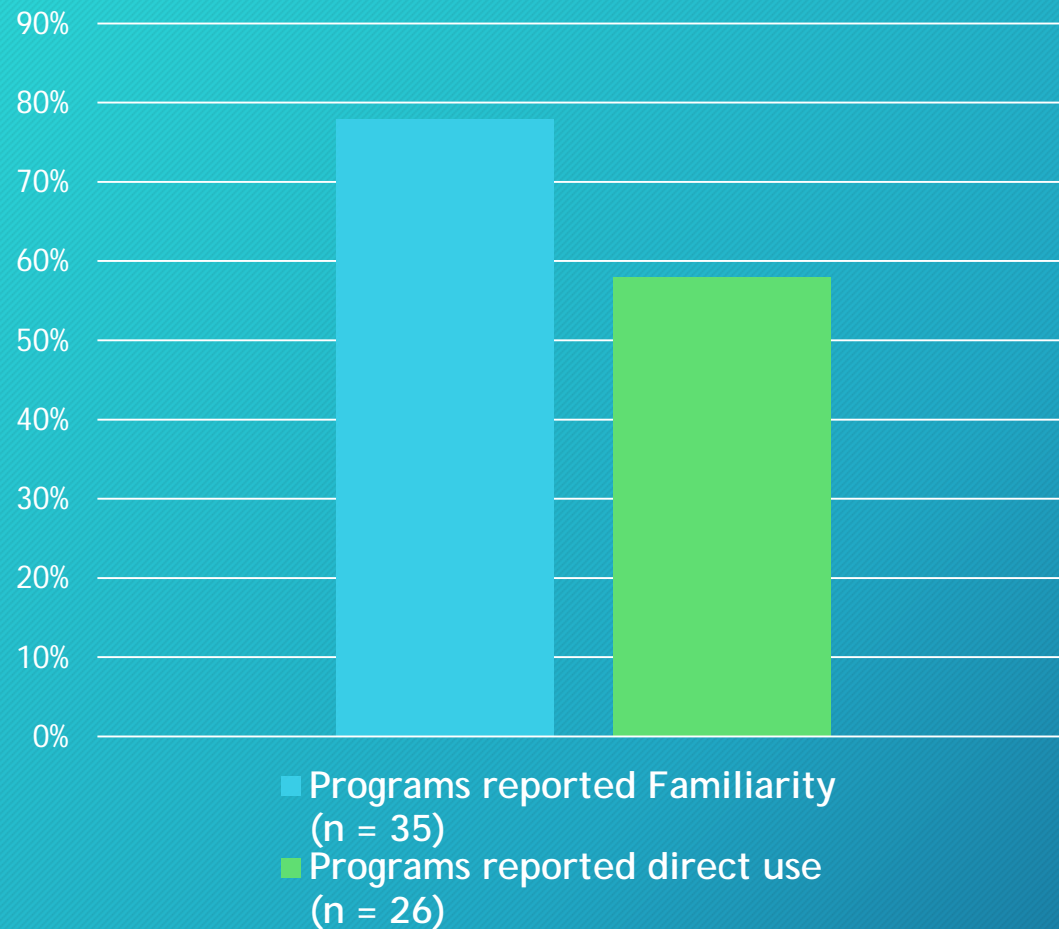
Immunization Program Staff

- Chapter 2: Scope
- Chapter 3: Domain Model - Concepts, Terms & Definitions (focus on "Discussion and Notes," pgs. 21-27)
- Chapter 4: Facility Identification Management
- Chapter 5: Updates and Revisions for the Existing MIROW DQA Guide (2008)

Technical Developers

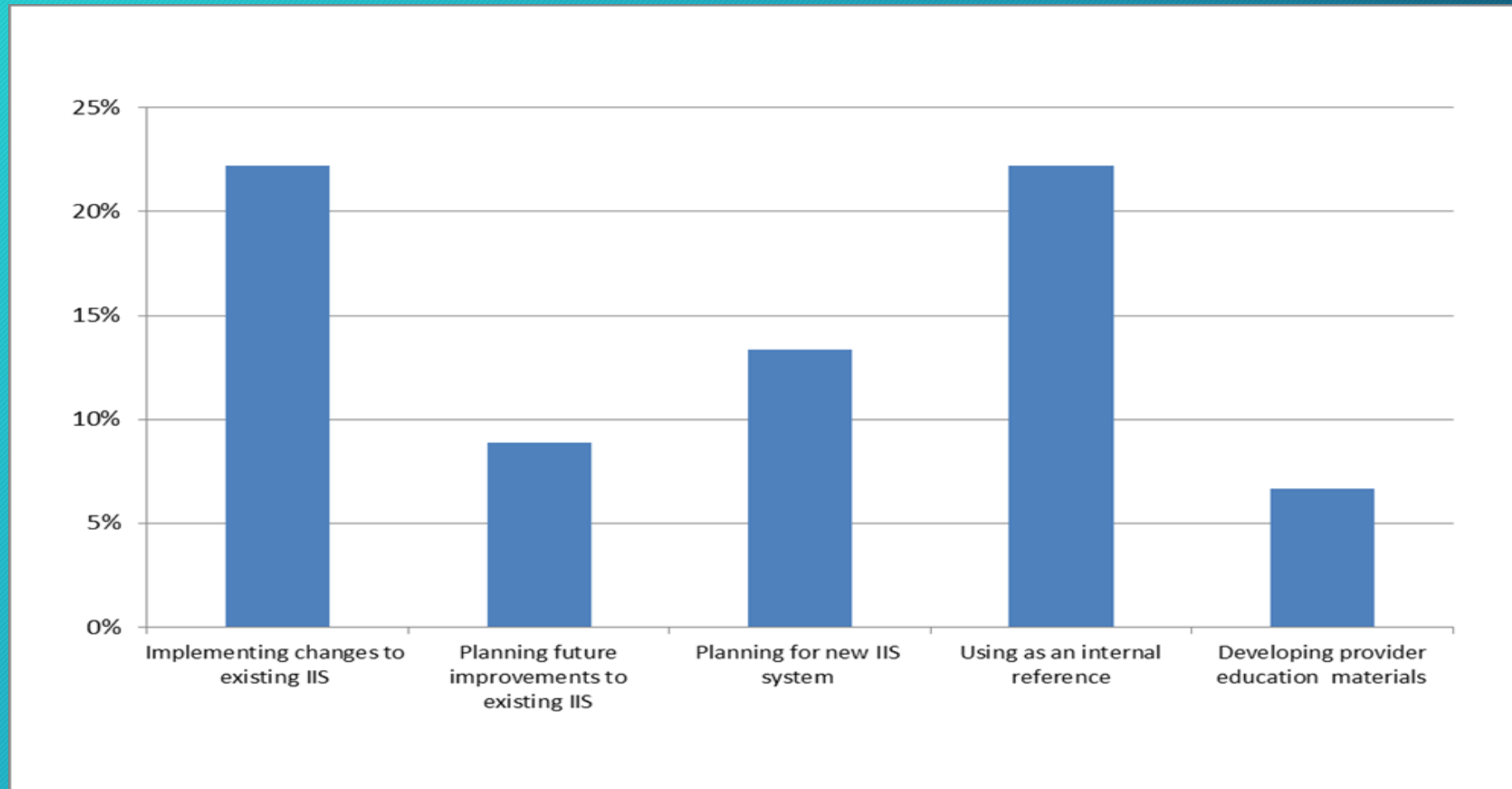
- Chapter 3: Domain Model - Concepts, Terms & Definitions (focus on pgs. 22-27)
- Chapter 4: Facility Identification Management (focus on pgs. 49-68)

MIROW Guide evaluation: incoming data quality guide



- Four programs were unsure whether this guide had been used

MIROW Guide evaluation: incoming data quality guide



MIROW Guide evaluation: incoming data quality guide

Positive impacts:

- “Using the guide has tremendously enhanced our ability to catch problems early, which has greatly reduced having to back out large quantities of data to clean up and reinsert”
- As a new IIS manager, it would have been hard to understand what business rules were needed in the system without the guide. Using the guide saved time by making it easier to create business rules and helped to validate some of what had already been doing already”

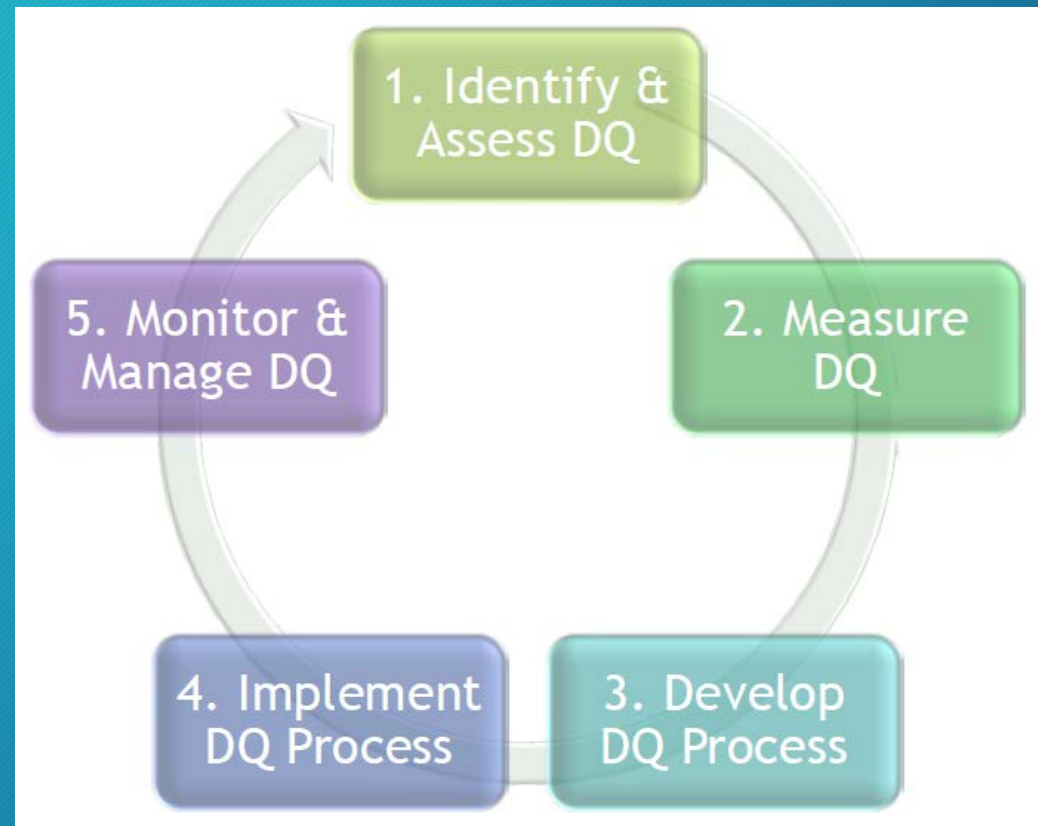
Use cases of DQA

- Kansas key improvements:
Incoming data
 - Gap analysis
 - Provider data quality report
 - Internal data quality monitoring procedures developed
- Washington key improvements:
Incoming data
 - Data loading quality
 - Policy and procedure documentation
 - Follow up on provider data quality

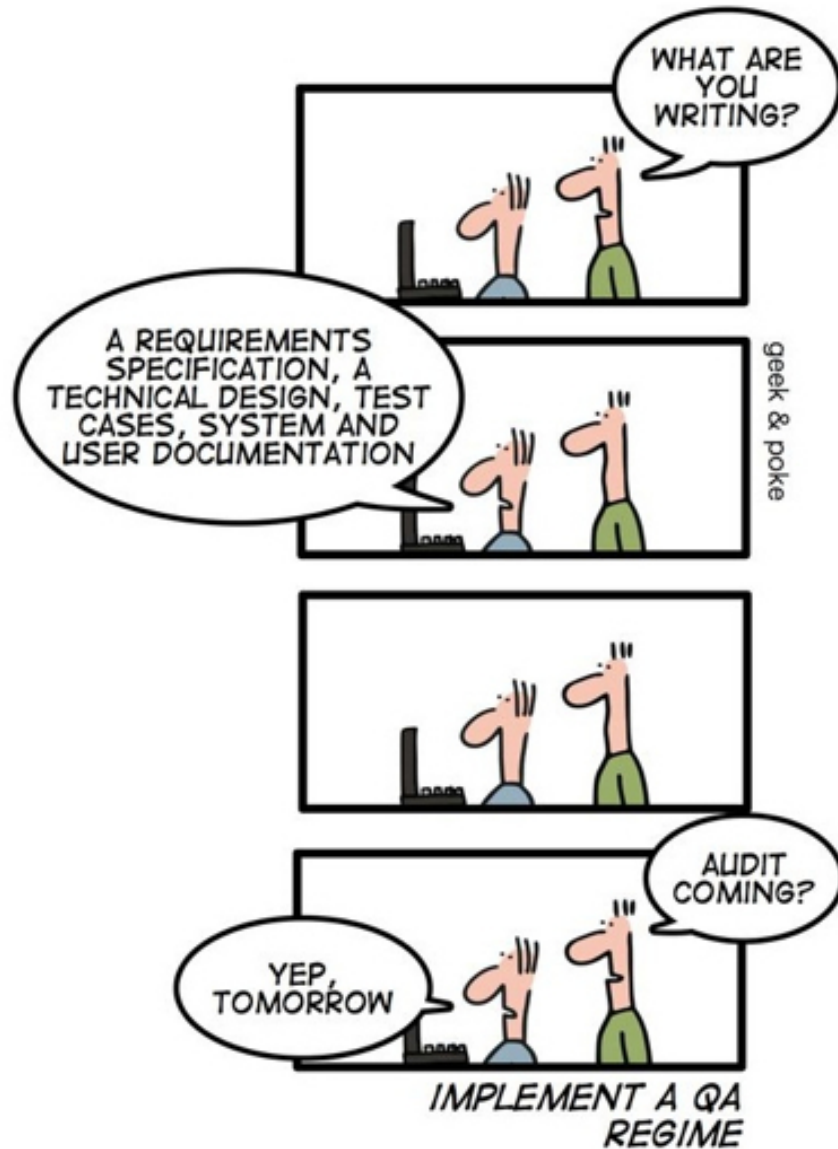


Use Cases DQA

- Oregon: Incoming data
 - Gap analysis using both DQA guides and AIRA self assessment tool
 - ALERT IIS Data Quality Protocol
 - Develop queries, reports and score card to assess data quality
- Oregon: Selected aspects
 - Gap analysis



HOW TO ENSURE QUALITY



Management of Patient Active/Inactive Status in Immunization Information Systems:

Replacement of 2005 Guidelines

Management of PAIS in IIS

- Work began in early 2014
- Face-to-face meeting held June 2014

- ...but why *replace* an existing guide?



MIROW Guide Evaluation

- Immunization Registry Operational Guidelines Evaluation = IROGE 😊
- Needed feedback
 - Do the guides help?
 - Should we keep doing this?
- Guidelines in Action



IROGE

The 2005 PAIS Guide...

"...was very helpful for working with our state IT in developing the ability to capture patient status..."

"...provides a good starting point for considering the larger issue of denominator management."

"...provided the impetus for discussions between IIS and VFC Program staff on patient status...", "helping them realize the impact of patient status on coverage rates."

IROGE: 2005 PAIS Guide

- Request for Proposal (RFP)
- Scope of Work (SOW)
- Upper Management
- Educational Materials
- Technical Staff
- Future IIS Development



IROGE: 2005 PAIS Guide

- Overall, positive feedback!



- Areas to improve
 - Patient active with more than one provider
 - One-time vaccinators
 - Geographic jurisdiction status
 - Electronic data Exchange



Management of PAIS in IIS Guide

Defines:

5 Patient Statuses at the Provider Organization (PO) Level

and

5 Patient Statuses at the Geographic (GJ) Jurisdiction Level

Provider Org.

- Active
- Inactive, with the following reason codes:
 - No longer a patient
 - Lost to follow-up
 - Unspecified
- Deceased

Geograph. Juris.

- Active
- Inactive, with the following reason codes:
 - Outside jurisdiction
- Unknown, with the following reason codes:
 - No address - no vaccination
 - No activity for extended period of time
- Deceased

Management of PAIS in IIS - New Concept

- Newly addressed concept

1-1

vs.

1-Many (1-M)



Management of PAIS in IIS - Principles

Principle 302

- Patient Status should be maintained in a hierarchical manner, ensuring a responsible party.

Principle 303

- A more rigid approach should be used when assigning PAIS at the geographic jurisdiction level as a “safety net” provision for the populace.

Management of PAIS in IIS - Principles

Principle 306

- Identification of an individual as a patient of a provider organization may be done...
 - Directly (when...)
 - Indirectly (when...)

Principle 307

- Identification of an individual as NOT a patient of a provider organization may be done...
 - Directly (when...)
 - Indirectly (when...)

Management of PAIS in IIS – Business Rules

Business Rule 401

- Establishes nomenclature for statuses at the PO Level:
 - Active
 - Inactive, with reason codes:
 - No longer a patient
 - Lost to follow-up
 - Unspecified
 - Deceased

Business Rule 411

- Establishes nomenclature for statuses at the GJ Level:
 - Active
 - Inactive, with reason codes:
 - Outside jurisdiction
 - Unknown, with reason codes:
 - No address - no vaccination
 - No activity for extended period of time
 - Deceased

Management of PAIS in IIS – Business Rules

Business Rule 402A

- For 1-1 approach, consider patient Active if:
 - PO directly identified individual as patient
 - PO indirectly identified individual as a patient
 - Conducted most recent (acceptable) event
 - Created a new record in IIS by submitting demographic-only or historical-only data

Business Rule 402B

- For 1-M approach, consider patient Active if:
 - PO directly identified individual as patient
 - PO indirectly identified individual as a patient
 - Conducted most recent (acceptable) event
 - Created a new OR updated existing record in IIS by submitting demographic-only or historical-only data

Management of PAIS in IIS – 1-1 vs. 1-M

Business Rule 402A

Remarks
<ul style="list-style-type: none">• For 1-1 approach, patient may have active status with only one provider organization at a time. Reference section "Description of 1-1 and 1-M approaches" in Chapter 3 of this document• See P306 for key factors that should be considered to determine patient's active status at the provider organization level.<ul style="list-style-type: none">◦ Note that not all the key factors included in P306 are used to determine active status in the 1:1 approach. The following condition in P306 are not used in 1:1 approach:<ul style="list-style-type: none">▪ Updates existing patient's record in IIS, i.e., submits or enters patient's demographic-only information or historical-only immunization information to IIS• "Provider organization of an acceptable type": shorthand for "Acceptable Provider Organization Type for Reminder Recalls or Assessments". In other words, the provider organization type should be considered acceptable if it may conduct reminder-recall or assessment reports for a patient.<ul style="list-style-type: none">◦ Which provider organization types are acceptable vary by IIS given varying needs and approaches to reminder-recalls and assessments◦ See item 5.2 in the appendix A (terms and definitions)◦ See the discussion of this term in the Appendix A of this document.◦ Note that acceptable provider organization type may vary according to the age of the patient.• "Provider organization directly identified individual as a patient": See principle P306.• "Vaccination encounter of an acceptable type": each IIS should decide on implementation specifics via definition for acceptable vaccination encounter type. In general, patient status should not be set to active for a mass vaccination event.<ul style="list-style-type: none">◦ See item 14.2 in Appendix A (terms and definitions)◦ See the discussion of this term in the Appendix A of this document.• See P308 "Supremacy of direct identification" above• Vaccine Type should not impact PAIS determination.• Patient status with a provider organization should be set to inactive when PAIS for this patient is set to active with another provider organization.• PAIS should remain active when a provider organization conducts a vaccination event for a patient who already has active status with that provider organization.• See operational scenarios S301, S501, S601, S701, and S704.

Business Rule 402B

Remarks
<ul style="list-style-type: none">• For 1-M approach, a patient may have active status with more than one provider organization at a time. Reference section "Description of 1-1 and 1-M approaches" in the Chapter 3 of this document.• See P306 for key factors that should be considered to determine active patient status at the provider organization level.• "Provider organization of an acceptable type": shorthand for "Acceptable Provider Organization Type for Reminder Recalls or Assessments". In other words, the provider organization type should be considered acceptable if it may conduct reminder-recall or assessment reports for a patient.<ul style="list-style-type: none">◦ Which provider organization types are acceptable vary by IIS given varying needs and approaches to reminder-recalls and assessments◦ See item 5.2 in the appendix A (terms and definitions)◦ See the discussion of this term in the Appendix A of this document.◦ Note that acceptable provider organization type may vary according to the age of the patient.• "Vaccination encounter of an acceptable type": each IIS should decide on implementation specifics via definition for acceptable vaccination encounter type. In general, patient status should not be set to active for a mass vaccination event.<ul style="list-style-type: none">◦ See item 14.2 in Appendix A (terms and definitions)◦ See the discussion of this term in the Appendix A of this document.• See P308 "Supremacy of direct identification"• Vaccine Type should not impact PAIS determination.• PAIS should remain active when a provider organization conducts a vaccination event for a patient who already has active status with that provider organization.• See P306 for indirectly inferring patient status as "active" when a patient has "active" status with a subsidiary provider organization. This is an optional, IIS-specific and case-specific condition.• See operational scenarios S302, S502, S602, S702, and S705.

Management of PAIS in IIS - Decision Tables

Reminder/Recall - PO Level

CONDITIONS	Scenario A	Scenario B
Patient status at the provider organization level	Active	Deceased Inactive
ACTIONS		
1. Include in provider organization RR notification ⁽¹⁾	X	
1. Exclude from provider organization RR notification		X

Reminder/Recall - GJ Level

CONDITIONS	Scenario A	Scenario B	Scenario C
Individual status at the geographical jurisdiction level	Active	Inactive Deceased	Unknown
ACTIONS			
1. Include in geographical jurisdiction RR notification ⁽¹⁾	X		
1. Exclude from geographical jurisdiction RR notification		X	
1. IIS makes determination whether to include ^{(2), (3)}			X

Management of PAIS in IIS - Decision Tables

Assessment Report - PO Level

CONDITIONS	Scenario A	Scenario B
Patient status at the provider organization level	Active	Deceased Inactive
ACTIONS		
1. Include in provider organization assessment report ⁽¹⁾	X	
1. Exclude from provider organization assessment report		X

Assessment Report - GJ Level

CONDITIONS	Scenario A	Scenario B
Patient Geographic Jurisdiction Status	Active Unknown	Inactive Deceased
ACTIONS		
1. Include in Geographic Jurisdiction Assessment ^{(1),(2)}	X	
1. Exclude from Geographic Jurisdiction Assessment		X

Management of PAIS in IIS – Scenarios

Scenario 101

Patient moved out of state, but uses in-state provider organization

- Patient moved out of the state
- Patient continues to use services of a provider organization within the state

Resolution

Status:

- Patient status at the geographic level (state) should be set to “Inactive: Outside jurisdiction”
- Patient status at the provider organization level should be set to “Active” with that in-state provider organization

Consequences:

- Patient should be excluded from the geographic jurisdiction (state) reminder-recalls and assessments
- Patient should be included in the provider organization reminder-recalls and assessments.

Remarks

- See [P310](#) “Out of state” patients
- See [BR413](#) Inactive status at the geographic jurisdiction level with the reason code “Outside jurisdiction”
- See [BR402A](#) and [BR402B](#). Active status at the provider organization level

Management of PAIS in IIS – Scenarios

Scenario 103

Patient address not known, patient receives services within state

- Patient address is not known, and
- Patient receives services from a provider organization within the state, Provider Org A

Resolution

Status:

- Patient status at the geographic jurisdiction level (state) should be set to “Active”
- Patient status at the provider organization level should be set to “Active” with Provider Org A

Consequences:

- Patient should be included in the geographic jurisdiction (state) reminder-recalls and assessments
- Patient should be included in Provider Org A provider organization reminder-recalls and assessments

Remarks

- See [BR412](#), Active status at the geographic jurisdiction level and [P303](#), ‘Avoid having people “fall through the cracks’
- See [BR402A](#) and [BR402B](#). Active status at the provider organization level

Management of PAIS in IIS – Reading Paths

Program Managers

- Executive Summary
- Chapter 3: PAIS Fundamentals
- Chapter 5: Using PAIS for Reminder-Recall and Assessment Reports

Immunization Program Staff

- Chapter 3: PAIS Fundamentals
- Chapter 4: PAIS Management
- Appendix B: Comparison of statuses with 2005 MOGE guide
- Chapter 5: Using PAIS for Reminder-Recall and Assessment Reports
- Chapter 6: Operational Scenarios
- Chapter 7: Implementation Considerations

Technical Developers

- Appendix A: Terms and Definitions
- Chapter 4: PAIS Management
- Chapter 5: Using PAIS for Reminder-Recall and Assessment Reports
- Chapter 6: Operational Scenarios
- Chapter 7: Implementation Considerations
- Appendix B: Comparison of statuses with 2005 MOGE guide

I can't believe we do this for a living



MIROW Guide Development

- What's next for MIROW?



MIROW 2015 - 2016 Topic



Decrementing
Inventory
via
Electronic Data
Exchange

MIROW Guide Development 2015 - 2016

Problem

- Change is rapid/rampant
 - A lot of work
 - Lengthy timeline
- Subject Matter Experts (SME's) have less time to share

Trial Resolution

- Reduce pre-/post-meeting work (teleconferences)
- Hired paid SME's
 - Scope/Domain Model/Materials
 - Prep volunteer SME's
- Volunteer SME's
 - Comment pre-/post-meeting
 - 1 teleconference
 - Face-to-face meeting
 - Internal review process

The Time is NOW for Applying MIROW Guidelines



Note: Humorous inserts throughout this presentation were borrowed from the New Yorker magazine, the Dilbert Comic Strip by Scott Adams, and Geek and Poke

The '411' of MIROW: Navigation to Implementation

Questions?

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