MANAGEMENT OF PATIENT STATUS IN IMMUNIZATION INFORMATION SYSTEMS

RECOMMENDATIONS OF THE AMERICAN IMMUNIZATION REGISTRY ASSOCIATION (AIRA) MODELING OF IMMUNIZATION REGISTRY OPERATIONS WORKGROUP (MIROW)

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AIRA
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EXECUTIVE SUMMARY

An important question in medical care and public health is "Who is the party responsible or accountable for the immunization of a patient?"

This relationship is documented as the "patient status," and it indicates responsibility for vaccination of a patient at a provider organization or geographic jurisdiction level. Active status of a patient with a provider organization or geographic jurisdiction indicates that the provider organization or geographic jurisdiction has responsibility for vaccination of that patient.

From the public health perspective, it is important to maintain status for a patient at both provider organization and geographic jurisdiction levels to ensure there is always a party responsible for immunization of every patient. For example, if a patient has moved within a jurisdiction and does not have active status with any provider organization, then the public health authority where the patient resides would be responsible for the patient's vaccination.

Immunization information systems (IIS) may use one of two common approaches to designate the responsibility of a provider organization for vaccinating a patient.

- Some IIS allow only one provider organization to have responsibility for a patient at a time (1–1 approach).
- Other IIS allow more than one provider organization to have responsibility for a patient simultaneously (1 to many, or 1–M approach).

Patient status is used to determine which patients to include in assessments and to decide which patients receive reminder/recall notifications. Inconsistent definitions among IIS could result in poor data comparability and data quality issues. As data sharing increases among IIS programs at the federal and state level, there is a need to use consistent and agreed upon patient status definitions and rules to promote the integrity of the information contained in IIS.

This guide was developed by the Modeling of Immunization Registry Operations Workgroup (MIROW), and the purpose of this guide is to define best practices regarding the assignment of patient status related to selection of patients to include in reminder/recalls and assessments.

In addition to best practice recommendations, the guidelines contain operational scenarios with resolutions for typical and challenging situations and descriptions of implementation considerations, including how to use HL7 specifications to transmit electronic data necessary to determine patient status.

From the public health perspective, it is important to maintain status for a patient at both provider organization and geographic jurisdiction levels to ensure there is always a party responsible for immunization of every patient.

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REVISION HISTORY

VERSION	DATE	CHANGES/UPDATES	LOCATION
1.0	Dec 2005	Initial version of published document	AIRA Archives
2.0	July 2015	Replacement of 2005 MIROW guidelines	AIRA Archives
3.0	March 2019	Repackaging and renaming of PAIS MIROW guide	https://repository.immregistries.org/resource/management-of-patient-status-in-immunization-information-systems

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FIGURES AND TABLES

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INTRODUCTION

"Patient status" is a term used to describe having responsibility or accountability for the vaccination of a patient.

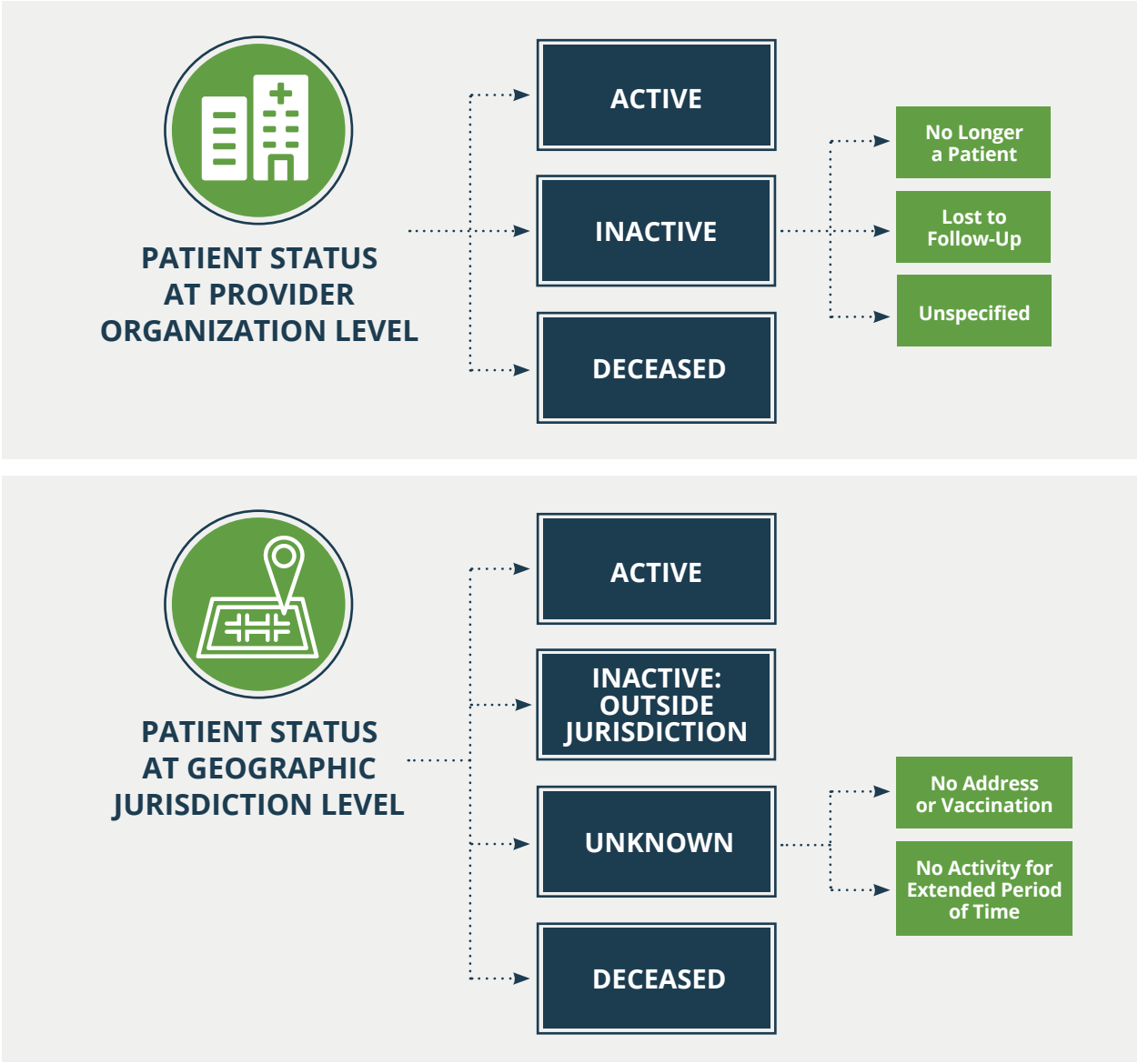
1 INTRODUCTION

BACKGROUND

"Patient status" is a term used to describe having responsibility or accountability for the vaccination of a patient. A provider organization has responsibility for ensuring the vaccination of its patient. Similarly, a public health organization has responsibility for ensuring the vaccination of a patient within its geographic jurisdiction Patient status should be maintained at provider-organization and geographic-jurisdiction levels to ensure there is always a party responsible for immunization of every individual. If a patient does not have active status with any provider organization within a geographic jurisdiction, then a public health authority is responsible for the individual's immunization. Figure 1 depicts the different patient statuses presented in this guide.

A provider organization has responsibility for ensuring the vaccination of its patient. Similarly, a public health organization has responsibility for ensuring the vaccination of a patient within its geographic jurisdiction.

Figure 1 | *Diagram showing patient status hierarchy*



Consistent and comparable designation of patient status is important to:

- **Determine which patients to include in coverage assessments**
- **Decide which patients receive reminder/recall notifications**
- **Promote data quality**
- **Promote data comparability**

Inconsistent definitions among immunization information systems (IIS) could result in poor data comparability and data quality issues. Consistent definitions and rules for patient status are important to ensure accurate communication between electronic health records (EHRs) to IIS via electronic data exchange (EDE) and comparability between IIS.

PURPOSE AND SCOPE

The purpose of this guide is to define best practices regarding the assignment of patient status related to selection of patients to include in reminder/recall and assessments, emphasizing:

- Electronic data exchange between immunization provider organizations and immunization information systems
- Integration of CDC's Assessment, Feedback, Incentives, and eXchange (AFIX) program functionality into IIS
- Assignment of patient status related to conducting assessments and reminder/recall activities

Appendix E: Scope provides more detail about the scope of this document.

AUDIENCE

The primary audience for this guide includes programmatic, technical, and operational personnel involved in creating or maintaining an IIS; awardee immunization program staff; as well as vendors of health care information systems and providers of immunization services. This guide can also be used by IIS for staff training, operational documentation, and communication purposes and for providing guidance for vendors and users of EHR applications. Specific reading paths have been identified based on audience role and can be found in Appendix C: Reading Paths.

METHODOLOGY OF GUIDE DEVELOPMENT

This guide has been developed using the Modeling of Immunization Registry Operations Workgroup (MIROW) Development Process. For more details on this process, please see the *MIROW and the Best Practice Development Process* document [1.11]. Domain diagrams and definitions for selected terms used in this guide can be found in Appendix B: Vocabulary and Domain Diagrams, and subject matter experts (SMEs) that contributed to this project can be found in Appendix G: Roster of Participants.

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PATIENT STATUS FUNDAMENTALS

2 PATIENT STATUS FUNDAMENTALS

Patient status characterizes the association between one patient and one party responsible for the patient's vaccinations.

A provider organization has responsibility for ensuring the vaccination of its patients. Similarly, a public health organization has responsibility for ensuring the vaccination of a patient within its geographic jurisdiction. Key concepts that guide designation and use of patient status are described below.

PATIENT STATUS HIERARCHY

There are two levels of patient status—at the provider level and at the geographic jurisdiction level. Maintaining a patient status at the geographic jurisdiction level ensures that there will always be a party responsible for a patient's vaccinations, even if the patient is not active with any provider organization. To maintain the responsibility of at least one party for the vaccination of a patient, a more rigid approach is used in assigning non-active status at the geographic jurisdiction level than at the provider organization level.

PATIENT STATUS AT THE PROVIDER ORGANIZATION LEVEL

1–1 AND 1–M APPROACHES

IIS may use one of two common approaches to designate the responsibility of a provider organization for vaccinating a patient.

- Some IIS allow only one provider organization to have responsibility for a patient at a time (1–1 approach).
- Other IIS allow more than one provider organization to have responsibility for a patient simultaneously (1 to many, or 1–M approach).

In this guide, **icons** are used to identify when something is signifying the **1–1 approach** or the **1–M approach**. If no icon appears, then the principle, business rule, or scenario can apply to both approaches.

Figure 2 | *Key points for 1–1 and 1–M*

1–1 APPROACH

- Maintains one provider organization with clear responsibility for the patient.
- Focuses resources for reminder/recalls and assessments on a single provider organization.
- May result in association of a patient with a provider organization that is most likely to see the patient on an ongoing basis.

Notes:
If an IIS uses the 1–1 approach, a patient is included in reminder/recall notifications and assessment reports for only one provider organization at a point in time. Routinely, the provider organization that administered the most recent vaccination is documented as the one provider organization bearing responsibility for that patient.

1–M APPROACH

- May support modern population trends better than a 1–1 approach. Many individuals, especially adults, do not have a single primary vaccination provider.
- May hold more provider organizations accountable for each patient's vaccinations. Since several provider organizations may have responsibility for a patient, there may be more opportunity to ensure that the patient is appropriately vaccinated.
- May result in multiple provider organizations devoting resources to the same efforts, such as reminder/recalls.

Notes:
If an IIS uses the 1–M approach, a patient can be included in reminder/recall notifications and assessment reports for more than one provider organization at the same time.

Several operational scenarios presented in Chapter 6: Operational Scenarios of this document illustrate basic differences between the 1–1 and 1–M approaches.

MOVING FROM ONE STATUS TO ANOTHER

The initial status for a relationship between a patient and a provider organization is unassigned, meaning that no relationship exists. From the initial unassigned status, a patient can move to active, inactive, or deceased statuses as illustrated in Figure 7. Designation of patient status at the provider organization level differs between the 1–1 and 1–M approaches as detailed in BR402A, BR402B, BR404A, and BR404B in Chapter 4: Patient Status Business Rules.

IDENTIFICATION OF A PERSON AS A PATIENT OF A PROVIDER ORGANIZATION

Active patient status identifies patients of a provider organization for purposes of assessments and reminder/recalls. A provider organization identifies its active patients via EDE or through a direct IIS user interface. An IIS can directly or indirectly identify active patients of a provider organization through documentation, such as a provider organization conducting a vaccination event for the patient or creating or updating a patient record.

Active patient status identifies patients of a provider organization for purposes of assessments and reminder/recalls.

IDENTIFICATION OF A PERSON AS **NOT** A PATIENT OF A PROVIDER ORGANIZATION

A patient is not an active patient of a provider organization for purposes of reminder/recall and assessments if:

- The patient is deceased
- The relationship between a provider organization and a patient is terminated because the patient has gone/transferred to another provider organization or the patient moved out of the area
- The patient has received a more recent immunization from another provider organization (only for 1–1)
- The provider organization is not an acceptable type—meaning it does not conduct assessment reports or reminder/recall (e.g., a mass immunization clinic)
- The vaccination encounter type is not an acceptable type—meaning it would not generally generate reminder/recalls or inclusion in assessments (e.g., influenza or travel vaccines)

PROVIDER ORGANIZATION IS NOT AN ACCEPTABLE TYPE

Patient status will not change if a vaccination is administered by an organization that is not of an acceptable type. Each IIS determines if a particular provider organization is one that conducts reminder/recalls or assessment reports (i.e., a provider organization of an acceptable type). Pharmacies and schools are examples of provider organizations that might not conduct reminder/recalls or assessment reports; however, provider organizations are evolving, with some now performing reminder/recalls and assessment reports that did not in the past. Pharmacies are beginning to offer a wider range of vaccinations, and some IIS may consider them to be provider organizations of an acceptable type. Acceptable-type organization also may vary based on the age of the patient; for example, a pharmacy might do reminder/recalls for adults but not for children.

Patient status will not change if a vaccination is administered by an organization that is not of an acceptable type. Each IIS determines if a particular provider organization is one that conducts reminder/recalls or assessment reports (i.e., a provider organization of an acceptable type).

VACCINATION ENCOUNTER IS NOT AN ACCEPTABLE TYPE

Type of immunization is a major factor in determining whether to change patient status. Some vaccination encounters do not indicate that the provider organization is responsible for the patient's ongoing vaccinations. In general, patient status should not be set to active for a mass vaccination event, for example, H1N1, flu-only clinics, Tdap in schools, and walk-in treatment centers with one-time events. Each IIS makes its own determination if a vaccination encounter is not of an acceptable type and has unique ways not to associate the patient with the provider of these types of vaccinations.

DIRECT AND INDIRECT ASSIGNMENT OF PATIENT STATUS

Patient status at the provider organization level may be assigned by the provider organization or by the IIS. Patient status can be set directly by a provider in any submission to the IIS or through a direct user interface or by the IIS based on documented evidence. Patient status can be implied and set indirectly by the IIS for a provider organization based on documented information. IIS should actively monitor indirect information on patient status at the provider organization level and update patient status in a timely manner. For example, a change in address could trigger a change in patient status. Any explicit assignment of patient status by a provider organization supersedes any previous patient status with that provider organization and an indirect designation of patient status by an IIS.

PATIENT STATUS AT THE GEOGRAPHIC JURISDICTION LEVEL

The initial status for a relationship between a patient and a provider organization is unassigned, meaning that no relationship exists. From the initial unassigned status, a patient can move to active, inactive (outside jurisdiction), unknown, or deceased.

Patient status at the geographic jurisdiction level may be assigned only by the IIS.

A patient should maintain active status at a geographic jurisdiction level until any of the following occurs:

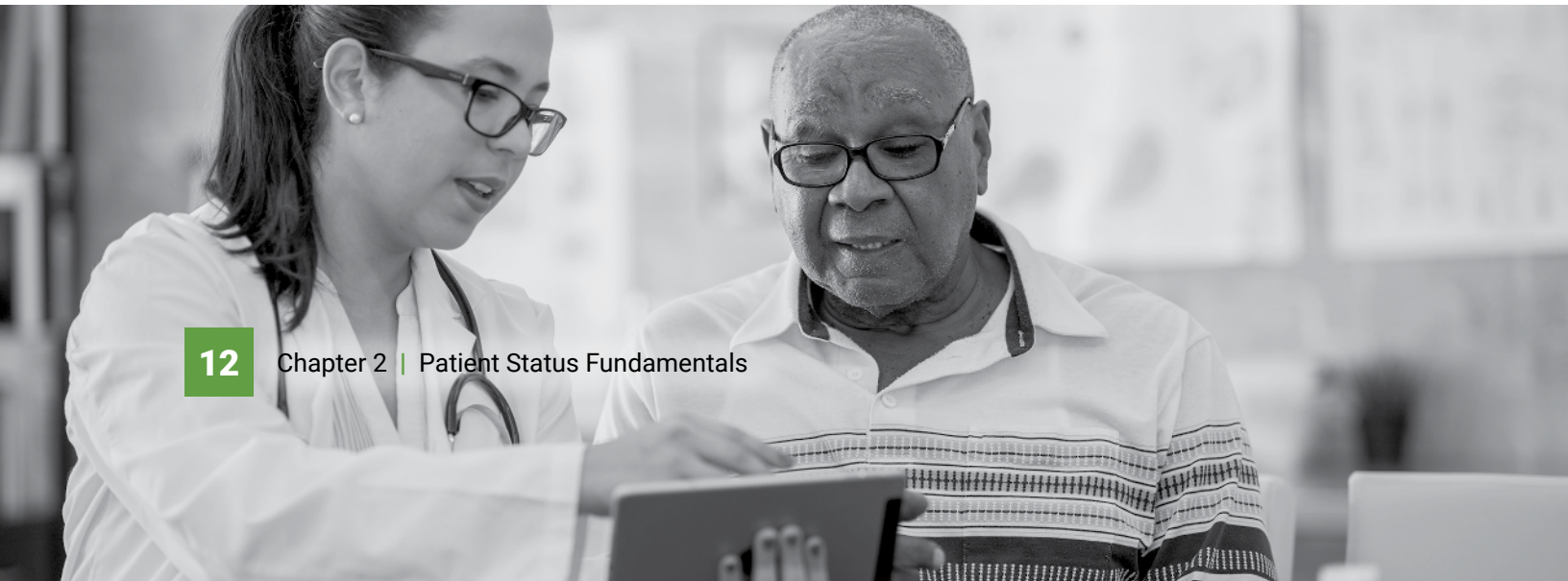
- **Patient moves out of geographic jurisdiction**
- **Patient is deceased**
- **IIS has not received information about this patient for an extended period of time**

OUT-OF-JURISDICTION PATIENTS

Specific rules apply to patients who reside outside the geographic jurisdiction. Patient status is maintained at the provider organization level for a patient who resides outside the geographic jurisdiction but is associated with the provider organization. Patient status is not active at the geographic jurisdiction level for a patient who resides outside the geographic jurisdiction level even if the patient is associated with a provider organization within the geographic jurisdiction.

OPT-OUT OF IIS OR REMINDER/RECALL

Opting out of IIS or reminder/recall does not impact patient status. Opt-outs can be handled through mechanisms separate from patient status and considered when selecting patients for assessments and reminder/recalls.



3

PATIENT STATUS PRINCIPLES

3 PATIENT STATUS PRINCIPLES

A principle (P) is a high-level business rule. It is a high-level direction that helps to capture institutional knowledge and to guide the development of more specific business rules.

There are 11 principles that relate to patient status. The concepts described in Chapter 2: Fundamentals, were used to shape the principles that are listed below and in tabular format in Table 1.

Principles are presented in Table 1 in the following order:

P301. Patient status scope: association between one patient and one party

P302. Patient status hierarchy

P303. Avoid having individuals fall through the cracks

P304. Who may assign patient status

P305. Make information available about patient status changes

P308. Supremacy of patient status explicit assignment

P309. Same rules for public and private provider organizations

P310. Out-of-state patients

P311. Patient status should be maintained for patients of all ages

P312. Any submission should include patient status

P313. Opt-out from IIS

P314. Opt-out from reminder/recall

Table 1 | *Principles for patient status*

PRINCIPLES	NOTES
P301. Patient status scope: association between one patient and one party Each patient status should characterize the association between one patient and one party responsible for the patient's vaccinations.	**References** • P313. Opt-out from IIS • P314. Opt-out from reminder/recall • BR401. Nomenclature of statuses at the provider organization level • BR411. Nomenclature of statuses at the geographic jurisdiction level
P302. Patient status hierarchy Statuses for a patient should be maintained in a hierarchical manner, specifically: • At the provider organization level (lower level of the hierarchy) • At the geographic jurisdiction level(s) (higher levels of the hierarchy)	**Example** • Examples of the geographic jurisdiction level(s) of the hierarchy include state, city, county, and other geographic area covered by a local public health authority.
P303. Avoid having patients fall through the cracks A more rigid approach should be used in assigning non-active status at the geographic jurisdiction level than at the provider organization level.	**References** • BR413. Inactive patient status at the geographic jurisdiction level (reason code outside jurisdiction) • BR415. Unknown patient status at the geographic jurisdiction level (reason code no activity for extended period of time) • BR421. Deceased patient status at the provider organization and geographic jurisdiction levels
P304. Who may assign patient status Patient status at the provider organization level may be assigned by any of the following parties: • Provider organization • Immunization program (at state, city, or county levels) Patient status at the geographic jurisdiction level may be assigned only by the immunization program (at state, city, or county levels).	**References** • BR413. Inactive status at the geographic jurisdiction level (reason code outside jurisdiction)
P305. Make information available about patient status changes. IIS should make available to a provider organization the information about changes it makes to a status maintained for a patient associated with that provider organization.	

PRINCIPLES	NOTES
P308. Supremacy of patient status explicit assignment Any explicit assignment of patient status by a provider organization of an acceptable type should supersede both • Previous patient status with that provider organization • Patient status that can be indirectly implied by IIS based on the information available up to this moment	**Exception** • A date of death received by IIS from Vital Records supersedes a status set by a provider organization. IIS should communicate such information to the provider organization. **Examples** • For 1–1 and 1–M approaches, if a provider organization directly sets patient status to inactive, the status should be considered as inactive regardless of any vaccination events the provider organization conducted for the patient. However, future vaccination events conducted by the provider organization for the patient may result in the patient status being changed to active. • If a provider organization submits information about a vaccination event that it conducted and the submission has a patient status of inactive, the status should be considered inactive. • If a provider organization has not conducted any vaccination events for the patient but sets patient status to active, the status should be considered active. • For the 1–1 approach, setting patient status to active by one provider may affect the patient status with other provider organizations – For example, if provider organization A gave the most recent vaccination but provider organization B claims a patient by setting the patient status to "active," then the patient status should be considered "active" with provider organization B and "inactive" with provider organization A. In other words, in the 1–1 approach, the provider organization that gave the last shot "wins"; i.e., most recent immunization trumps. It should be a rare occurrence that two providers vaccinate the same patient on the same day. • A provider organization may submit a status for a patient it expects to see on an upcoming date but who has not yet received vaccination services from that provider organization. **References** • S801. Patient demographics and historical immunizations, existing record: 1–1

PRINCIPLES	NOTES
P309. Same rules for public and private provider organizations Rules for status assignment should be the same for public and private provider organizations.	
P310. Out-of-state patients Status should be maintained at the provider organization level for a patient who resides outside the geographic jurisdiction served by the IIS but is associated with a provider organization within that geographic jurisdiction. Status may never be active at the geographic jurisdiction level for a patient who resides outside the geographic jurisdiction served by the IIS but is associated with a provider organization within that geographic jurisdiction.	**References** • S101. Patient moved out of state but uses in-state provider organization • S102. Patient moved out of state and ceased to use in-state provider organizations • S103. Patient address not known, patient receives services within state • S401. In-state patient uses out-of-state provider organization
P311. Patient status should be maintained for patients of all ages Patient status should be maintained for patients of all ages.	
P312. Any submission should include patient status Patient status should be included in any submission from a provider organization to the IIS.	
P313. Opt-out from IIS Opting out of IIS should not impact patient status. Rather, it should be handled as an additional consideration (filter) for selecting a cohort for reminder/recalls and coverage assessments.	
P314. Opt-out from reminder/recall Opting out of reminder/recall notifications should not impact patient status. Rather, it should be handled as an additional consideration (filter) for selecting a cohort for reminder/recall.	

4

PATIENT STATUS BUSINESS RULES

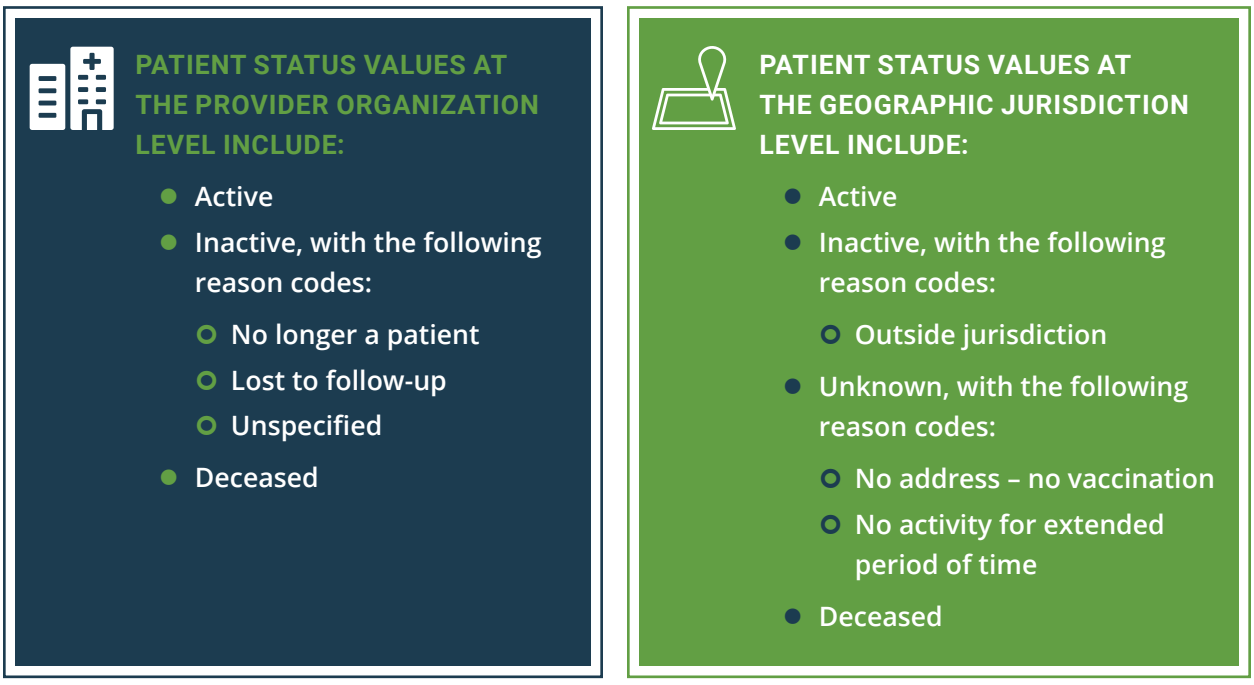
Patient status is defined at two levels—at the provider organization level and at the geographic jurisdiction level.

4 PATIENT STATUS BUSINESS RULES

NOMENCLATURE OF STATUSES

Patient status is defined at two levels—at the provider organization level and at the geographic jurisdiction level. Since a geographic jurisdiction can contain another geographic jurisdiction, these definitions cover a hierarchical structure of statuses at provider organization, city, county, and state levels (see Appendix B: Vocabulary and Domain Diagrams).

Figure 3 | *List of patient statuses*



Descriptions of these statuses and conditions for transitioning from one status to another are presented with business rules in Table 2 and are shown in Figure 7 in Appendix F: Patient Status Diagrams.

BUSINESS RULES

Business rules (BR) represent specific requirements and decision-making logic for IIS processes and operations. Specific recommendations are presented in Table 2, where business rules are shown in the following order:

BR401. Nomenclature of statuses at the provider organization level

BR402A. Active status at the provider organization level: 1–1

BR402B. Active status at the provider organization level: 1–M

BR404A. Patient status at the provider organization level: inactive: no longer a patient: 1–1

BR404B. Patient status at the provider organization level: inactive: no longer a patient: 1–M

BR405. Patient status at the provider organization level: inactive: lost to follow-up

BR406. Patient status at the provider organization level: inactive: unspecified

BR411. Nomenclature of statuses at the geographic jurisdiction level

BR412. Active status at the geographic jurisdiction level

BR413. Patient status at the geographic jurisdiction level: inactive: outside jurisdiction

BR414. Patient status at the geographic jurisdiction level: Unknown: no address, no vaccination

BR415. Patient status at the geographic jurisdiction level: Unknown: no activity for extended period of time

BR421. Deceased status at the provider-organization and geographic jurisdiction levels

Table 2 | *Business rules for patient status*

BUSINESS RULES	NOTES
Provider organization level	
BR401. Nomenclature of statuses at the provider organization level Patient status at the provider organization level may have only one of the following designations: • Active • Inactive, with one of the following reason codes: – No longer a patient – Lost to follow-up – Unspecified • Deceased	**References** • P301. Patient status scope: association between one patient and one party
1–1 **BR402A. Active status at the provider organization level: 1–1** For the 1–1 approach, patient status with a provider organization should be considered active only if the provider organization is of an acceptable type and any of the following is true: • Provider organization directly identifies the individual as a patient. • Provider organization indirectly identifies the individual as a patient. • Provider organization has conducted the most recent vaccination event during the vaccination encounter of an acceptable type for the patient. • Provider organization has created new patient record in IIS (i.e., submitted or entered patient demographic-only information or historical-only immunization information for a patient not already in IIS).	**Exception** • Updates to an existing patient record in IIS (i.e., submission or entry of a patient demographic-only information or historical-only immunization information to IIS) does not result in active status in the 1–1 approach. **Examples** • Vaccine type should not impact patient status determination. • Patient status with a provider organization should be set to inactive when patient status for this patient is set to active with another provider organization. • Patient status should remain active when a provider organization conducts a vaccination event for a patient who already has active status with that provider organization. **References** • P308. Supremacy of patient status direct identification • S101. Patient moved out of state but uses in-state provider organization • S301. Patient lives with divorced parents: 1–1 • S501. Provider organization of an acceptable type: 1–1 • S504. Birth dose submitted by hospital, acceptable type • S601. Vaccination encounter of an acceptable type: 1–1 • S701. Patient demographics received with no address and no vaccination: 1–1 • S703. Patient demographics and historical immunizations, no existing record • S704. Patient demographics and historical immunizations, existing record: 1–1 • S706. Patient demographics and historical immunizations, no existing record; not acceptable provider type: 1–1 • S801. Patient demographics and historical immunizations, existing record: 1–1

BUSINESS RULES	NOTES
Provider organization level	
BR402B. Active status at the provider organization level: 1–M For the 1–M approach, patient status with a provider organization should be considered active only if the provider organization is of an acceptable type and any of the following is true: • Provider organization directly identifies the individual as a patient. • Provider organization indirectly identifies the person as a patient in any of the following ways: – Provider organization conducted a vaccination event during a vaccination encounter of an acceptable type for the patient. – Provider organization has created new or updated an existing patient record in IIS (i.e., submitted or entered patient demographic-only information or historical-only immunization information for a patient).	**Example** • Vaccine type should not impact patient status determination. • Patient status should remain active when a provider organization conducts a vaccination event for a patient who already has active status with that provider organization. **References** • S101. Patient moved out of state but uses in-state provider organization • S302. Patient lives with divorced parents: 1–M • S502. Provider organization of an acceptable type: 1–1 • S504. Birth dose submitted by hospital, acceptable type • S602. Vaccination encounter of an acceptable type: 1–M • S702. Patient demographics received with no address and no vaccination: 1–M • S703. Patient demographics and historical immunizations, no existing record • S705. Patient demographics and historical immunizations, existing record: 1–M • S706. Patient demographics and historical immunizations, no existing record; not acceptable provider type: 1–1

BUSINESS RULES	NOTES
Provider organization level	
1–1 **BR404A. Patient status at the provider organization level: inactive: no longer a patient: 1–1** For the 1–1 approach, patient status at the provider organization level should be considered inactive (reason code no longer a patient) only if any of the following is true: • Relationship between a provider organization and a patient has been terminated by either party, for example: – Patient has gone/transferred to another provider organization – Patient has moved out of the area – Patient has received a more recent immunization from another provider organization	**Remarks** • There may be overlap in the criteria elements (i.e., criteria elements are not mutually exclusive). • The criterion "moved out of area" should be locally defined. • There are cases when a patient has moved but still receives immunizations from the provider organization. In some areas, it is not unusual for a patient to continue receiving services from a provider organization that is a long distance away. Therefore, criteria should be established by each IIS based on local circumstances to define when a patient's move should result in inactive status with a provider organization. The key factor should be that a provider organization does not recognize an individual as a patient. • A provider organization may choose to code patients who have not been seen for an extended period of time as inactive: no longer a patient. **Example** • Examples include notations in a patient's chart that the patient is moving or a record release that indicates the patient is seeing a different provider organization. **References** • P308. Supremacy of patient status explicit assignment • S102. Patient moved out of state and ceased to use in-state provider organizations • S201. Transfer of medical records • S301. Patient lives with divorced parents: 1–1 • S501. Provider organization of an acceptable type: 1–1 • S601. Vaccination encounter of an acceptable type: 1–1 • S801. Patient demographics and historical immunizations, existing record: 1–1

BUSINESS RULES	NOTES
Provider organization level	
1–M **BR404B. Patient status at the provider organization level: inactive: no longer a patient: 1–M** For the 1–M approach, patient status at the provider organization level should be considered inactive (reason code no longer active) only if any of the following is true: • Relationship between a provider organization and a patient has been terminated by either party, for example: – Patient has gone/transferred to another provider organization – Patient has moved out of the area	**Remarks** • There may be overlap in the criteria elements (i.e., criteria elements are not mutually exclusive). • The condition "moved out of area" should be locally defined. There are cases when a patient has moved but still receives immunizations from the provider organization. In some areas, it is not unusual for a patient to continue receiving services from a provider organization that is a long distance away. Therefore, criteria should be established by each IIS based on local circumstances to define when a patient's move should result in inactive status with a provider organization. The key factor should be that a provider organization does not recognize an individual as a patient. • A provider organization may choose to code patients who have not been seen in an extended period of time as inactive: no longer a patient. **Examples** • Examples include notations in a patient's chart that the patient is moving or a record release indicating that the patient is seeing another provider organization. **References** • P308. Supremacy of patient status explicit assignment • S102. Patient moved out of state and ceased to use in-state provider organizations • S201. Transfer of medical records

BUSINESS RULES	NOTES
Provider organization level	
BR405. Patient status at the provider organization level: inactive: lost to follow-up Patient status at the provider organization level should be considered inactive (reason code lost to follow-up) only if any of the following is true: • Attempts to contact the patient have been documented, but no documented response has been received • Provider organization has no means to contact patient, e.g. no address, no cell phone	**Remarks** • In the absence of any state guideline, after 90 days and a minimum of three unsuccessful attempts to contact a patient, patient status at the provider organization level should be set to inactive (reason code lost to follow-up) and remain active at the geographic jurisdiction level. • This is an update to BR802 from the 2009 MIROW Reminder/Recall guide (1.4, p. 50). • Consider following the escalation principle P802 from the MIROW Reminder/Recall guide (1.4, p. 49) to increase likelihood of successful contact: – "After an unsuccessful RR attempt, if the RR process is not ended, consider a different RR Notification method. For example, escalation from a postcard to a telephone call." **References** • P802 in the 2009 MIROW Reminder/Recall guide (1.4, p. 49) • P803 in the 2009 MIROW Reminder/Recall guide (1.4, p. 49)
BR406. Patient status at the provider organization level: inactive: unspecified Patient status at the provider organization level should be considered inactive (reason code unspecified) only if patient's information has been submitted to an IIS via an electronic interface with inactive status without a reason code being specified.	**Remarks** • BR406 should be used only by provider organizations that are technically not able to specify a reason, (e.g., EHR system is in transition). • Provider organizations should not set the inactive unspecified status arbitrarily but, rather, base it on rules defined in this guide.
Geographic jurisdiction level	
BR411. Nomenclature of statuses at the geographic jurisdiction level Patient status at the geographic jurisdiction level may have only one of the following designations: • Active • Inactive, with the following reason code: – Outside jurisdiction • Unknown, with the following reason codes: – No address, no vaccination – No activity for extended period of time • Deceased	

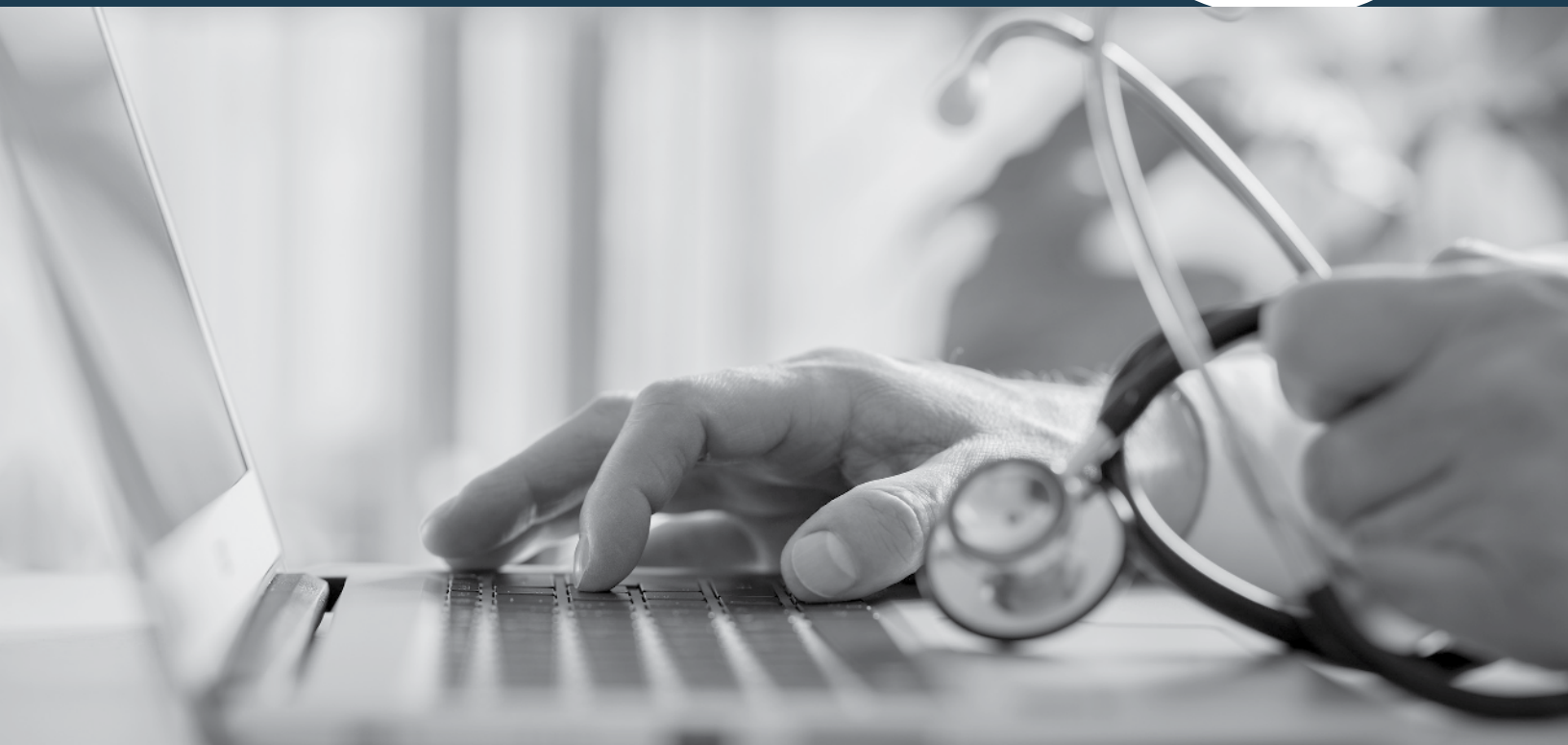
BUSINESS RULES	NOTES
Geographic jurisdiction level	
BR412. Active status at the geographic jurisdiction level Individual status with a geographic jurisdiction should be considered active only if any of the following is true: • Individual residence within the geographic jurisdiction has been confirmed. • Individual received an immunization from a provider organization within the geographic jurisdiction, and individual's address is not known (*this condition applies only to highest level geographic jurisdiction, such as state or city*).	**Remarks** • Status should not be set to active at the geographic jurisdiction level for an individual who received an immunization from a provider organization within the geographic jurisdiction and has an address outside of that jurisdiction. **References** • BR413. Inactive status at the geographic jurisdiction level (reason code outside jurisdiction) • S103: Patient address not known, patient receives services within state • S401. In-state patient uses out-of-state provider organization • S504. Birth dose submitted by hospital, acceptable type • S505. Birth dose submitted by hospital, not an acceptable type • S703. Patient demographics and historical immunizations, no existing record • S706. Patient demographics and historical immunizations, no existing record, not acceptable provider type: 1–1
BR413. Patient status at the geographic jurisdiction level: inactive: outside jurisdiction Patient status at the geographic jurisdiction level should be considered inactive (reason code outside jurisdiction) only if the patient does not reside in the geographic jurisdiction.	**Examples** • Individual once had a valid address in the jurisdiction but now has a known address outside the jurisdiction. • Individual has a known residence outside the highest level geographic jurisdiction (such as state) but receives health care within the state. – In this specific example (not all cases of this scenario), the patient will be active with at least one provider organization at the provider organization level. • Change of address received in a submission from a provider organization may include a partial address, such as when only the patient's state of residence is known (in which case the individual status is inactive: outside jurisdiction), and if there is an address-unknown flag (in which case it cannot be concluded that patient has moved outside of the geographic jurisdiction and the status remains active at the geographic jurisdiction level). **References** • S101. Patient moved out of state but uses in-state provider organization • S102. Patient moved out of state and ceased to use in-state provider organizations

BUSINESS RULES	NOTES
Geographic jurisdiction level	
BR414. Patient status at the geographic jurisdiction level: Unknown: no address, no vaccination Individual status at the geographic jurisdiction level should be considered unknown: no address, no vaccination only if the IIS has never received an address and has never received vaccination information about the individual.	**Examples** • Demographic data received with no address. • Birth record where child is up for adoption and no birth dose. • Patient may be homeless (and has not received immunization). **Remarks** • Other types of contact information (e.g., email address) might be available, which can be used to attempt contact. IIS should consider using other sources (e.g., health information exchange) to find contact information. • IIS should use reliable data sources and must be careful about what sources they authorize to provide data (i.e., IIS should avoid situations in which they have no address and no immunization). • This BR applies to incoming data. An IIS might have existing data that was not coded as required by this BR. **References** • Table 6, Assessment report at the geographic jurisdiction level. • S701. Patient demographics received with no address and no vaccination: 1–1 • S702. Patient demographics received with no address and no vaccination: 1–M
BR415. Patient status at the geographic jurisdiction level: Unknown: no activity for extended period of time Patient status at the geographic jurisdiction level should be considered inactive: no activity for extended period of time only if the IIS has not received demographic and/or immunization information for a patient for an extended period of time.	**Remarks** • The SME panel had extensive discussions about defining "extended period of time" and was not able to provide a specific (numeric) recommendation. • Extended period of time could be different for different age cohorts. For example, adults might not be eligible for anything other than flu vaccination for an extended period of time. • Each IIS should (1) document its practices and the specific (numeric) period of time used to determine unknown status at the geographic jurisdiction level (reason code no activity for extended period of time) and (2) share the documented practices with AIRA to ensure transparency and to inform a future recommendation for a specific (numeric) period of time. • Some IIS currently require seven years of inactivity to classify someone as unknown. Other IIS never assign inactive status due to lack of activity at the jurisdictional level. **References** • Table 6, Assessment report at the geographic jurisdiction level.

BUSINESS RULES	NOTES
Both provider organization and geographic jurisdiction levels	
BR421. Deceased status at the provider organization and geographic jurisdiction levels Patient status at the provider organization and geographic jurisdiction levels should be considered inactive with the reason code deceased only if a patient's death is confirmed.	**Remarks** • For a deceased patient, patient status should be changed to deceased at both the provider organization level and the geographic jurisdiction level. • Patient status at both levels—geographic jurisdiction and provider organization—should be coordinated (i.e., if status is set to deceased at the geographic jurisdiction level, it should also be set to deceased at the provider organization level for all provider organizations associated with the patient, and vice versa). **Examples** • Examples of confirmation include a family member informing the IIS or provider organization, or a notification from Vital Records.

5

USING PATIENT STATUS FOR REMINDER/RECALLS AND ASSESSMENT REPORTS



5 USING PATIENT STATUS FOR REMINDER/ RECALLS AND ASSESSMENT REPORTS

This chapter provides recommendations on using patient statuses, defined in Appendix B: Vocabulary and Domain Diagrams, when selecting a cohort for reminder/recalls and assessment reports.

Note that a variety of factors other than patient status affect selection of a patient cohort. For example, depending on the assessment report or reminder/recall purpose, a cohort may be composed of patients of a certain age range, residence location, and/or specific types of vaccine. The recommendations presented here focus only on the impact of patient status on the population cohort selection.

Note that patient status at the provider organization level and geographic jurisdiction level are defined by different business rules. For example, a provider organization may indicate a patient as inactive: lost to follow-up, but lost to follow-up is not a reason for a geographic jurisdiction to assign inactive status.

Rules for including patients in reminder/recalls and assessment reports are documented in the following decision tables:

Table 3. Reminder/recall at the provider organization level

Table 4. Reminder/recall at the geographic jurisdiction level

Table 5. Assessment report at the provider organization level

Table 6. Assessment report at the geographic jurisdiction level

The top half of each table reflects the conditions used to determine whether a patient is included in the process. The bottom half reflects the recommended actions. Each column represents a scenario indicating what the resulting action should be for specific conditions. For example, in Table 4, Scenario A, if a patient has active status, he/she should be included in reminder/recall. In Scenario B, if a patient has inactive or deceased status, he/she should be excluded from reminder/recall notification.

The following notes apply to each table in this section:

- For considerations regarding patients who have opted out, refer to principles P313. Opt-out from IIS, and P314. Opt-out from reminder/recall.
- Inactive includes all inactive reason codes.
- Unknown applies to both unknown reasons.
- Patients with an initial unassigned status should not be included in the assessment reports and reminder/recalls. Figure 7 illustrates the initial unassigned patient status.
- If a method of contact that is not based on the patient address is available, the IIS may choose to include the patient in the cohort and send a reminder/recall notification using the available contact method. For example, an IIS may continue trying to contact individuals with patient status at the geographic jurisdiction level “unknown: no activity for extended period of time” and “unknown: no address, no vaccination” using available contact methods other than an address.

REMINDER/RECALL AT THE PROVIDER ORGANIZATION LEVEL

In general, no reminder/recall notifications should be sent to a patient who opts out of reminder/recall notifications, subject to local policies and laws. Some IIS do allow reminder/recall notifications to be sent to individuals who opted out of reminder/recall notifications (e.g., in case of a disease outbreak). Some IIS do not allow individuals to opt out of reminder/recall notifications (P314).

Table 3 | *Reminder/Recall (RR) at the provider organization level*

CONDITIONS	SCENARIO A	SCENARIO B
Patient status at the provider organization level	Active	Inactive Deceased
Actions		
1. Include in provider organization RR	X	
2. Exclude from provider organization RR		X

REMINDER/RECALL AT THE GEOGRAPHIC JURISDICTION LEVEL

Table 4 | *Reminder/Recall (RR) at the geographic jurisdiction level*

CONDITIONS	SCENARIO A	SCENARIO B	SCENARIO C
Patient status at the geographic jurisdiction level	Active	Inactive Deceased	Unknown
Actions			
1. Include in geographic jurisdiction RR	X		
2. Exclude from geographic jurisdiction RR		X	
3. IIS makes determination whether to include			X

ASSESSMENT REPORT AT THE PROVIDER ORGANIZATION LEVEL

There is a great variety of provider organization level assessment reports conducted based on IIS data. Table 5 presents recommendations for selecting a population cohort for a generic assessment report at the provider organization level based on AFIX considerations. The recommendations replicate the decision logic presented in Table 3 for reminder/recall at the provider organization level.

In order to satisfy needs of local immunization programs, an IIS may choose to modify the recommended decision logic to run various types of additional assessment reports at the provider organization level. However, each IIS should have functionality available to support best practice recommendations presented in Table 5.

Table 5 | *Assessment report at the provider organization level*

CONDITIONS	SCENARIO A	SCENARIO B
Patient status at the provider organization level	Active	Inactive Deceased
Actions		
1. Include in provider organization assessment report	X	
2. Exclude from provider organization assessment report		X

ASSESSMENT REPORT AT THE GEOGRAPHIC JURISDICTION LEVEL

Table 6 | *Assessment report at the geographic jurisdiction level*

CONDITIONS	SCENARIO A	SCENARIO B
Patient status at the geographic jurisdiction level	Active Unknown	Inactive Deceased
Actions		
1. Include in geographic jurisdiction assessment	X	
2. Exclude from geographic jurisdiction assessment		X

Be aware that use of the unknown status in Table 6 for an assessment at the geographic jurisdiction level is different from Table 4 for reminder/recall at the geographic jurisdiction level due to the nature of determining the information that is available—in many cases the patient address is not known (unknown status: no address, no vaccination).

6 OPERATIONAL SCENARIOS

Patient status is relevant to three aspects of IIS operations:

1. Information that an EHR (as well as a direct user interface) captures and transmits to an IIS. The information is a snapshot in time for the EHR.
2. How an IIS interprets information in incoming data.
3. How an IIS applies patient status recommendations to existing data in the IIS.

6 OPERATIONAL SCENARIOS

This chapter presents typical and challenging operational scenarios that illustrate implementation of best practice recommendations.

Using real situations to evaluate principles (Chapter 3: Principles), business rules (Chapter 4: Business Rules), diagrams, and decision tables for inclusion and exclusion of patients in reminder/recalls and assessment reports (Chapter 5: Reports) should help the user of this guide to test and explore best practice recommendations.

Operational scenarios are presented in Table 7. These scenarios do not constitute an exhaustive set of all possible scenarios related to management of patient status. Rather, they are a limited set of some typical and challenging situations and recommended resolutions that are based on principles, business rules, and decision tables. This set of scenarios can be expanded by individual IIS for training and operational purposes.

In reviewing these scenarios, keep in mind that patient status is relevant to three aspects of IIS operations:

1. Information that an EHR (as well as a direct user interface) captures and transmits to an IIS. The information is a snapshot in time for the EHR.
2. How an IIS interprets information in incoming data.
3. How an IIS applies patient status recommendations to existing data in the IIS.

Operational scenarios are grouped in the following categories that describe various situations with a patient:

PLACE OF RESIDENCE

S101. Patient moved out of state but uses in-state provider organization

S102. Patient moved out of state and ceased to use in-state provider organization

S103. Patient address not known, patient receives services within state

CHANGING PROVIDER ORGANIZATION

S201. Transfer of medical records

SERVICE FROM MORE THAN ONE PROVIDER ORGANIZATION

S301. Patient lives with divorced parents: 1–1

S302. Patient lives with divorced parents: 1–M

SERVICE FROM OUT-OF-STATE PROVIDER ORGANIZATION

S401. In-state patient uses out-of-state provider organization

ACCEPTABLE PROVIDER ORGANIZATION TYPE

S501. Provider organization of an acceptable type: 1–1

S502. Provider organization of an acceptable type: 1–M

S503. Provider organization not of an acceptable type

S504. Birth dose submitted by hospital, acceptable type

S505. Birth dose submitted by hospital, not an acceptable type

ACCEPTABLE VACCINATION ENCOUNTER TYPE

S601. Vaccination encounter of an acceptable type: 1–1

S602. Vaccination encounter of an acceptable type: 1–M

S603. Vaccination encounter not of an acceptable type

INDIRECT STATUS DESIGNATION

S701. Patient demographics received with no address and no vaccination: 1–1

S702. Patient demographics received with no address and no vaccination: 1–M

S703. Patient demographics and historical immunizations, no existing record

S704. Patient demographics and historical immunizations, existing record: 1–1

S705. Patient demographics and historical immunizations, existing record: 1–M

S706. Patient demographics and historical immunizations, no existing record, not acceptable provider type: 1–1

DIRECT STATUS DESIGNATION

S801. Patient demographics and historical immunizations, existing record: 1–1

Table 7 | *Operational scenarios*

PLACE OF RESIDENCE

S101. Patient moved out of state but uses in-state provider organization

Description:

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

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 assessment reports.
- Patient should be included in the provider organization reminder/recalls and assessment reports.

References:

- P310. Out-of-state patients
- BR413. Patient status at the geographic jurisdiction level: inactive: outside jurisdiction
- BR402A. Active status at the provider organization level: 1–1
- BR402B. Active status at the provider organization level: 1–M

S102. Patient moved out of state and ceased to use in-state provider organizations

Description:

- Patient moved out of the state and no longer receives services of a provider organization within the state.

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 "inactive: no longer a patient" for each in-state provider organization(s) that has an "active, inactive: lost to follow-up" or "inactive: unspecified status" for that patient.

Consequences:

- Patient should be excluded from the geographic jurisdiction reminder/recalls and assessment reports.
- Patient should be excluded from the provider organization reminder/recalls and assessment reports.

References:

- BR404A. Patient status at the provider organization level: inactive: no longer a patient: 1–1
- BR404B. Patient status at the provider organization level: inactive: no longer a patient: 1–M
- BR413. Patient status at the geographic jurisdiction level: inactive: outside jurisdiction

PLACE OF RESIDENCE

S103: Patient address not known, patient receives services within state

Description:

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

Status:

- Patient status at the geographic jurisdiction level 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 reminder/recalls and assessment reports.
- Patient should be included in Provider Org A provider organization reminder/recalls and assessment reports.

References:

- P303. Avoid having people fall through the cracks
- BR412. Active status at the geographic jurisdiction level
- BR402A. Active status at the provider organization level: 1–1
- BR402B. Active status at the provider organization level: 1–M

CHANGING PROVIDER ORGANIZATION

S201. Transfer of medical records

Description:

- A patient has active status with Provider Org A. Provider Org A received a request to transfer the patient's medical records to Provider Org B. The IIS and provider organizations can infer that the patient is moving from one provider organization to another.

Status:

- Patient status should be set to inactive: no longer a patient for Provider Org A (by the IIS or by Provider Org A).
- Patient status should be set to active for Provider Org B (by the IIS or by Provider Org B).

Consequences:

- Patient should be excluded from reminder/recalls and assessment reports for Provider Org A.
- Patient should be included in reminder/recalls and assessment reports for Provider Org B.

References:

- BR404A. Patient status at the provider organization level: inactive: no longer a patient: 1–1
- BR404B. Patient status at the provider organization level: inactive: no longer a patient: 1–M

SERVICE FROM MORE THAN ONE PROVIDER ORGANIZATION

1–1

S301. Patient lives with divorced parents: 1–1

Description:

- A patient (a child) lives interchangeably with each of his/her divorced parents (e.g., three months with one parent and then three months with the other parent). The patient switches back and forth (every three months) from Provider Org A to Provider Org B. Provider Org A and Provider Org B contribute equally to the patient's immunizations. Provider Org A conducted the latest vaccination event for the patient. The IIS uses the 1–1 approach.

Status:

- Patient status should be set to active for Provider Org A (by the IIS or by the Provider Org A).
- Patient status should be set to inactive: no longer a patient for Provider Org B (by the IIS).

Consequences:

- The patient should be included in reminder/recalls and assessment reports for Provider Org A.
- The patient should be excluded from reminder/recalls and assessment reports for Provider Org B.
- The same should apply when the patient moves back from Provider Org B to Provider Org A.

References:

- BR402A. Active status at the provider organization level: 1–1
- BR404A. Patient status at the provider organization level: inactive: no longer a patient: 1–1

1–M

S302. Patient lives with divorced parents: 1–M

Description:

- A patient (a child) lives interchangeably with each of his/her divorced parents (e.g., three months with one parent and then three months with the other parent). The patient switches back and forth (every three months) from Provider Org A to Provider Org B. Provider Org A and Provider Org B contribute equally to the patient's immunizations. Provider Org A conducted the latest vaccination event for the patient. The IIS uses the 1–M approach.

Status:

- Patient status should be set to active for Provider Org A (by the IIS or by the Provider Org A).
- Patient status should be set to (or remain) active for Provider Org B (by the IIS).

Consequences:

- The patient should be included in reminder/recalls and assessment reports for Provider Org A.
- The patient should be included in reminder/recalls and assessment reports for Provider Org B.
- The same should apply when the patient moves back from Provider Org B to Provider Org A.

References:

- BR402B. Active status at the provider organization level: 1–M

SERVICE FROM OUT-OF-STATE PROVIDER ORGANIZATION

S401. In-state patient uses out-of-state provider organization

Description:

- A patient who resides within the IIS jurisdiction sees a provider organization outside the jurisdiction.

Status:

- Patient status at the geographic level should be set to active.
- There is no status at the provider organization level with the out-of-state provider organization.

Consequences:

- The patient should be included in the geographic jurisdiction reminder/recalls and assessment reports.

References:

- P310. Out-of-state patients
- BR412. Active status at the geographic jurisdiction level

ACCEPTABLE PROVIDER ORGANIZATION TYPE

S501. Provider organization of an acceptable type: 1–1

Description:

- A patient has an active status with Provider Org A, where he/she regularly receives vaccinations. The patient receives a flu vaccination from Provider Org B, which is a pharmacy. The IIS uses the 1–1 approach and considers the pharmacy (Provider Org B) as an acceptable provider organization type.

Status:

- Patient status should be set to active for Provider Org B (pharmacy).
- Patient status should be set to inactive: no longer a patient for Provider Org A.

Consequences:

- Patient should be included in reminder/recalls and assessment reports for Provider Org B.
- Patient should be excluded from reminder/recalls and assessment reports for Provider Org A.

References:

- Chapter 2: Patient Status Fundamentals
- BR402A. Active status at the provider organization level: 1–1
- BR404A. Patient status at the provider organization level: inactive: no longer a patient: 1–1

ACCEPTABLE PROVIDER ORGANIZATION TYPE

1–M

S502. Provider organization of an acceptable type: 1–M

Description:

- A patient has an active status with Provider Org A, where he/she regularly receives vaccinations. The patient receives a flu vaccination from Provider Org B, which is a pharmacy. The IIS uses the 1–M approach and considers the pharmacy (Provider Org B) as an acceptable provider organization type.

Status:

- Patient status should be set to active for Provider Org B (pharmacy).
- Patient status should remain active for Provider Org A.

Consequences:

- Patient should be included in reminder/recalls and assessment reports for Provider Org B.
- Patient should be included in reminder/recalls and assessment reports for Provider Org A.

References:

- Chapter 2: Patient Status Fundamentals
- BR402B. Active status at the provider organization level: 1–M

S503. Provider organization not of an acceptable type

Description:

- A patient has an active status with Provider Org A, where he/she regularly receives vaccinations. The patient received a flu vaccination from Provider Org B, which is a pharmacy. The IIS does not consider Provider Org B (pharmacy) as an acceptable provider organization type.

Status:

- Patient status should remain Active relative to Provider Org A.
- Patient status should be unassigned with respect to Provider Org B. The initial status for a relationship between a patient and a provider organization is unassigned.

Consequences:

- Patient should be included in reminder/recalls and assessment reports for Provider Org A.
- Patient should be excluded from reminder/recalls and assessment reports for Provider Org B.
- Patients vaccinated by a provider organization not of acceptable type are excluded from all assessment reports and reminder/recalls at the provider organization level.

References:

- BR401. Nomenclature of statuses at the provider organization level
- BR402A. Active status at the provider organization level: 1–1
- BR402B. Active status at the provider organization level: 1–M
- Figure 7: Patient status diagrams

ACCEPTABLE PROVIDER ORGANIZATION TYPE

S504. Birth dose submitted by hospital, acceptable type

Description:

- A patient received birth doses of hepatitis B at the hospital. No patient record existed in the IIS prior to the time the dose was reported to the IIS by the hospital. The patient address is within the geographic jurisdiction. The IIS considers the hospital an acceptable provider organization type.

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.

Consequences:

- Patient should be included in reminder/recalls and assessment reports for the geographic jurisdiction.
- Patient should be included in reminder/recalls and assessment reports for the hospital.

References:

- BR412. Active status at the geographic jurisdiction level
- BR402A. Active status at the provider organization level: 1–1
- BR402B. Active status at the provider organization level: 1–M

S505. Birth dose submitted by hospital, not an acceptable type

Description:

- A patient received birth doses of hepatitis B at the hospital. No patient record existed in the IIS prior to the time the dose was reported to the IIS by the hospital. The patient address is within the geographic jurisdiction. The IIS does not consider the hospital an acceptable provider organization type.

Status:

- Patient status at the geographic jurisdiction level (state) should be set to active.
- Patient status should remain unassigned with respect to the hospital. The initial status for a relationship between a patient and a provider organization is unassigned.

Consequences:

- Patient should be included in reminder/recalls and assessment reports for the geographic jurisdiction.
- Patient should be excluded from reminder/recalls and assessment reports for the hospital.
- Patients vaccinated by a provider organization not of acceptable type are excluded from all provider organization level assessment reports and reminder/recalls.

References:

- BR401. Nomenclature of statuses at the provider organization level
- BR411. Nomenclature of statuses at the geographic jurisdiction level
- BR412. Active status at the geographic jurisdiction level

ACCEPTABLE VACCINATION ENCOUNTER TYPE

1–1

S601. Vaccination encounter of an acceptable type: 1–1

Description:

- The patient has an active status with Provider Org A, where he/she regularly receives vaccinations. Patient received a non-seasonal influenza (e.g., H1N1) vaccination from Provider Org B. The IIS uses the 1–1 approach. The IIS considers this vaccination encounter to be one of an acceptable type (not a mass vaccination). The IIS considers Provider Org B as an acceptable provider organization type.

Status:

- Patient status should be set to active for Provider Org B.
- Patient status should be set to inactive: no longer a patient for Provider Org A.

Consequences:

- Patient should be included in reminder/recalls and assessment reports for Provider Org B.
- Patient should be excluded from reminder/recalls and assessment reports for Provider Org A.

References:

- BR402A. Active status at the provider organization level: 1–1
- BR404A. Patient status at the provider organization level: inactive: no longer a patient: 1–1
- Chapter 2: Patient Status Fundamentals

1–M

S602. Vaccination encounter of an acceptable type: 1–M

Description:

- The patient has an active status with Provider Org A, where he/she regularly receives vaccinations. Patient received a non-seasonal influenza (e.g., H1N1) vaccination from Provider Org B. The IIS uses the 1–M approach. The IIS considers this vaccination encounter to be one of an acceptable type (not a mass vaccination). The IIS considers Provider Org B as an acceptable provider organization type.

Status:

- Patient status should be set to active for Provider Org B.
- Patient status should remain active for Provider Org A.

Consequences:

- Patient should be included in reminder/recalls and assessment reports for Provider Org B.
- Patient should be included in reminder/recalls and assessment reports for Provider Org A.

References:

- Chapter 2: Patient Status Fundamentals
- BR402B. Active status at the provider organization level: 1–M

ACCEPTABLE VACCINATION ENCOUNTER TYPE

S603. Vaccination encounter not of an acceptable type

Description:

- A patient has active patient status with Provider Org A, where he/she regularly receives vaccinations. The patient received a non-seasonal influenza (e.g., H1N1) vaccination from Provider Org B. The IIS considers this vaccination encounter not of an acceptable type (e.g., a mass vaccination). The IIS considers Provider Org B as an acceptable provider organization type.

Status (applies to both 1–1 and 1–M):

- Patient status should remain active for Provider Org A.
- Patient status should remain the same with respect to Provider Org B:
  - Unassigned, if patient had no prior relationship (i.e., has an initial unassigned status) with Provider Org B.
  - Active (in 1–M IIS) or inactive (in 1–1 and 1–M IIS) if patient had prior relationship (i.e., some assigned status) with Provider Org B via a vaccination encounter of an acceptable type.

Consequences:

- Patient should be included in reminder/recalls and assessment reports for Provider Org A.
- Patient should be:
  - Excluded from reminder/recalls and assessment reports for Provider Org B if status is unassigned or inactive.
  - Included in reminder/recalls and assessment reports for Provider Org B if status is active (1–M IIS only).

References:

- Chapter 2: Patient Status Fundamentals
- BR401. Nomenclature of statuses at the provider organization level
- BR402A. Active status at the provider organization level: 1–1
- BR402B. Active status at the provider organization level: 1–M

INDIRECT ASSIGNMENT OF STATUS

1–1

S701: Patient demographics received with no address and no vaccination: 1–1

Description:

- IIS received a demographic-only submission from Provider Org A. The IIS considers Provider Org A to be an acceptable provider organization type. A patient address is not provided in the submission. The IIS has never received vaccination data for the patient. The submission does not include patient status. The IIS uses the 1–1 approach.

Status:

- Patient status at the geographic jurisdiction level (state) should be set to unknown: no address, no vaccination.
- If a new patient record is created in the IIS, patient status should be set to active for Provider Org A at the provider organization level.
- If an existing patient record is updated in the IIS, the patient status should remain the same with Provider Org A.

Consequences:

- IIS makes determination whether to include patient in a geographic jurisdiction reminder/recall.
- Patient should be included in geographic jurisdiction assessment reports (unless other methods are used to control for denominator inflation; see Chapter 7, Assessment report at the geographic jurisdiction level).
- If a new patient record is created in the IIS (active status), the patient should be included in Provider Org A reminder/recalls and assessment reports.

References:

- BR402A. Active status at the provider organization level: 1–1
- BR414. Patient status at the geographic jurisdiction level: unknown: no address, no vaccination

INDIRECT ASSIGNMENT OF STATUS

1–M

S702: Patient demographics received with no address and no vaccination: 1–M

Description:

- The IIS received a demographic-only submission from Provider Org A. The IIS considers Provider Org A to be of an acceptable provider organization type. A patient address is not provided in the submission. The IIS has never received vaccination data for the patient. The submission does not include patient status. The IIS uses the 1–M approach.

Status:

- Patient status at the geographic jurisdiction level (state) should be set to unknown: no address, no vaccination.
- Patient status should be set to active at the provider organization level.

Consequences:

- IIS makes determination whether to include the patient in the geographic jurisdiction reminder/recalls.
- Patient should be included in the geographic jurisdiction assessment reports.
- Patient should be included in Provider Org A reminder/recalls and assessment reports.

References:

- BR402B. Active status at the provider organization level: 1–M
- BR414. Patient status at the geographic jurisdiction level: unknown: no address, no vaccination

S703. Patient demographics and historical immunizations, no existing record

Description:

- Provider Org A submits patient demographic information (with a patient address inside the IIS geographic jurisdiction or without address) and historical immunizations. The IIS considers Provider Org A as an acceptable provider type. The submission does not indicate a patient status. The IIS does not have an existing matching patient record.

Status (both 1–1 and 1–M):

- Patient status at the geographic jurisdiction level should be set to active.
- Patient status should be set to active for Provider Org A.

Consequences:

- The patient should be included in geographic jurisdiction reminder/recalls and assessment reports.
- Patient should be included in reminder/recalls and assessment reports for Provider Org A.

References:

- BR402A. Active status at the provider organization level: 1–1
- BR402B. Active status at the provider organization level: 1–M

INDIRECT ASSIGNMENT OF STATUS

S704. Patient demographics and historical immunizations, existing record: 1–1

Description:

- The IIS has an existing patient record with active status for Provider Org A. Provider Org B submits patient demographics and historical immunizations for the same patient. The IIS considers Provider Org B as an acceptable provider type. The submission does not indicate a patient status. The IIS uses the 1–1 approach.

Status:

- Patient status remains active for Provider Org A.
- Patient status remains unassigned for Provider Org B.

Consequences:

- Patient should be included in reminder/recalls and assessment reports for Provider Org A.
- Patient should not be included in reminder/recalls and assessment reports for Provider Org B.

References:

- BR401. Nomenclature of statuses at the provider organization level
- BR402A. Active status at the provider organization level: 1–1
- BR411. Nomenclature of statuses at the geographic jurisdiction level
- Figure 7: Patient status diagrams

S705. Patient demographics and historical immunizations, existing record: 1–M

Description:

- The IIS has an existing patient record with active status for Provider Org A. Provider Org B submits patient demographics and historical immunizations for the same patient. The IIS considers Provider Org B as an acceptable provider type. The submission does not indicate a patient status. The IIS uses the 1–M approach.

Status:

- Patient status should remain active for Provider Org A.
- Patient status should be set to active for Provider Org B.

Consequences:

- Patient should be included in reminder/recalls and assessment reports for Provider Org A.
- Patient should be included in reminder/recalls and assessment reports for Provider Org B.

References:

- BR402B. Active status at the provider organization level: 1–M

INDIRECT ASSIGNMENT OF STATUS

1–1

S706. Patient demographics and historical immunizations, no existing record, not acceptable provider type: 1–1

Description:

- Provider Org A submits patient demographics and immunizations for a patient new to the IIS. Provider Org A is not an acceptable provider type. The submission does not indicate a patient status. The IIS uses the 1–1 approach.

Status:

- Patient status should be set to active at the geographic jurisdiction level if there is no patient address or the patient address is within the jurisdiction.
- Patient status should remain unassigned at the provider organization level.

Consequences:

- Patient should not be included in reminder/recalls and assessment reports for Provider Org A.
- Patient should be included in reminder/recalls and assessment reports at the geographic jurisdiction level.

References:

- BR401. Nomenclature of statuses at the provider organization level
- BR411. Nomenclature of statuses at the geographic jurisdiction level
- Figure 7: Patient status diagrams

DIRECT ASSIGNMENT OF STATUS

1–1

S801. Patient demographics and historical immunizations, existing record: 1–1

Description:

- Provider Org A submits patient demographics and historical immunizations. The submission included an indication of active status. The IIS already has a matching patient record with active status for Provider Org B. The IIS uses the 1–1 approach.

Status:

- Patient status should be set to active for Provider Org A.
- Patient status should be set to inactive: no longer a patient for Provider Org B.

Consequences:

- Patient should be included in reminder/recalls and assessment reports for Provider Org A.
- Patient should not be included in reminder/recalls and assessment reports for Provider Org B.

References:

- P308. Supremacy of patient status explicit assignment
- BR402A. Active status at the provider organization level: 1–1

7

IMPLEMENTATION CONSIDERATIONS

With EDE being the model for the present and future for collection of all immunization-related data, including data used to determine patient status, considerations need to be taken for implementation of many of this guide's recommendations.

7 IMPLEMENTATION CONSIDERATIONS

Although patient status does not directly impact clinical decision support algorithms and thus the vaccinations that are recommended for administration, it does have a direct impact on selection of patients for both reminder/recall and assessments.

With EDE being the model for the present and future for collection of all immunization-related data, including data used to determine patient status, considerations need to be taken for implementation of many of this guide's recommendations.

IIS can maintain patient status in dedicated fields (patient status at the provider-organization level and patient status at the geographic jurisdiction level) or virtually by calculating it every time when it is needed (especially for the geographic jurisdiction level) (P305). The section "Operational-level analysis requirements vs. implementation-level design solutions" in Appendix E: Scope describes various implementation approaches that IIS can use to store and manage information related to determination of patient status.

This section discusses in detail those implementation considerations and is organized as follows:

- MESSAGING PATIENT STATUS
- HANDLING OF PATIENT IN REPORTS (REMINDER/RECALL, PATIENT LISTS)
- OPT-OUT

MESSAGING PATIENT STATUS

Provider organizations submit vaccination events and patient demographic information to IIS via EDE and IIS direct user interface. EDE is the interface through which data can be communicated electronically between a provider organization's system, such as an EHR system, and the IIS.

Electronic messages use Health Level Seven (HL7) specification, which is a nationally recognized standard for EDE between systems housing health care data. HL7 specifications define a syntax, or grammar, for formulating the messages that carry this information and describe a standard vocabulary that is used in these messages. Obtaining and interpreting the information from EDE is not always as straightforward as it should be. Instead of one single field in HL7 to represent patient status, there can be multiple fields that must be considered.

PATIENT STATUS AT THE PROVIDER ORGANIZATION LEVEL

DIRECT IDENTIFICATION

Information about status of a patient at the provider organization level is a part of the overall information on vaccination events and patient demographics submitted by a provider organization to an IIS. It indicates if the provider organization considers itself responsible for that patient's immunizations.

Currently, the National HL7 Implementation Guide (IG) for Immunization Messaging states that fields PD1–16 (Immunization Registry Status) and PD1–17 (date associated with status) should be used to transmit the patient status information.

PD1 is a segment in the VXU (unsolicited immunization update) message; it is required but may be empty (RE). (If there are data, PD1 is required—senders must be able to record it and send it, if populated.) PD1–16 is used by IIS to update the relationship between the patient and the provider organization in the IIS.

The national IG also outlines the standardized set of codes that should be sent in PD1–16. Table 8 demonstrates how the provider organization level patient status categories outlined in this document can be directly coded using the nationally recognized HL7 codes.

Table 8 | *Direct coding of patient status at the provider organization level in HL7 messages*

STATUSES FROM THE HL7 SPECIFICATION, USER-DEFINED TABLE 0441		CLARIFICATION OF PATIENT STATUS CATEGORIES FOR PROVIDER ORGANIZATION LEVEL	
Value	**Description**	**Name**	**Reference**
A	Active	Active	BR402A BR402B
I	Inactive: Unspecified	Inactive: Unspecified	BR406
L	Inactive: Lost to follow-up (cannot contact)	Inactive: Lost to follow-up	BR405
M	Inactive: Moved or gone elsewhere (transferred)	Inactive: No longer a patient	BR404A BR404B
P	Inactive: Permanently inactive (do not reactivate or add new entries to this record)	Deceased (see Note 1 below)	BR421
U	Unknown	N/A	N/A

Notes:

1. When status code "P" is received in an HL7 message, the patient status should not be updated until there is a secondary confirmation of the death, either from the family, practice, or Vital Records or if PID-30 is filled with "Y."
2. Current (as of April 2015) HL7 codes/values for patient active/inactive statuses at the provider organization level presented in the HL7 specification (HL7 Version 2.5.1: Implementation Guide for Immunization Messaging, Release 1.5) are defined according to the 2005 MOGE guide.
3. Reason codes can be handled as sub-statuses of the inactive status (e.g., inactive: no longer a patient; inactive: not acceptable provider type; inactive: lost to follow-up; inactive: unspecified) (BR401).
4. Some EHR systems might not provide a reason for inactive status, using an empty reason or null value instead (BR406).
5. Interfaces should be set up to allow for a provider organization to message patient status for a patient who has become inactive with this provider organization (P304).

In addition to the immunization registry status that can be passed in PD1 above, a separate death indicator can be sent in field PID-30. PID-29 can also be sent that includes the patient's date and time of death. This information in PID-29 is used to change the patient's status at both the provider organization and geographic levels (BR421). The HL7 message should be considered a confirming message from the provider organization.

An IIS program may want to consider turning off reminder/recall notifications if a "P" is received without the PID-30 field filled in with a "Y." The program can investigate the death notification further for confirmation, but it is important to prevent a notification from being sent to a family member if the individual is deceased (BR421).

INDIRECT IDENTIFICATION

In addition to the codes above, patient status for a provider organization can be determined indirectly by the IIS by using data in the RXA (Pharmacy/Treatment Administration). Fields RXA-3 (Date/Time Start of Administration), RXA-9 (Administration Notes), and RXA-11 (Administered-at Location LA2 data type) can also be used to infer which provider administered which immunizations. This information is used differently by IIS that use the 1–1 and 1–M approaches.

RXA-3 is a required field in the HL7 message that indicates the date of the vaccine administration. This information is needed to determine the most recent acceptable vaccine encounter for IIS that use the 1–1 approach. RXA-9 is used to indicate whether the vaccine is newly administered or is a historical record. The record of whether a vaccine is newly administered or historical is used in determining the active status between the patient and provider organization if the 1–1 approach is used by the IIS. See also BR402A, and S704. RXA-11 is used to indicate the clinic or office site where the vaccine was administered. Other IIS enrollment information will be used to then determine whether the site (provider organization) listed in RXA-11 is an acceptable type.

PATIENT STATUS AT THE GEOGRAPHIC JURISDICTION LEVEL

Data exchanged electronically should be used to update patient address information. Patient status at the geographic jurisdiction level can then be determined indirectly from address information obtained from an HL7 message. The HL7 message from a provider organization within the geographic jurisdiction is considered to be a confirmed address. HL7 VXU messages contain a required PID segment with a patient address field PID-11. If the address type is coded P (Permanent) or H (Home), it can be used to determine if a specific geographic jurisdiction is responsible for the patient.

Active status at the geographic level should not depend on a confirmed address only. Business rule BR412 specifies the following conditions for assignment of active status at the geographic jurisdiction level in addition to a confirmed address:

- Residence within the geographic jurisdiction has been confirmed.
- Receipt of an immunization from a provider organization within the geographic jurisdiction and the patient's address is not known (this condition applies only to highest level geographic jurisdiction, such as state or city).

The majority of IIS currently do not have an actual field called "patient status at the geographic jurisdiction level"; however, many IIS derive this status from other data, primarily residence address. Having a separate field (data element) for patient status at the geographic jurisdiction level would represent a more solid implementation approach (e.g., it could provide traceability and history of status changes) (BR411).

The majority of IIS currently do not have an actual field called "patient status at the geographic jurisdiction level"; however, many IIS derive this status from other data, primarily residence address.

In addition, patients with patient status "unknown: no activity for extended period of time" and "unknown: no address, no vaccination" at the geographic jurisdiction level might reflect two sub-populations of individuals: (1) patients who reside in the jurisdiction who have not received vaccinations for a long time or (2) patients who no longer reside in the jurisdiction but have not been identified as non-residents. Ideally, IIS should include patients in the first category in geographic jurisdiction level coverage assessment reports to ensure that assessment reports include the full population and should exclude patients in the second category. However, IIS might not be able to distinguish between these sub-populations. Therefore, it is recommended that IIS include individuals with unknown status in geographic jurisdiction level coverage assessment reports to ensure full capture of the geographic jurisdiction population.

Note that IIS can employ other methods to reduce the impact of biases resulting from the inadvertent inclusion of non-residents in the assessment. For example, IIS can use other reference sources, such as census data, to produce denominators for geographic jurisdiction coverage assessment reports or to perform statistical adjustments to IIS data to produce more accurate estimates of population denominators.

In some cases, based on the purpose of the assessment, an IIS may decide it is inappropriate to include patients with unknown status at the geographic jurisdiction level in the coverage assessment. If patients with unknown patient status are excluded from a geographic jurisdiction assessment, this should be clearly documented.

In some cases, based on the purpose of the assessment, an IIS may decide it is inappropriate to include patients with unknown status at the geographic jurisdiction level in the coverage assessment.

PATIENT STATUS IN ASSESSMENT REPORTS

Keeping patient status history, including dates of changes and reason/entity making the change, would be helpful for assessment reports that are done retrospectively. IIS might consider implementing reports of patients whose information has not been updated over a specific time frame (per age cohort) as well as patients who have an "inactive" status but are receiving immunizations (P304).

ASSESSMENT REPORT AT THE PROVIDER ORGANIZATION LEVEL

Active status is a key factor used to determine if a patient should be included in an assessment report. There are some differences between definitions of active patient status in 1–1 and 1–M approaches (see BR402A and BR402B). Also, as described in section "1–1 and 1–M approaches" in Chapter 2, when the 1–1 approach is used, a patient may be included in assessment reports for only one provider organization at a point in time, and when the 1–M approach is used, a patient may be included in assessment reports for many provider organizations at a point in time. Comparing assessment report data between an IIS using a 1–1 approach and another IIS using a 1–M approach presents statistical challenges. Note that the main focus of the AFIX program is to compare provider organizations within a single IIS. Each IIS should use either a 1–1 or 1–M method consistently. Special investigation methods should be used if the need to compare provider organizations across IIS arises, as there are many other factors beyond use of either the 1–1 or 1–M approach that impact the ability to compare data across IIS.

Hypothetically, in the 1–M approach, a single, principal provider organization responsible for a patient could be selected among many provider organizations by using rules from the 1–1 approach for assigning responsibility. Assigning responsibility to a single, principal provider organization for assessment report purposes in an IIS using the 1–M approach could allow assessment reports to be compared across IIS using 1–1 and 1–M approaches.

IMPLEMENTATION CONSIDERATIONS FOR PRE-ASSESSMENT REVIEW

Pre-assessment activities should include creation of a list of patients who can be related to a provider organization, followed by a review and verification of each candidate patient for inclusion/exclusion in the assessment. Immunization programs may use various ways to develop a list of patients considered for inclusion for the pre-assessment review.

It is possible to support identification and management of such candidate patients through the functionality known in some IIS implementations as association. Some immunization programs may implement the association functionality in an all-inclusive manner with selection of all patients that might be considered as candidates for inclusion in the assessment report for a provider organization; other immunization programs may choose to use a more restrictive approach by including in the pre-assessment review only patients with an active patient status. A provider organization may take time during the pre-assessment activities to review every candidate patient identified via the association functionality and modify patient status for some of the candidate patients; immunization programs may assist in this effort as time allows. Actual inclusion or exclusion of candidate patients in the provider organization's assessment report depends on the patient status for each patient after any adjustments made during the pre-assessment review process. Support for creating and managing a list of candidate patients for the pre-assessment review can be achieved with a variety of implementation approaches using predetermined or ad hoc queries, depending on specific policies and established practices of immunization programs.

ASSESSMENT REPORT AT THE GEOGRAPHIC JURISDICTION LEVEL

Patients with patient status unknown: no activity for extended period of time and unknown: no address, no vaccination at the geographic jurisdiction level might reflect two sub-populations of individuals: (1) patients who reside in the jurisdiction who have not received vaccinations for a long time or (2) patients who no longer reside in the jurisdiction but have not been identified as non-residents. Ideally, IIS should include patients in the first category in geographic jurisdiction level coverage assessment reports to ensure that assessment reports include the full population and exclude patients in the second category. However, IIS might not be able to distinguish between these sub-populations. Therefore, it is recommended that IIS include individuals with unknown status in geographic jurisdiction level coverage assessment reports to ensure full capture of the geographic jurisdiction population.

IIS can employ other methods to reduce the impact of biases resulting from the inadvertent inclusion of non-residents in the assessment. For example, IIS can use other reference sources such as census data to produce denominators for geographic jurisdiction coverage assessment reports or perform statistical adjustments to IIS data to produce more accurate estimates of population denominators.

In some cases, based on the purpose of the assessment, an IIS may decide it is inappropriate to include patients with unknown status at the geographic jurisdiction level in the coverage assessment. If patients with unknown patient status are excluded from a geographic jurisdiction assessment, this should be clearly documented.

OPT-OUTS AND PATIENT PRIVACY

Laws and policies regarding opt-outs and limitations in sharing data vary significantly across registries (P313). Accordingly, there are many different ways in which registries must handle opt-outs and limitations in sharing data, for example:

- Some are required to purge any information once someone opts out.
- Some allow only name and certain minimal demographic information to be stored (so it can be matched if subsequent information is received).
- Some still report all of the patient's immunizations but don't allow provider organizations to access them.
- Some do not create a record for the individual at all.
- Some allow only the IIS to have access to the information, but it is hidden from all others.

Based on local opt-out laws or policies, individuals who have opted out may be included in geographic jurisdiction assessments and reminder/recall. AFIX policies exclude from assessments individuals who have opted out of the IIS.

Adoption is very similar to opt-out. Each IIS will be required to address adoption in accordance with varying state laws and policies, and the mechanism should (but might not be) separate from the patient status mechanism. Some IIS may use the "expanded" patient status concept to deal with adoptions.

Publicity Code. The RE (required but may be empty) PD1 segment contains a publicity code, PD1–11, with RE usage. The code refers to how a person wishes to be contacted for reminder/recall notifications. The code set is in User-defined Table 0215 – Publicity code. This information may be used by the provider organization or geographic jurisdiction to determine additional exclusions from reminder/recall activities or to determine the manner of reminder/recall.

Protection Indicator. PD1–12 is an RE (required but may be empty) field. It identifies whether a person's information may be shared with others by the sending system. "Y" indicates the data are protected and should not be shared. "N" indicates it is not necessary to protect the data and sharing is permissible. How the data are protected is determined locally. See P313, P314.

APPENDICES

APPENDIX A ABBREVIATIONS

ABBREVIATION	FULL VERSION
AFIX	Assessment, Feedback, Incentives, and eXchange
AIRA	American Immunization Registry Association
BR	Business Rule
CDC	Centers for Disease Control and Prevention
EMR/EHR	Electronic Medical Record/Electronic Health Record
DOB	Date of Birth
EDE	Electronic Data Exchange
GJ	Geographic Jurisdiction
HL7	Health Level Seven International
IIS	Immunization Information System
MIROW	Modeling of Immunization Registry Operations Workgroup
MOGE	Moved or Gone Elsewhere
N/A, NA, na	Not Applicable
NCIRD	National Center for Immunization and Respiratory Diseases at CDC
Org	Organization
P	Principle (high-level business rule)
Patient status	Patient Active/Inactive Status
RR	Reminder/recall
SME	Subject Matter Expert
UI	User Interface
VFC	Vaccines for Children
Y/N	Yes/No

APPENDIX B VOCABULARY AND DOMAIN DIAGRAMS

Below are selected terms and definitions used in this guide. For a more complete list of MIROW terms, please see the MIROW Common Vocabulary materials [1.12]. The domain model that illustrates the relationship between these terms is shown in Figure 4 and Figure 5.

Address is the place where a party is located or may be reached.

Administered/Historical Indicator is the state of the association between a vaccination event and a provider organization indicating whether the provider organization administered the vaccination event or is submitting the vaccination event on behalf of another provider organization.

Assessment Report is an account of the degree to which a cohort is immunized according to current recommendations.

Cohort is a group of people who share a common characteristic, such as age.

Contact Method is a manner in which to contact a patient.

Contact Method Primary Indicator is an indicator to denote the primary contact method for a patient.

Contact Method Type is the mode of communication that will be used to contact a patient.

Date of Birth is the birth date of the patient.

Date of Death (DOD) is the date of the patient's death.

Demographic Submission is a submission regarding a patient's demographic information.

Electronic Data Exchange (EDE) is an interface in which data can be communicated electronically between an IIS and another system, such as an electronic health record system.

Geographic Jurisdiction is a physical area identified by a governing authority.

IIS Direct User Interface is a software application that allows a person to enter data directly into or retrieve data directly from an IIS.

Immunization History is a collection of information detailing vaccination events for a patient.

Immunization Information System (IIS) is a confidential, population-based, computerized database for recording information, including vaccination history and vaccine doses given by participating health care providers.

Immunization Program is a public health organization that coordinates public health activities related to immunizations for a geographic jurisdiction.

Patient is a person who is the actual or potential recipient of a vaccine.

Patient Status is an indicator of an organization's accountability for a patient's immunizations.

Patient Status at Geographic Jurisdiction Level is a patient status with respect to an immunization program.

Patient Status at Provider Organization Level is a patient status with respect to a provider organization.

PO Type/Sub-Type is a categorization assigned by an IIS to a provider organization based on a combination of services provided and the cohort served by the provider organization.

Provider Organization (PO) is an organization that has any combination of the following characteristics:

- Provides vaccination services
- Responsible for an entity that provides vaccination services
- Manages inventory for an entity that provides vaccination services

Reminder/Recall Report is a report listing one or more patients with one or more recommended vaccinations due now or in the future.

Residence is a location where a person resides.

Responsible Party is a person responsible for a patient.

Submission is a collection of information sent from an IIS-AO (authorized organization) to an IIS.

Submission Date is the date a submission is received by an IIS.

Vaccination Encounter is an opportunity for one or more vaccination events to occur.

Vaccination Encounter Date is the date of a vaccination encounter.

Vaccination Encounter Type is a kind of vaccination encounter.

Vaccination Event (VE) is a medical occurrence of administering one vaccine to a patient.

Vaccination Event Date is the date of the vaccination event.

Vaccination Event Submission is a submission regarding a vaccination event(s).

Vaccine is a dose of substance administered during a vaccination event.

Vaccine Product Type is a classification that describes the manufacturer and presentation of a vaccine type.

Vaccine Type is a classification of a vaccine that describes the disease to which it provides immunity.

Figure 4 | *High-level domain diagram depicting categories of terms defined in this document*

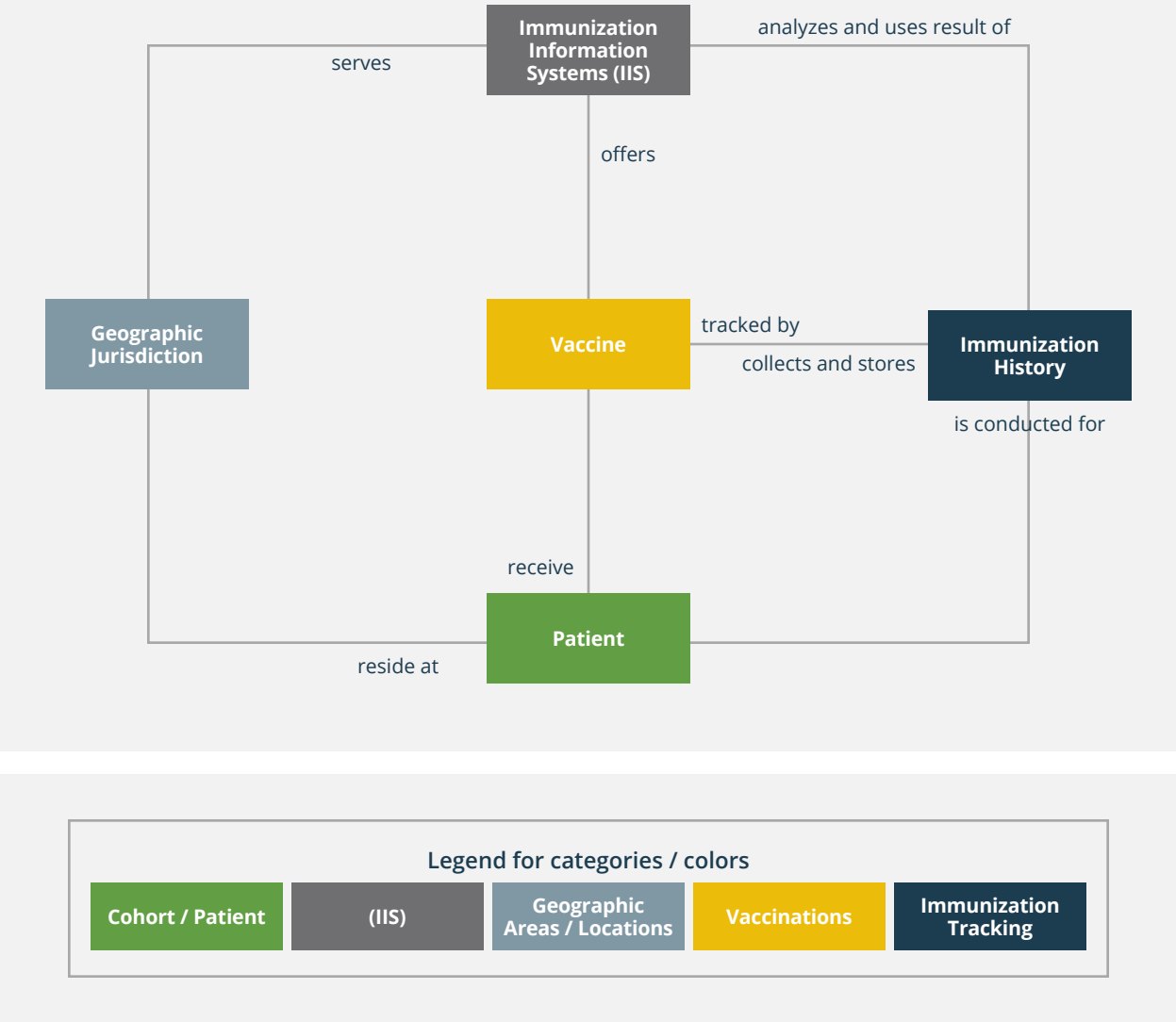
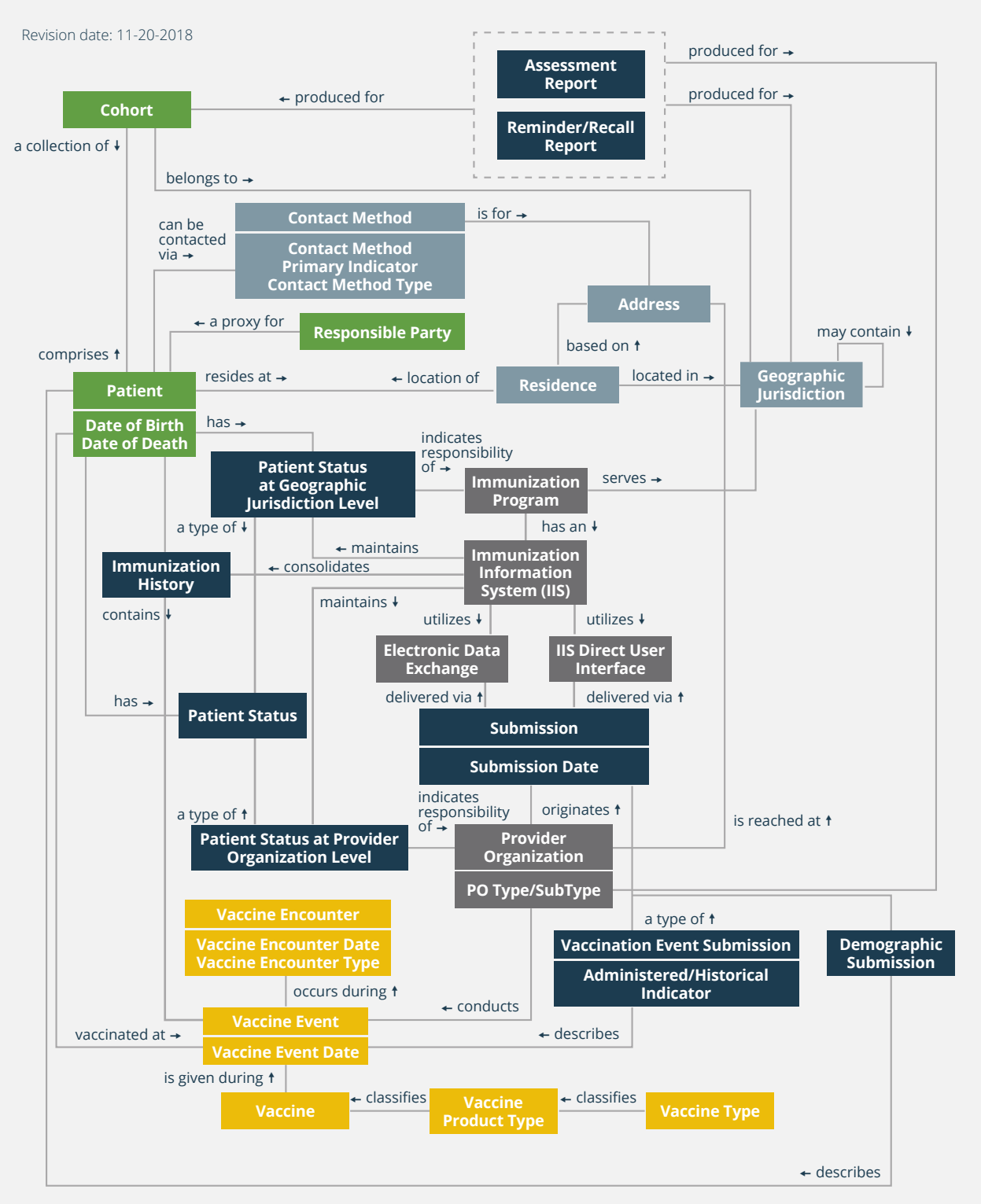


Figure 5 | *Detailed domain diagram depicting relationship of terms defined in this document*



APPENDIX C READING PATHS

The following reading paths represent a minimalistic approach. A curious reader interested in detailed understanding of "who, what, why, where, when" aspects of patient status should read the entire document, starting with the MIROW and the Best Practice Development Process document [1.11].

Program Managers:

- Executive Summary
- Chapter 2: Patient Status Fundamentals
- Chapter 5: Using Patient Status for Reminder/Recalls and Assessment Reports

Immunization Program Staff:

- Chapter 2: Patient Status Fundamentals
- Chapter 4: Patient Status Business Rules
- Chapter 5: Using Patient Status for Reminder/Recalls and Assessment Reports
- Chapter 6: Operational Scenarios
- Chapter 7: Implementation Considerations

Technical Developers:

- Chapter 4: Patient Status Business Rules
- Chapter 5: Using Patient Status for Reminder/Recalls and Assessment Reports
- Chapter 6: Operational Scenarios
- Chapter 7: Implementation Considerations
- Requirements vs. implementation section of Appendix E: Scope
- Appendix B: Vocabulary and Domain Diagrams

APPENDIX D SELECTED REFERENCES

PREVIOUSLY DEVELOPED MIROW GUIDES OR RELATED MATERIALS

For complete list of MIROW materials go to: https://www.immregistries.org/mirow.

CITATION	TITLE	DATE RELEASED
1.1	Management of Patient Active/Inactive Status in Immunization Information Systems	March 2019
1.2	Vaccine Level Deduplication in Immunization Information Systems	Dec 2006
1.3	Data Quality Assurance in IIS: Incoming Data	Feb 2008
1.4	Reminder/Recall in Immunization Information Systems	April 2009
1.5	Immunization Information System Collaboration with Vaccines for Children Program and Grantee Immunization Programs	April 2011
1.6	Immunization Information System Inventory Management Operations	June 2012
1.7	Data Quality Assurance in Immunization Information Systems: Selected Aspects	May 2013
1.8	Lot Number Validation Best Practices (Micro-Guide)	May 2014
1.9	Decrementing Inventory via Electronic Data Exchange	March 2016
1.10	Consolidating Demographic Records and Vaccination Event Records	Oct 2017
1.11	MIROW and the Best Practice Development Process	2019
1.12	MIROW Common Vocabulary	2019

GENERAL REFERENCES

CITATION	TITLE AND URL
2.1	Immunization Information System (IIS) Functional Standards http://www.cdc.gov/vaccines/programs/iis/func-stds.html
2.2	AFIX Program Policies and Procedures Guide for Awardees https://www.cdc.gov/vaccines/programs/afix/downloads/standards-guide.pdf
2.3	IPOM: Immunization Program Operations Manual http://www.cdc.gov/vaccines/imz-managers/guides-pubs/index.html
2.4	VFC Operations Guide http://www.cdc.gov/vaccines/programs/vfc/index.html
2.5	HL7 Version 2.5.1: Implementation Guide for Immunization Messaging, Release 1.5: http://www.cdc.gov/vaccines/programs/iis/technical-guidance/hl7.html
2.6	Epidemiology and Prevention of Vaccine-Preventable Diseases (the Pink Book): Course Textbook http://www.cdc.gov/vaccines/pubs/pinkbook/index.html
2.7	Meaningful Use Definition and Objectives http://www.healthit.gov/providers-professionals/meaningful-use-definition-objectives

APPENDIX E SCOPE

FOCUS

There are many types of associations that could be tracked by IIS. *This document focuses on the status that characterizes associations of individuals/patients with immunization providers and public health authorities related to selecting a cohort for reminder/recalls and assessment reports.* However, other associations and their characteristics (statuses) outside of the scope of this document could be (and are) tracked by IIS.

INTEGRATION WITH OTHER INITIATIVES

Development of this guide was coordinated with efforts to integrate the AFIX program functionality (the provider assessment functions) into IIS. AIRA convened a panel of subject matter experts to develop "AFIX-IIS Integration Operational and Technical Guidance for Implementing IIS-Based Coverage Assessment – Phase 1" (AFIX-IIS panel). This document supports the AFIX-IIS panel's recommendations by defining patient status used to select cohorts for AFIX assessment reports.

INCLUDING (IN SCOPE)

- Patient status definition at the following levels:
  - Provider Organization—health care/clinical level
  - Geographical Jurisdiction—population/public health levels (such as state, city, county, region)
- Establishing status indirectly (i.e., if status information is missing from submissions) based on other data available
- Impact of patient status on immunization coverage assessments
  - Primary: AFIX assessments
  - Secondary: other assessments (e.g., jurisdiction-level coverage: state/county/city/zip code) as time permits
- Impact of patient status on reminder/recall notifications
- All age cohorts: children, adolescents, adults

EXCLUDING (OUT OF SCOPE)

- *The impact of patient status on other areas of immunization programs, beyond selecting a cohort for assessments and reminder/recall,* for example, Vaccines for Children (VFC) profiles of provider organizations as they relate to vaccine ordering and pre-assessment review of candidate patients for AFIX and other assessments. Opt-out from IIS has a much larger (global) scope and is out of scope for this topic.
- Implementation specifics (e.g., design solutions, technology-specific considerations, HL7 v2.5.1 specifications) (see Chapter 7: Implementation Considerations).
- VFC and AFIX programmatic-level recommendations, such as recommendations regarding AFIX coverage assessment, other than directly related to patient status (all other recommendations regarding AFIX coverage assessments are included in the AFIX-IIS Integration Operational and Technical Guidance for Implementing IIS-based Coverage Assessment – Phase 1).
- Data quality considerations, including deduplication (patients are assumed to be deduplicated).

OPERATIONAL-LEVEL ANALYSIS REQUIREMENTS VS. IMPLEMENTATION-LEVEL DESIGN SOLUTIONS

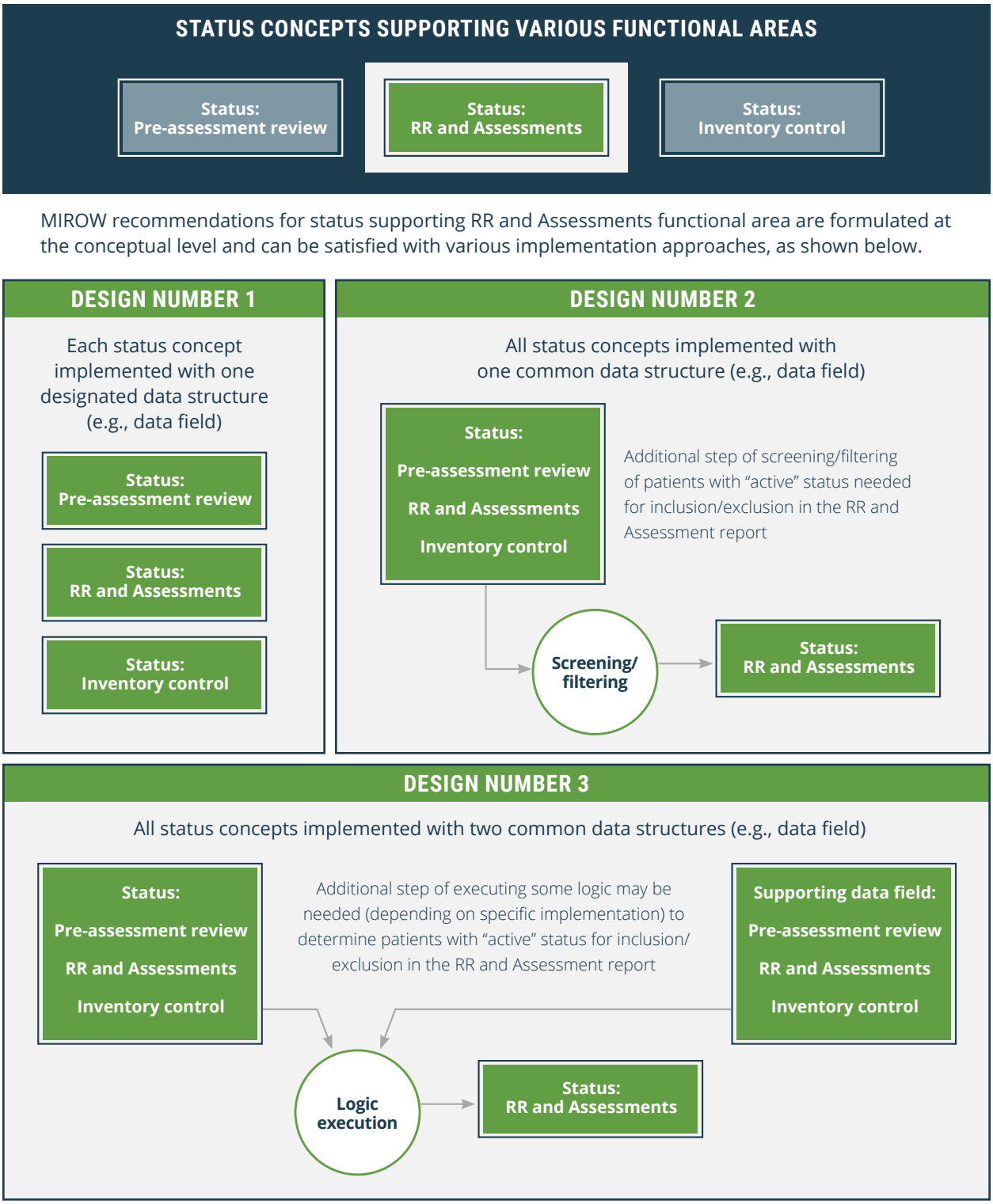
Best practice recommendations described in this document should reflect results of requirements analysis performed at the operational level. Design solutions that an IIS employs to implement the concept of patient status are out of scope for this document. The MIROW subject matter experts do not endorse or recommend any particular implementation-level design over any other design.

A sketch in Figure 6 depicts three functional areas where a patient status concept characterizing associations between patients and provider organizations are commonly employed by IIS:

- Reminder/recall and assessment reports
- Pre-assessment review (evaluation of "candidate" patients for inclusion/exclusion in the cohort for assessment); see section implementation considerations for pre-assessment review in Chapter 7: Implementation Considerations of this guide
- Inventory control (determination of current and future vaccine ordering needs for both provider organizations and immunization programs)

Operational-level recommendations for these functional areas (top part of the sketch) can be satisfied with a variety of implementation approaches (bottom part of the sketch). In principle, each of the three functional areas can be supported with implementation of its own status, designated exclusively for one area (Design No. 1). Some of the existing IIS design solutions "stretch" the patient status concept to support other functional areas, such as pre-assessment review and inventory control, with a single data field that is common for all three areas. Designs No. 2 and No. 3, shown at the lower part of the sketch, illustrate such "expanded" implementation of the patient status. All of these design solutions are capable of supporting best practice recommendations for a "narrowly" defined area of reminder/recall and assessment reports described in this guide. An additional step of screening patients with "broadly" defined active status or execution of additional logic is employed by these implementation solutions.

Figure 6 | *Operational-level concepts vs. implementation-level design solutions*



APPENDIX F PATIENT STATUS DIAGRAM

The diagrams in Figure 7 represent the decision making used to determine patient status.

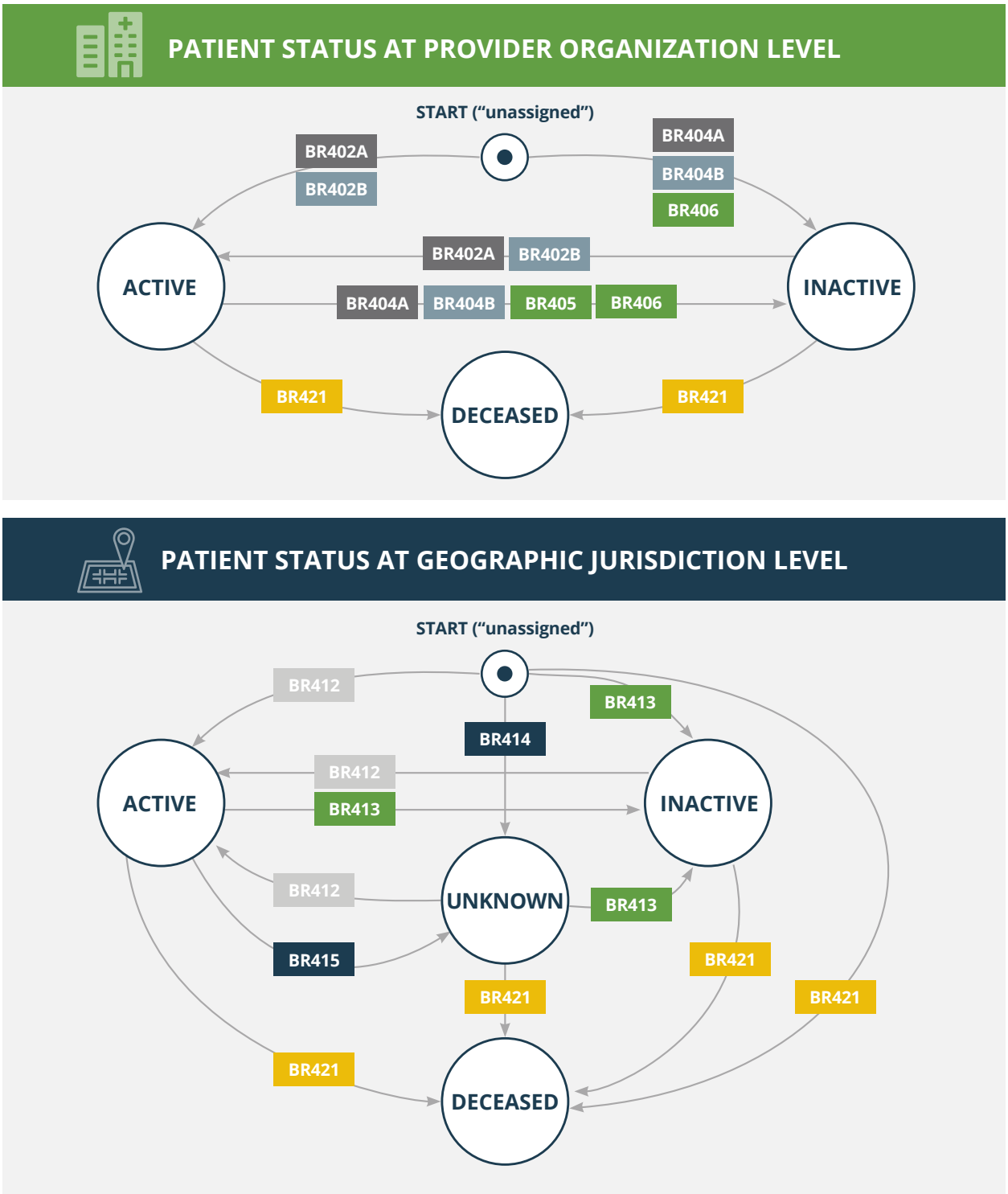
The rectangles in the diagrams represent patient status. The arrows between the rectangles represent the patient's transition from one status to another. The arrows are associated with the business rules used to move a patient from one status to another. These diagrams graphically represent the decision-making process used to change patient status at each level (provider organization or geographic jurisdiction) relative to assessment or reminder/recall.

When interpreting the diagrams, it is often useful to talk your way through each one. For example, when interpreting the diagram "Patient status at the provider organization level" at left, begin at the starting point at the top and move down the left-hand side: If Provider Org A sends demographic and immunization information for an individual to the IIS and identifies that individual as a patient, then business rule BR402A or BR402B would be applied and the status would be set to active with Provider Org A. If contact with the patient is subsequently lost and documented attempts have been made to locate/contact the patient with no response, then business rule BR405 would be applied and the patient may be moved from active status with Provider Org A to inactive status, with the reason code lost to follow-up. However, if the IIS can determine that the patient in question is receiving immunizations elsewhere (BR404A, 1–1 approach), then the patient status may be changed to inactive with Provider Org A, with the reason code no longer a patient.

Assigning a status to a patient should, therefore, be the result of systematically employing the business rules (Table 2) that govern an individual's relationship with a provider organization or geographic jurisdiction.

Note: In Figure 7, the initial status for a relationship between a patient and a party (provider organization or geographic jurisdiction) is "unassigned," meaning that no relationship (with respect to reminder/recall and assessment) between a patient and a provider organization/geographic jurisdiction exists.

Figure 7 | *Patient status diagram*



APPENDIX G ROSTER OF PARTICIPANTS

The following section identifies the list of participants from this MIROW topic.

A (*) denotes contributing members of the Modeling of Immunization Registry Operations Workgroup (MIROW) who also served on the MIROW Steering Committee.

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