PATIENT STATUS IN IMMUNIZATION INFORMATION SYSTEMS

RECOMMENDATIONS AND IMPLEMENTATION STRATEGIES

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AIRA
AMERICAN IMMUNIZATION REGISTRY ASSOCIATION

EXECUTIVE SUMMARY

The focus of this guide is patient status management within the immunization information system (IIS).

The main purpose is to bridge the gap between currently published guidance on patient status and its actual implementation by IIS.[1] As such, this guide offers practical guidelines for providers, public health entities, and IIS to use in implementing and managing patient status. Patient status is a concept that defines responsibility for vaccination of a specific patient at a provider organization or geographic jurisdiction level. 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 vaccination of every patient. 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. 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 is usually responsible for the patient's vaccination, whether through outreach, reminder/recall activities, or actual administration of doses.

Patient status plays a role in determining whom to include in reminder/recall lists and assessments. For example, having the ability to easily exclude patients with a deceased status from a mailed reminder/recall facilitates appropriate mailing and avoids causing distress to the families of deceased patients. Likewise, excluding patients with a status of "outside jurisdiction" or "no activity for extended period of time" can produce more accurate assessment results.

[1] This guide expands upon the published guidance found in the AIRA Modeling of Immunization Registry Operations Workgroup (MIROW) Best Practices Guide, *Management of Patient Status in Immunization Information Systems, Version 3*. https://repository.immregistries.org/resource/management-of-patient-status-in-immunization-information-systems/

There are several challenges to implementation of patient status within an IIS. To determine current practices and barriers, surveys of IIS and electronic health record (EHR) partners and in-depth interviews with IIS staff were conducted. A workgroup of subject matter experts (SMEs) then provided valuable input on their real-life experiences in managing patient status and made consensus-based recommendations included in the guide. One of the major challenges is connected to the growing number of provider organizations that submit data through electronic data exchange (EDE) from EHRs. Currently, there are notable limitations in the ability of EHRs to submit up-to-date patient status information. In addition, manual data entry of patient status often does not fit into a provider organization's workflow yet is necessary, at least until EHRs can provide a solution. This guide presents strategies for IIS to use in assisting providers to find feasible methods for patient status entry. For example, a list of questions related to provider workflow and location of patient status data is offered to help guide discussions with providers. Also, a template for provider guidance is included that IIS can use for educating providers about patient status.

Challenges and recommendations related to IIS functionality, ease of use, implementation, and policy are described for both provider organization and geographic jurisdiction level issues. Although few IIS have implemented geographic jurisdiction level patient status as specific fields in their IIS, many are able to derive needed values from existing data in the system on an ad hoc basis for specific reports. It is considered a best practice to have discrete fields for geographic jurisdiction status. This will help ensure accuracy, consistency, and comparability of reports over time. The guide also describes the importance of getting death data from the local vital records agency on a regular basis and offers practical steps for doing so. A summary of all challenges and recommendations can be found in Appendix G: Summary of Challenges and Recommendations.

A secondary purpose of the guide is to address the issue of denominator inflation experienced by many IIS. This inflation is the result of an expanding number of patient records in the IIS that incorrectly reflect the actual population. Patient status management can provide a tool for more accurate calculations of vaccination coverage rates. The guide describes strategies for IIS population record management, including recommendations for inactivation at the geographic jurisdiction level based on age and length of time since activity on a record.

The primary audiences for the guide include IIS managers, IIS staff, and immunization program staff who work with providers, such as in Vaccines for Children (VFC) and quality improvement work. The document may also be valuable to the Centers for Disease Control and Prevention (CDC) National Center for Immunizations and Respiratory Diseases (NCIRD), immunization program managers, IIS vendors, EHR vendors, jurisdiction-specific information technology staff, national organizations supporting IIS, health care providers, and other partners and policy makers.

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INTRODUCTION

SECTION 1 INTRODUCTION

BACKGROUND

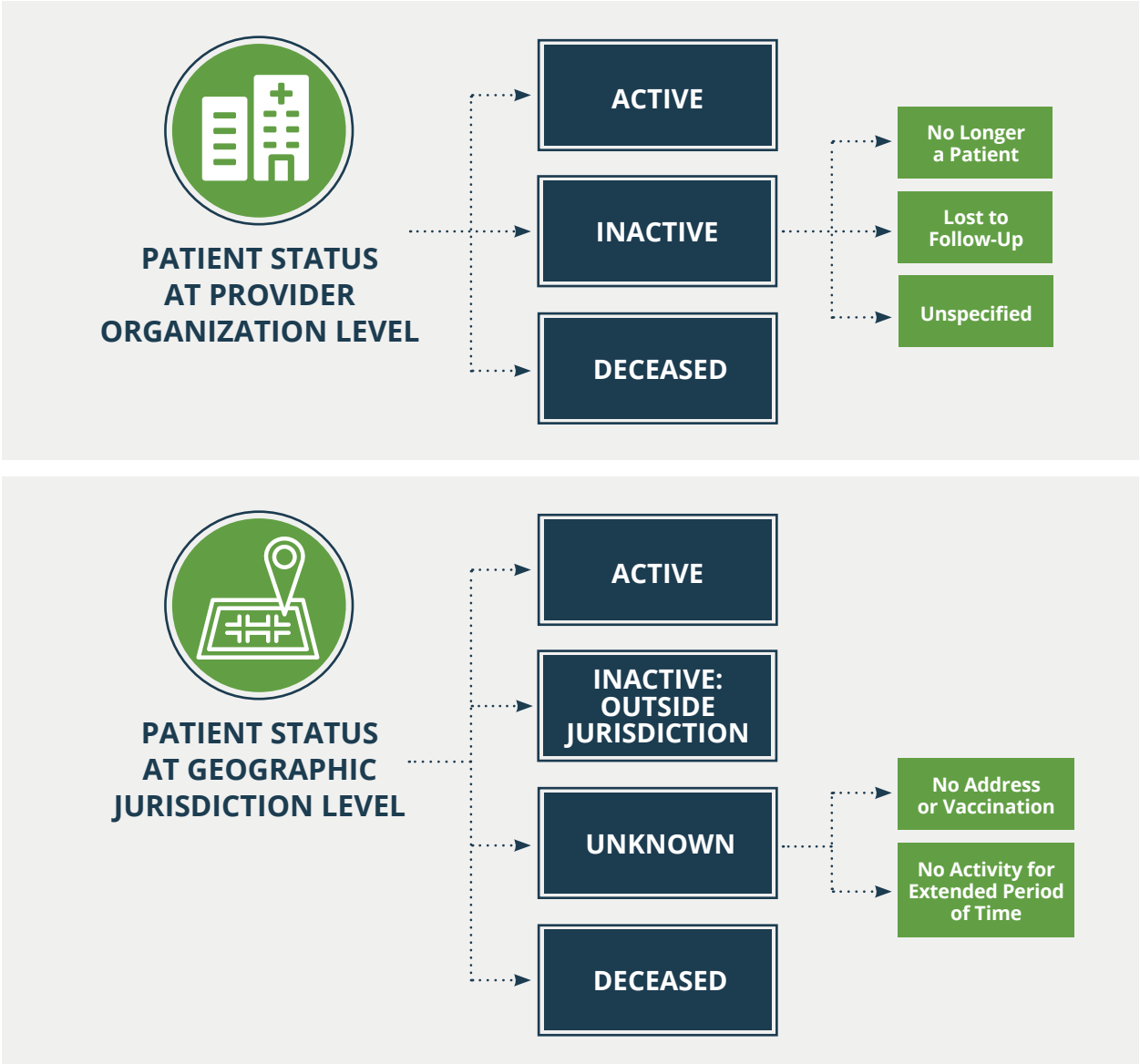
Patient status is a concept used in immunization information systems (IIS) to describe responsibility for the vaccination of a patient at a provider organization or geographic jurisdiction level.

A patient's active status with a provider signifies that the provider is responsible for ensuring the vaccination of that patient. Accordingly, patients with an active status are included in the provider's reminder/recall process and provider-specific coverage reports. At the geographic jurisdiction level, patient status helps local public health entities ensure that patients without a provider receive the vaccinations they need. In addition, geographic jurisdiction level data allows for the production of public health reports, such as community vaccination coverage assessments. The information can be used to ensure complete saturation in an IIS and accurate reporting of vaccination coverage data.

The Modeling of Immunization Registry Operations Workgroup (MIROW) within the American Immunization Registry Association (AIRA) first developed best practice guidance related to patient status in 2005 in a document titled *Management of Moved or Gone Elsewhere (MOGE) Status and other Patient Designations in Immunization Information Systems* (MIROW Patient Status guide).[2] Revisions to the content were made in 2015 and titled *Management of Patient Active/Inactive Status in Immunization Information Systems: Replacement of 2005 Guidelines,*[3] and repackaging of the guide was conducted in 2019, which was then titled *Management of Patient Status in Immunization Information Systems, Version 3* (hereinafter referred to as "the MIROW guide").[4] The MIROW 2019 guide is the guide that should now be used. The MIROW guide identifies several standard patient status designations that IIS are recommended to use when classifying patients at the provider and geographic jurisdiction levels (see Figure 1 for MIROW-defined patient status designations and hierarchy). As identified during this project, the guidance is inconsistently applied within IIS, and many immunization providers and electronic health record (EHR) systems are unfamiliar with the guidance and are not required to follow it.

[2] Guide replaced with 2015 MIROW Patient Active/Inactive Status (PAIS) guide and has been archived.
[3] Management of Patient Active/Inactive Status in Immunization Information Systems: Replacement of 2005 Guidelines. AIRA Modeling of Immunization Registry Operations Workgroup (eds). Atlanta, GA: American Immunization Registry Association. April 2015. https://repository.immregistries.org/resource/management-of-patient-active-inactive-status-in-immunization-information-systems-1/
[4] Management of Patient Status in Immunization Information Systems. AIRA Modeling of Immunization Registry Operations Workgroup (eds). Atlanta, GA: American Immunization Registry Association. Version 3.0. July 2019. https://repository.immregistries.org/resource/management-of-patient-status-in-immunization-information-systems

Figure 1 | *Diagram showing patient status designations and hierarchy defined in the MIROW guide*[5]



[5] Some IIS allow patients to opt out of the IIS and have created functionality that treats opt-out as a patient status. However, laws, rules, and processes vary by jurisdiction. The MIROW Patient Status guide, BR316, states that opting out of IIS should not impact patient status but should be handled as an additional consideration (filter) for selecting a cohort for reminder/recalls and coverage assessments.

The shift from user-interface entry to submission through electronic data exchange (EDE) from EHRs has contributed to a gap in the capture of patient status data. This is at least partly due to inconsistent practices used among IIS and EHRs. EDE also inherently complicates the processing and standardization of the data because there are multiple data fields that can either directly or indirectly impact how patient status is interpreted. Lastly, it is not always clear that the data being submitted through EDE provides the most up-to-date information: EHR-specific workflows can trigger the submitting of data upon certain events at the clinical practice but not all patient events. See Appendix D. EHR Implementation Gaps for more details on EHR implementation gaps. Although the MIROW guide identified best practices for the management of patient status data, additional guidance is needed for uniform implementation and management of this data.

PURPOSE

The primary purpose of this project is to bridge the gap between currently published guidance on patient status and its actual implementation by IIS, with a focus on challenges that can be tackled at both the provider and the geographic jurisdiction levels. Accordingly, this *Patient Status in Immunization Information Systems* guide (hereinafter referred to as "the guide") offers practical guidelines for providers, public health entities, and IIS to use in patient status management. Emphasis is placed on identification of the highest-priority patient status categories as well as practical implementation strategies that reflect the real-world limitations of resources at both the IIS and provider levels.

A secondary purpose of this guide is to address the issue of denominator inflation experienced by many IIS. This inflation is the result of an expanding number of patient records that incorrectly reflect the actual population. Strategies for IIS population record management are described, including recommendations for inactivation at the geographic jurisdiction level based on patient age, time since last vaccination, and other parameters, in order to reduce inflated denominators.

SCOPE OF WORK

The scope of work includes prioritization of patient status categories used at both the provider and geographic jurisdiction level, defining geographic jurisdiction level functionality and how to implement it, and development of a specific strategy at the IIS level to inactivate patient records to address denominator inflation.

Although the MIROW guide defined patient status categories that IIS should use, many IIS either have not implemented all of the 2015 categories or have not made changes to their predefined categories. This guide aims to prioritize which patient status categories should be implemented for core standardized practices across IIS. It will build upon previous guidance to bring clarity to the importance of patient status and provide practical implementation strategies.

The MIROW guide states that an individual should be marked with an "active" status at the geographic jurisdiction level unless a few conditions are met. One of those conditions is when the "IIS has not received information about the individual for an extended period of time." In this case, records can be marked with an "unknown" status with a subcategory (i.e., reason code) of "no activity for extended period of time." However, the 2015 MIROW group was unable to come to a consensus on how to define "extended period of time." This guide will provide more guidance on criteria to use for inactivation of these records.

OUT OF SCOPE

Findings from the initial survey/interview phase of the project revealed that significant gaps exist in the capability to capture and transmit patient status information both from EHRs and in the IIS. EHR workflows, data capture, and data transmission consistency need significant assessment and adaptations. Promotion of changes within the EHR community will need much more collaboration than this project can provide and has been deemed out of scope. For a more detailed synopsis of EHR implementation gaps identified, please see Appendix D. EHR Implementation Gaps.

AIRA leadership recognizes the importance of EDE and IIS-EHR collaboration for this topic. In that light, AIRA plans to explore the potential of another entity to take on a project that brings EHRs, IIS, and providers together to develop standardized workflow practices that best capture patient status data from immunization providers while utilizing standardized patient status designations.

AUDIENCE

The primary audiences for the guide include IIS managers, IIS staff, and immunization program staff who work with providers, such as in Vaccines for Children (VFC) and quality improvement work. The document may also be valuable to the Centers for Disease Control and Prevention (CDC) National Center for Immunizations and Respiratory Diseases (NCIRD), immunization program managers, IIS staff members, IIS vendors, EHR vendors, jurisdiction-specific information technology staff, national organizations supporting IIS, health care providers, and other partners and policy makers.

METHODOLOGY FOR GUIDE DEVELOPMENT

To develop this guide, AIRA implemented a series of surveys, conducted subject matter expert (SME) interviews, and assembled a virtual SME workgroup composed of individuals from the IIS community, CDC partners, public health consultants, American Academy of Pediatrics (AAP) representatives, and AIRA staff (see list of participants in Appendix H. Acknowledgements section).

During the initial phase of the project, existing IIS materials were gathered and reviewed to identify current patient status practices and processes. The results of the surveys and interviews provided a framework for prioritizing issues. Forty IIS out of the 64 IIS awardees (63%) responded to the survey. Representatives of 10 IIS were also interviewed. Seven EHR representatives of seven different EHR products responded to the EHR-specific survey out of 57 individuals contacted from 18 different EHR products. Though few in number, EHR respondents represented five large, well known EHR products and two smaller, lesser known products.

With support from a public health consultant and an AIRA project manager, the workgroup met via telephone from May 2019 through July 2019. The workgroup reviewed materials and developed recommendations for the guide while the consultant drafted and revised the guidelines based on input and feedback from the workgroup and others. Finally, the document was reviewed by AIRA staff, the AIRA board of directors, and the IIS community and then published.

PRIMARY RESOURCE MATERIALS REVIEWED FOR THIS TOPIC INCLUDE:

- AIRA Modeling of Immunization Registry Operations Workgroup (MIROW) Best Practices Guides:
  - Management of Moved or Gone Elsewhere (MOGE) Status and other Patient Designations in Immunization Information Systems, 2005[6]
  - Management of Patient Active/Inactive Status in Immunization Information Systems, 2015[7]
  - Management of Patient Status in Immunization Information Systems, 2019[8]
- HL7 Version 2.5.1 Implementation Guide for Immunization Messaging, release 1.5 and Addendum[9]
- CDC IIS Functional Standards, version 4.0[10]

[6] 2005 Guide replaced with 2015 MIROW PAIS guide and no longer available.
[7] 2015 Guide – https://repository.immregistries.org/resource/management-of-patient-active-inactive-status-in-immunization-information-systems-1/
[8] 2019 Guide – https://repository.immregistries.org/resource/management-of-patient-status-in-immunization-information-systems/
[9] HL7 Version 2.5.1 Implementation Guide for Immunization Messaging, release 1.5, November 2014, and Addendum. July 2015. https://www.cdc.gov/vaccines/programs/iis/technical-guidance/hl7.html
[10] IIS Functional Standards, v4.0. January 2018 https://www.cdc.gov/vaccines/programs/iis/functional-standards/func-stds-v4-0.html

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PROVIDER LEVEL ISSUES

SECTION 2 PROVIDER LEVEL ISSUES

Patient status at the provider level identifies which provider organizations are responsible for vaccination of individual patients.

According to the MIROW guide, active status of a patient with a provider organization indicates that the provider organization has responsibility for vaccination of that patient. In addition, patient status is included in the list of CDC Core Data Elements.[11]

The CDC Functional Standards for IIS stipulate that an IIS must maintain patient status at the provider level and allow an IIS user to update the patient status through the user interface (UI) or via Health Level 7 (HL7) message.[12] Accurate and complete patient status information at the provider level is used to determine which patients to include in the provider organization's own reminder/recall notifications and internal vaccination coverage assessments. High-quality patient status data is especially important for CDC's Immunization Quality Improvement for Providers (IQIP) program, which replaced CDC's AFIX (Assessment, Feedback, Incentives, eXchange) program in July 2019.[13]

CDC core data elements

- **Patient status indicator provider level**
- **Patient status-jurisdiction level**

Patient status designation is important to:

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

[11] CDC. Core Data Elements for IIS Functional Standards v4.0. https://www.cdc.gov/vaccines/programs/iis/core-data-elements.html
[12] IIS Functional Standards, v4.0. January 2018. https://www.cdc.gov/vaccines/programs/iis/functional-standards/func-stds-v4-0.html
[13] CDC. (IQIP) Immunization Quality Improvement for Providers. https://www.cdc.gov/vaccines/programs/iqip/index.html

Standard 11 of the IIS Functional Standards, v.4.0 states:
The IIS manages patient status at the provider organization and jurisdiction levels.

- **11.1 The IIS maintains patient "active" or "inactive" status (PAIS) at the provider site level.**
- **11.2 The IIS assigns PAIS to an individual at one or more jurisdictional levels.**
- **11.3 The IIS user can update PAIS through the user interface or via HL7 message.**
- **11.4 The IIS user can generate a roster of active patients from the IIS for a provider site.**
- **11.5 The IIS assigns PAIS to a patient for a provider site based on information in the IIS.**

Most IIS have a UI that allows providers to view and/or edit the patient status. Occasionally, IIS have additional methods for providers to view and edit patient status, such as via patient lists and reports. These methods offer providers a more efficient approach for managing patient status than individually opening and editing each patient's record. Additionally, almost all IIS are able to automatically assign active status based on the patient's most recent immunization.

To satisfy the HL7 component of this functional standard, IIS should have the ability to accept patient status data through HL7 interfaces. IIS have implemented a mix of strategies for this. Some accept specific patient status data submitted from an EHR through HL7 messages while other IIS derive active status based on a recently administered vaccination without referring to a designated patient status field within an HL7 message. Multiple data fields submitted through HL7 can either directly or indirectly impact the patient status. The fields in an HL7 message that directly identify the patient status and date are PD1-16 and PD1-17, respectively. In addition, there are distinct HL7 fields for the death indicator with date (PID-30 and PID-29, respectively). Indirectly, vaccination encounter data (RXA segment) and opt-out status (PD1-11 and PD1-12) can also be used to infer patient status.[14]

The MIROW Patient Status guide describes three statuses (i.e., active, inactive, and deceased) that should be utilized at the provider organization level, as well as three subcategories of patient status (i.e., no longer a patient, lost to follow-up, and unspecified). See Figure 1 for a visual depiction of the patient status designation hierarchy. The definitions are taken from the MIROW guide.[15]

[14] https://www.cdc.gov/vaccines/programs/iis/technical-guidance/hl7.html
[15] Management of Patient Status in Immunization Information Systems, 2019. https://repository.immregistries.org/resource/management-of-patient-status-in-immunization-information-systems/

PROVIDER LEVEL PATIENT STATUS DEFINITIONS

Active

- Provider organization has directly or indirectly (through submission of vaccination event or new patient demographic record) identified the individual as a patient.staff can account for an increased spike in errors and warnings.

Inactive

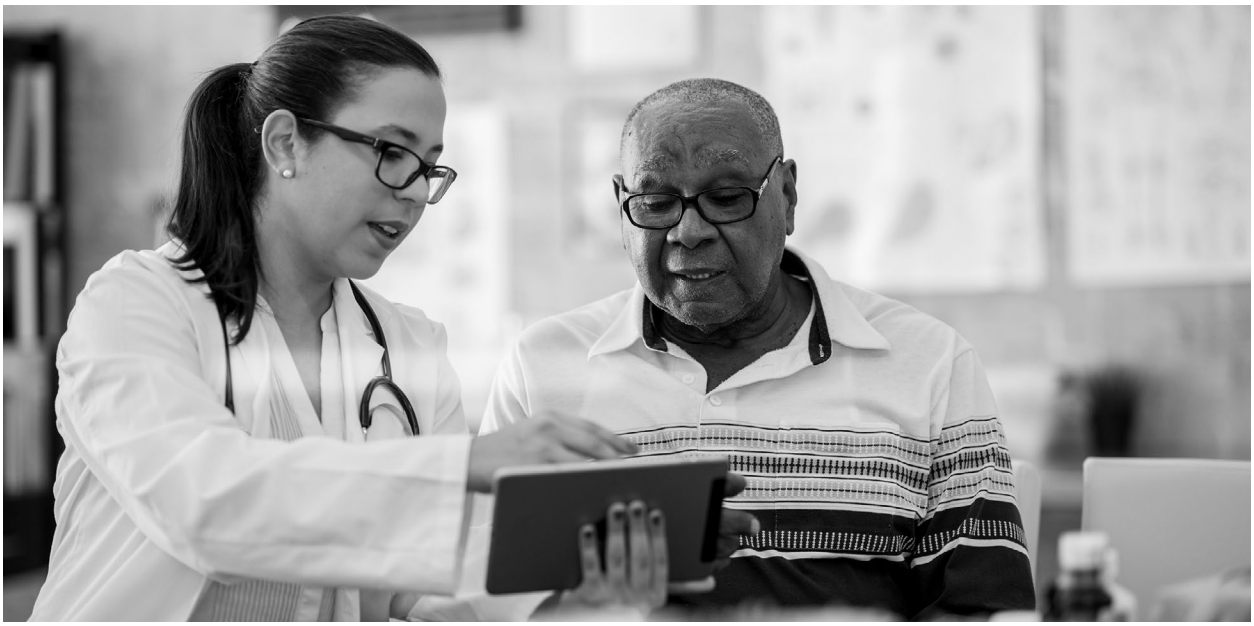
- Provider organization is no longer the responsible party for vaccination of the patient.

Inactive subcategories

- **Inactive - no longer a patient –** Relationship between a provider organization and a patient has been terminated by either party. For example, patient has gone/ transferred to another provider organization or patient has moved out of the area.
- **Inactive - lost to follow-up –** Attempts to contact the patient have been documented, but no documented response has been received or provider organization has no means to contact patient, e.g., no address, no phone.
  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 - lost to follow-up
  and remain active at the geographic jurisdiction level. (In some cases, the provider may have its own guidelines for inactive, and IIS should request documentation.)
- **Inactive - unspecified –** Should be used only by provider organizations that are technically not able to specify a reason, (e.g., they are submitting data via HL7 and do not have the capacity to send the specific reason).

Deceased:

- Patient has died.



CURRENT USE

The IIS survey found that all respondents except one have implemented some degree of patient status tracking (whether in their UI, HL7 interface, or both).[16] Sixty percent reported having all three of the inactive subcategories in their UI, while some include only the generic inactive status. Nearly half of survey respondents indicated they use status designations outside of the latest MIROW recommendations, either based on the original 2005 MIROW nomenclature or on their own IIS-specific terminology. All reported having the status of deceased, though they sometimes use another term, such as inactive - permanently. In some IIS, deceased status is located in a section of the IIS separate from other statuses.

Almost all IIS offer users the ability to view and edit patient status on the UI patient demographic screen. About half offer patient management tools, such as parameter-based patient lists, that make it easier for providers to inactivate patient records. Additionally, most IIS automatically assign active status based on a provider's having administered an immunization to the patient. In many jurisdictions, use of patient status fields by providers is inconsistent. Although 75% of IIS reported that providers edit patient status occasionally or frequently, this activity is usually associated with a

[16] The single IIS without patient status functionality is currently in the process of developing it.

quality improvement visit (e.g., IQIP) and does not occur on an ongoing basis. Many survey respondents indicated a need for clear and simple training materials for providers, especially with regard to status definitions and how to determine them. It is worth noting that some IIS do not allow providers to update the patient status field to deceased, permitting updates only by a vital records source or an IIS level user with special permissions.

The EHR survey provided additional information from the EHR vendor point of view on current capabilities and challenges for the exchange of patient status information. EHRs present considerable variation in functionality and ability for providers to record patient status. Slightly more than half of survey respondents stated there is a distinct field for patient status in both the EHR UI and in the database. The remainder identified (1) the presence of a distinct field in the database not visible in the UI; (2) no distinct field but the ability to derive status from data within the system; or (3) no ability to capture or derive patient status at all.

Among the responding EHRs with a distinct field in the UI, most said provider users can change the patient status. However, one said that change cannot be made at the provider level but requires an edit in the practice management system, not in the EHR.[17] All EHR respondents stated their system captures the patient status of active, and more than half capture inactive - unspecified and deceased. Few capture other subcategories of inactive.

EHR responses varied on both the ability to send patient status and the specific patient statuses currently being sent. Seventy percent said they send active status, and of the ones that capture inactive - unspecified, most send that status to an IIS. Respondents noted a major caveat: patient status is sent only if an administered immunization is also included. None of the respondents indicated they currently send any ADT messages (Admit, Discharge, Transfer), and EHRs rarely send a VXU message without a vaccination event. EHR respondents brought up provider workflow as a major concern

- **ADT messages** are a type of HL7 message used for transmitting demographic-only data, such as patient name, birthdate, address.
- **VXU messages** are a type of HL7 message used for transmitting vaccination event information (i.e., type of vaccination, date of vaccination), along with demographic data.

[17] Practice management systems are a category of medical practice software that captures billing data such as insurance payers and patient demographics and also may perform billing tasks, appointment scheduling, and report generation. An EHR, on the other hand, is geared toward documenting and storing a patient's medical information.

for their ability to input patient status. Many large practices (e.g., hospital systems and multiple facility organizations) have a separate admission/registration process where patient address and other demographic information is captured. This often occurs in a part of the EHR separate from clinical data—or in the practice management system—and is unlikely to trigger an update to the IIS. A provider's interaction with the patient record often includes only clinical information, such as vaccination administration if it occurs. The actual clinician might never have access to updated demographic information during the patient visit.

PROVIDER LEVEL CHALLENGES AND RECOMMENDATIONS

Gaps and challenges in the area of provider level status are related to four main areas:

- IIS functionality
- Provider usage
- IIS need for additional guidance
- Policy/rules regarding deceased data

Specific challenges under each of the four areas are described below, along with recommendations for addressing them.

IIS FUNCTIONALITY

The majority of IIS have some degree of provider level patient status functionality, but it is often limited. For example, the subcategories of inactive status are frequently missing from the IIS user interface (see **Functionality Challenge 1**). A few IIS have well functioning, well used systems for patient status but with status terms that do not always match exactly with the MIROW classifications (see **Functionality Challenge 2**). In addition, IIS tools and processes for providers to manually change patient status may be cumbersome. There is a need for tools that make it easier for providers to update status (see **Functionality Challenge 3**).

FUNCTIONALITY CHALLENGE 1:
Missing patient status categories

Recommendation(s)

All IIS should include, at a minimum, the three main patient status designations: active, inactive, and deceased. Having these patient status categories available is essential for the IIS to produce accurate reports at the provider level. The three inactive subcategories (no longer a patient, lost to follow-up, and unspecified) are desirable but not required. They are nice to have so that providers can document the reason a patient was inactivated and in case the IIS or providers make decisions based on this information.

FUNCTIONALITY CHALLENGE 2:
Variability in patient status nomenclature

Recommendation(s)

Many patient status naming conventions exist across the IIS community. Questions have arisen about the importance of changing terminology to align with the MIROW terms. The project's SME group determined that, as long as terminology variations can be mapped to the minimum recommended patient status designations (i.e., active, inactive, deceased), it is not necessary for IIS to change their nomenclature. For example, an IIS using the designation "MOGE," which historically has been known as "moved or gone elsewhere," can continue to use it, assuming that it can be mapped to inactive or inactive - no longer a patient. Rationale for this recommendation stems from the time it would take to reeducate providers about changes in terminology, as well as potential system costs of the changes, for questionable benefit overall.

FUNCTIONALITY CHALLENGE 3:
Need for efficient status update tools for providers

Recommendation(s)

In order to make patient status easier for providers to manage, it is recommended that IIS automate the updating of patient status wherever possible and create easy-to-use tools to facilitate manual updates. These two strategies are described in more detail below.

Automation of patient status

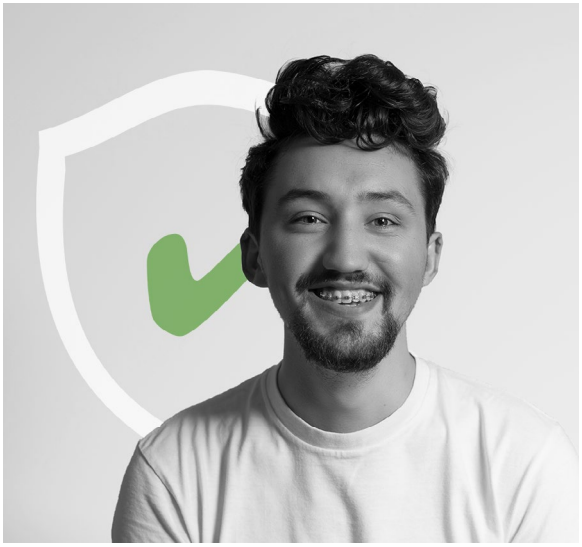
All IIS should have the ability to automatically update a patient record to active when a provider submits a newly administered vaccination event or creates or updates a patient demographic record. For IIS with a 1–Many (1–M) approach, the automatic update to active status will usually occur regardless of whether the vaccination event is administered or historical, recent, or in the past. For IIS with a 1–1 approach, the automatic update to active will usually occur when the vaccination is the most recent vaccination event. Likewise, with the 1–1 approach, the patient's status with the previous provider should change to inactive - no longer my patient when another provider submits the most recent vaccination. On the other hand, the 1–M IIS will usually not automatically change the status to inactive when a second provider submits a vaccination.[18]

In either case, it is essential that patient status of an inactive patient revert to active for a given provider whenever a new immunization record is submitted by that provider, with the exception of deceased patients (discussed in Section 3 under Policy/rules regarding deceased records). This automation of status change should occur for records that are entered both through a direct user interface and through EDE and without forcing the submission of the patient status field itself.

Designation of patient status at the provider organization level differs between IIS with the 1–1 and 1–M approaches.

- **1–1 –** only one provider at a time responsible for each patient
- **1–M –** multiple providers can be responsible a single patient

The MIROW guide's business rules BR402A, BR402B, BR404A, and BR404B detail how the different approaches can be managed.



[18] Management of Patient Status in Immunization Information Systems, 2019. Chapter 3. https://repository.immregistries.org/resource/management-of-patient-status-in-immunization-information-systems/

As stipulated in the MIROW guide's business rules, patient status should not change if a vaccination is administered by an organization that is not of an "acceptable type" or if the vaccination encounter type is not of an "acceptable type." Acceptable provider type is determined by the IIS and generally excludes those that do not conduct reminder/recall or assessment reports (e.g., often schools, sometimes pharmacies). An acceptable vaccination type is one that is indicative of a provider's ongoing responsibility for the patient's routine vaccinations, i.e., vaccinations in the routine schedule defined by the Advisory Committee on Immunization Practices (ACIP). Patient status usually should not be set to active for a mass vaccination event. Examples include flu-only clinics and one-off events, such as the H1N1 clinics in the past. "Each IIS makes its own determination if a vaccination encounter is not of an acceptable type and has unique ways to not associate the patient with the provider of these types of vaccinations."[19]

Multiple patient inactivation reports

IIS should provide tools that allow for easy inactivation of patient records at the provider level. Such tools still require hands-on work by a provider organization but make the work more efficient. Tools can include report or list functions that permit groups of records to be inactivated rather than requiring the selection of each patient individually. A "select all" function is highly desirable. However, IIS should consider the appropriateness of this approach based on the purpose of the inactivation.

Inactivation reports should allow provider organizations to select from a list of their active patients by the following parameters:

- Age or birthdate range
- Last vaccination date (or years since last vaccination)
- Last update of a patient record

[19] Chapter 2. https://repository.immregistries.org/resource/management-of-patient-status-in-immunization-information-systems/

The ability to exclude patients with documented vaccine refusal is helpful to avoid inactivating patients who have chosen not to vaccinate. These reports can be used to prepare for a provider organization's internal review of its patient population's vaccination completeness. Additionally, these reports can be incorporated into the IQIP visit. Inactivation tools and reports should be available to providers regardless of how their data enters the IIS—whether by EHR interface or manual data entry. In addition to the three parameters listed above, it is helpful to offer parameters that allow the selection of manageable groups of patients, such as first letter of last name or the date patient status was last changed. Finally, it could be especially useful for providers to be able to generate lists of patients who have been marked as inactive - outside jurisdiction at the geographic jurisdiction level but who are still active with the provider organization. Such lists would allow providers, including local health department staff, to check their own records to determine if patients have indeed gone elsewhere, bearing in mind that patients may be outside the jurisdiction but still be patients of the provider.

PROVIDER USAGE

Obtaining and entering the patient status in an IIS or EHR is outside the normal workflow for most provider staff. As such, it can be time-consuming, especially since patient status information might not be easily available. With increased use of EHRs nationwide, staff in some practices no longer directly access the IIS on a regular basis. It may be challenging for the IIS to ask provider staff to change their normal workflow to include entering patient status-related data into the IIS. In addition, even when willing, these staff might not have access to the needed information in their own EHR or other internal systems. Often, staff with appropriate permissions to modify (or even view) EHR demographic data are limited to those with admission-like roles, not those providing direct patient care. These factors mean that significant changes in established workflow may need to be made in order for staff first to access their system's patient demographic information and second to enter the relevant data in the IIS. One approach that has seen success in some areas is incentivizing providers to improve their vaccination practices and coverage rates. Health plans and other immunization partners in the community have created incentives, financial or otherwise, to engage providers in improving their vaccination coverage rates. This strategy may prove advantageous to getting patient status data into the IIS (see Provider Usage Challenge 1).

PROVIDER USAGE CHALLENGE 1:
Entering patient status in an IIS is outside the normal workflow for provider staff

Recommendation(s)

Workflow and IIS usage at each practice vary significantly, making it hard to offer specific recommendations. Nonetheless, until more EHRs send patient status updates, IIS should continue to encourage providers to take the time to manually enter patient status or update addresses when address changes are known. Since their patients automatically default to active based on data entered or updated, the focus for providers should be on identifying patients who are no longer active at their provider organization. This may mean exploring with provider staff best strategies for accessing appropriate information in their EHRs. As part of onboarding and ongoing check-ins with providers, IIS should strongly recommend that designated provider staff be assigned IIS user accounts for the purpose of overall quality control. In addition to checking for import and export errors, these staff can be asked to compare their IIS active patient lists to their internal system list and to update records accordingly.

To ease the burden of additional work and provider staff time, IIS may want to explore partnerships with other immunization-related organizations that may offer support for these efforts. Engaging with local chapters of the American Academy of Pediatrics (AAP), health plans, and immunization action coalitions may lead to creative solutions to the resource challenge.

In discussions with provider organization staff, it may be helpful to ask about access to demographic information. Staff designated as responsible for entering patient status in the IIS might be:

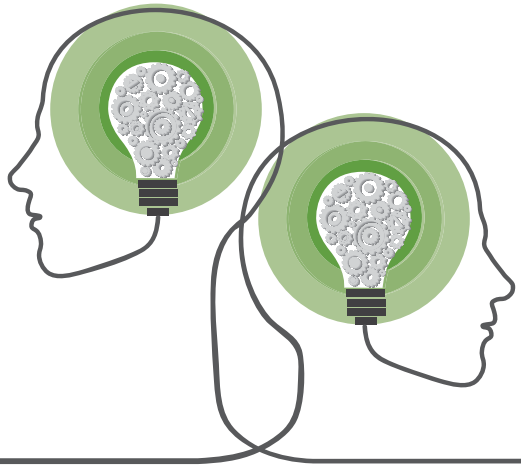
1. Members of the clinical staff who have access to patient demographic information in the practice management or EHR system
2. Administrative staff outside of the provider's office who deal with patient demographics on a regular basis
3. Admissions or medical record staff responsible for responding to medical record requests and updating patient status in the EHR

The following questions can then be used to help provider staff identify how best to enter the data into the IIS:

1. Do patients usually notify the provider when they are moving out of the area or to a new provider?
    a. If so, is there a procedure for recording them as inactive in the EHR or elsewhere?
    b. If a patient mentions it during a medical visit, does the provider have a place to record the information?
2. How is the information processed? Where is it recorded?
3. Medical record requests can be an indication that the patient has moved:
    a. How are medical record requests handled?
    b. By whom?
    c. Where are medical record requests recorded?
    d. Is a record request ever used to indicate in the EHR that the person is no longer a patient?
    e. Are there ways to determine if it is a temporary "away-from-home" situation, not a permanent move?
4. Is there a place in the process where it makes sense for the IIS to be updated?

IIS NEED FOR IMPLEMENTATION GUIDANCE

IIS staff have identified a need for provider level guidance that is clear, concise, and easy to understand. Specifically, they requested information that will help providers understand how, when, and why to inactivate patients in the IIS (see Additional Guidance Challenge 1).



ADDITIONAL GUIDANCE CHALLENGE 1:
Need for provider level guidance

Recommendation(s)

AIRA has developed a one-page template for IIS to use with providers (see Appendix E. Template for Provider Guidance on Patient Status Management) that highlights the importance of patient status and can be used alongside training materials. The basic information in the template can be included in instructions to providers about the use of the patient status field. The intent is to provide a short, easy-to-understand explanation of patient status and management. Each IIS should adopt the wording to fit its own situation and terminology and can add instructions for changing patient status in the IIS. The template includes:

- Definitions of patient status categories in clear, easy-to-understand language
- Why it is important to keep patient status updated
- When to update patient status

POLICY/RULES REGARDING PROVIDER ENTRY OF DECEASED DATA

- For more information on geographic policies on deceased data see **Policy/rules regarding deceased records** in **Section 3**.

Having accurate and timely death data is important both to maintain accurate information in the IIS and to avoid mailing reminders to families of deceased individuals. Some IIS do not allow providers to change patient status to deceased (see Deceased Records Challenge 1), and some IIS limit providers' ability to view records with a status of deceased. The primary reason for limiting provider access to this information is concern about confidentiality and privacy. Such concern may result from rules put in place by the jurisdictional vital records department. More information about death data best practices is provided in the geographic jurisdiction section.

DECEASED RECORDS CHALLENGE 1:
Allowing providers to enter death data

Recommendation(s)

It is a best practice to allow providers to change a record status to deceased. This should be allowed both through manual data entry and through EDE. Even with successful vital records exchange, not all deaths occur in-state, so not all death events will be received from the vital records office. In some cases, providers may have the information before the vital records data is received. In order to ensure timely and complete entry of deceased status, it is important to offer multiple paths for the data to come into the IIS, such as through both providers and vital records feeds. A date-of-death field should be available in the UI but should not be required for the manual entry of a deceased status. Providers may learn of a death from a trusted member of the family or from another provider, who does not know the date of death. The importance of recording the death outweighs the importance of having the date. It should be noted that the HL7 Implementation Guide does require additional information confirming a death and this is not a recommendation to change that rule. Requiring two fields for EDE helps avoid inadvertently marking thousands of records as deceased due to a coding error. Entry errors through the UI (i.e., manual data entry one record at a time) would likely affect only a single record and thus carry significantly less risk. Nonetheless, IIS can minimize possible user error by offering one of these two strategies in their systems:

- Provide a "pop-up" dialog that warns users they are about to mark a patient as deceased for the entire IIS and asks if they are sure they want to do this. Such a feature can serve as an added safeguard or double-check on the status change.
- For those that remain concerned about allowing a provider to mark a record as deceased, the IIS could provide an interim step that allows a provider to flag a record without changing the status. The flag then prompts review/confirmation by IIS staff. Automatically withholding these provisionally deceased records from reminder/recall activities should be considered until the official death record is received or until another vaccination is added. In addition, a security level could be available that allows only approved provider users to enter death data.

3

GEOGRAPHIC JURISDICTION LEVEL ISSUES

SECTION 3 GEOGRAPHIC JURISDICTION LEVEL ISSUES

Patient status at the geographic jurisdiction level identifies how the IIS classifies patients with regard to the public health jurisdiction's responsibility for their vaccinations.

According to the CDC Functional Standards, IIS should assign patient status at one or more jurisdictional levels.[20] From a public health perspective, it is important to maintain the status of a patient at both provider and geographic levels to ensure there is always a party responsible for the vaccination of every patient.[21] If a patient lives within a geographic jurisdiction and does not have active status with any provider organization, then the public health authority where the patient resides is usually responsible for ensuring that patient's vaccination, either directly or indirectly. This function of public health is often known as "the safety net."

Few IIS have implemented all of the recommended patient status categories defined at the geographic jurisdiction level within MIROW guide. However, many IIS are able to derive the needed values from existing data in the system in order to produce assessments and other reports. Patient status at the geographic jurisdiction level should be assigned only by the IIS or IIS-approved parties and should not be editable through the provider UI or EDE. However, it could be helpful to provide functionality that captures out-of-state addresses at the time of data entry or shortly thereafter, in order to flag it at the geographic jurisdiction level.

[20] https://www.cdc.gov/vaccines/programs/iis/functional-standards/func-stds-v4-0.html
[21] https://repository.immregistries.org/resource/management-of-patient-status-in-immunization-information-systems/

The MIROW guide describes five statuses (active, inactive - outside of jurisdiction, unknown - no address/no vaccination, unknown - no activity for extended period of time, and deceased) that should be utilized at the geographic jurisdiction level. (See Figure 1 for a visual depiction of the patient status designation hierarchy).[22] The MIROW guide also stipulates that a patient's status should remain active at the 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.

GEOGRAPHIC JURISDICTION LEVEL PATIENT STATUS DEFINITIONS

Active

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

Inactive - outside jurisdiction

The individual does not reside in the geographic jurisdiction.

Unknown - no address, no vaccination

The IIS has never received an address and has never received vaccination information about the individual.

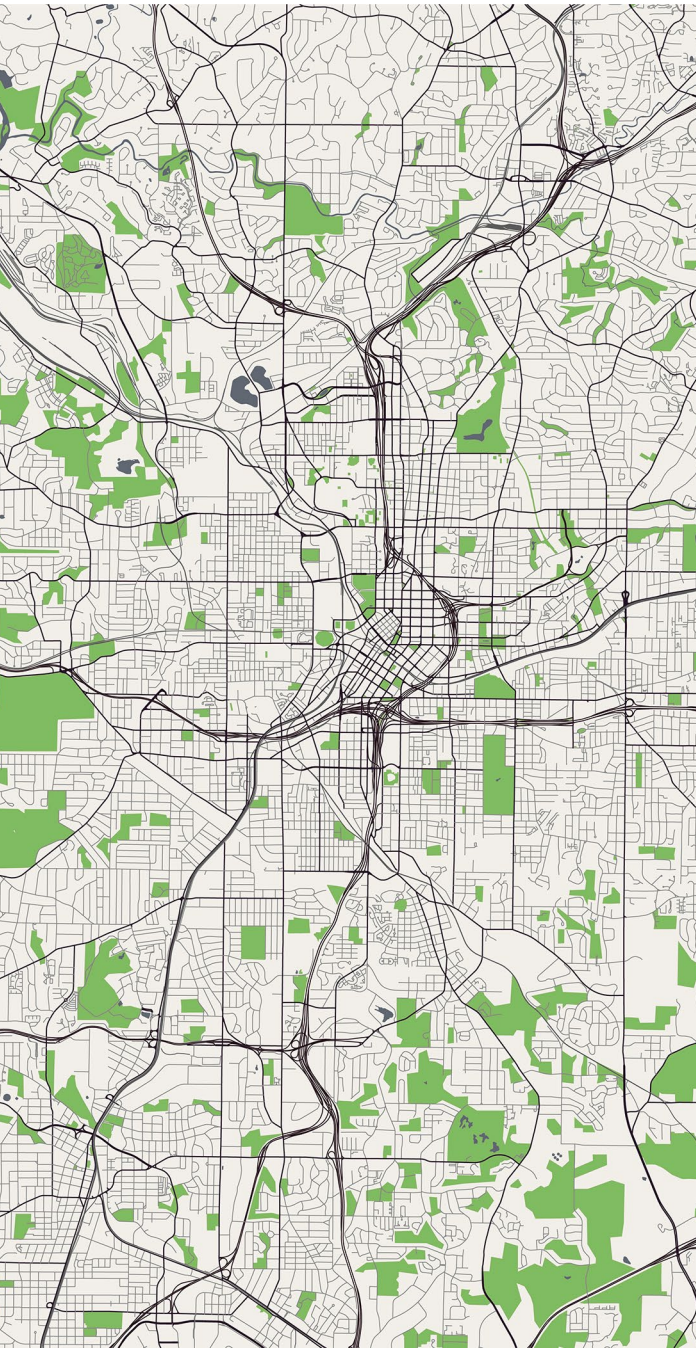
Unknown - no activity for extended period of time

The IIS has not received demographic and/or immunization information for a patient for an extended period of time.

Deceased

Patient has died.

[22] See the 2019 MIROW Guide, BR 412, 413, 414, and 421



CURRENT USE

The IIS survey found that 25% of IIS have no designated fields for geographic jurisdiction level patient status. In the absence of these fields, and with a need to run geographic-based reports, survey respondents reported deriving some values from existing data, such as patient address, vaccination history, or provider level patient status. About 60% of IIS have active status available—which is sometimes the only geographic jurisdiction status available in the IIS. Some IIS have both active and deceased patient statuses available but no others. Less than half include the status of inactive - outside jurisdiction, despite the high value of this information. Only 20% said they have one or both of the unknown subcategories. All reported having the status of deceased, though they sometimes use another term, such as “inactive - permanently.”

As echoed in the responses to provider-level status questions, many IIS have geographic status designations that vary from the latest MIROW recommendations—either based on the original 2005 MIROW nomenclature or on their own IIS-specific terminology. They question the need to change the terminology they are using.

Thirty-six percent use address data to update geographic jurisdiction level patient status. Of those that do, a few mentioned the value of using address cleansing and address correction services, such as United States Postal Service (USPS), SmartyStreets,[23] and other geocoders. Although acquiring deceased records from vital records offices is a best practice, not all IIS are able to do so. As for the actual use of geographic jurisdiction level patient status where it is available, less than half of IIS reported that all patient statuses in the IIS were used. Although not all IIS recognized a need for geographic jurisdiction level patient status as a distinct data element, most would like to implement it and expressed an interest in more information on its benefits and uses as well as the need for more guidance on how to implement its use.

GEOGRAPHIC JURISDICTION LEVEL CHALLENGES AND RECOMMENDATIONS

Gaps and challenges in geographic jurisdiction level status relate to three main areas:

- IIS functionality
- IIS need for implementation guidance
- Jurisdictional level policy

Specific challenges under each of the three areas are described below, along with recommendations for addressing them.

[23] AIRA. IIS Reintegration of Cleansed Addresses and Geocodes. September 30, 2018. https://repository.immregistries.org/resource/iis-reintegration-of-cleansed-addresses-and-geocodes/

IIS FUNCTIONALITY

There are two primary gaps related to functionality in geographic jurisdiction level status. First, a significant number of IIS lack all or most patient status categories and subcategories at this level (see Functionality Challenge 1). Second, IIS use a variety of terms for the geographic jurisdiction status designations (see Functionality Challenge 2).

FUNCTIONALITY CHALLENGE 1:
Missing patient status categories

Recommendation(s)

All IIS should include, at a minimum, the patient status designations at the geographic jurisdiction level of active, inactive - outside jurisdiction, and deceased. Having these patient status categories available is necessary to produce accurate reports at the geographic level. The SME workgroup determined that the two unknown categories (no address/no vaccination and no activity for extended period of time) are highly desirable but should not be viewed as required at this time. The unknown categories are especially helpful when running coverage assessments and reminder/recall, as they assist public health to identify patients to include and exclude in outreach and follow-up. It should be noted that, without the unknown categories, patients will remain as active at the geographic jurisdiction level until they are known to have moved outside the jurisdiction or known to be deceased.

FUNCTIONALITY CHALLENGE 2:
Variability in patient status nomenclature

Recommendation(s)

Many patient status naming conventions exist across the IIS community. Questions have arisen about the importance of changing terminology to align with the MIROW terms. The project's SME group determined that, as long as terminology variations can be mapped to the minimum recommended patient status designations (i.e., active, inactive - outside jurisdiction, deceased), it is not necessary for IIS to change their nomenclature. For example, an IIS using the designation "permanently inactive" can continue using this term, as long as it can be mapped to "deceased." However, IIS in the process of developing geographic jurisdiction level functionality for the first time are encouraged to use the standard terms as currently defined in the MIROW guide.

IIS NEED FOR IMPLEMENTATION GUIDANCE

Not all IIS recognize the value of geographic jurisdiction status functionality. Some survey respondents requested details on benefits and prioritization justification (see Implementation Guidance Challenge 1). Some also identified a lack of adequate guidelines and guidance for implementing and managing patient status at the geographic jurisdiction level. Interest is high for practical strategies on how to obtain relevant data, such as "out of jurisdiction" address information, and how to use the two unknown statuses when conducting reminder/recall and assessment. Specific topics of interest covered below include:

- Benefits of patient status at geographic jurisdiction level (see Implementation Guidance Challenge 1)
- Implementing a distinct data field for patient status (see Implementation Guidance Challenge 2)
- Determining and designing the appropriate hierarchy of geographic jurisdictional levels in the IIS (see Implementation Guidance Challenge 3)
- Implementing strategies for obtaining the most accurate and up-to-date address, e.g., out-of-state (see Implementation Guidance Challenge 4)
- Establishing rules for classifying patients as unknown - no activity for extended period of time (see Implementation Guidance Challenge 5)
- Determining which statuses to include when running reminder/recall and assessment reports (see Implementation Guidance Challenge 6)

IMPLEMENTATION GUIDANCE CHALLENGE 1:
Benefits of patient status at geographic jurisdiction level

Recommendation(s)

Understanding the benefits of this functionality is an important first step to adopting it. Some of the benefits to maintaining a discrete geographic jurisdiction level status include the ability to:

- Produce more accurate coverage assessment reports at the geographic jurisdiction level
- Facilitate age appropriate reminder/recall information mailings
- Identify those patients active at the geographic jurisdiction level but not at the provider level for safety net service by public health
- Meet national functional standards
- More easily produce certain reports, such as the Immunization Information System Annual Report (IISAR)

This level of functionality allows IIS reports to easily exclude out-of-jurisdiction, deceased records, and those with no activity for an extended period of time, without evaluating all patient records every time a report is needed. Sharing the benefits with IIS and immunization program staff, including decision makers, may be helpful in promoting the development and use of this functionality.[24]

[24] It should be noted that, at the time of this guide's publication, CDC requires the inclusion of "no activity for an extended period of time" in the IISAR coverage assessments.

IMPLEMENTATION GUIDANCE CHALLENGE 2:
Implementing a distinct data field for patient status

Recommendation(s)

IIS should have a distinct field designating geographic jurisdictional level patient status for each patient record. Having a separate field (i.e., data element) for patient status at the geographic jurisdiction level enables traceability and the ability to view patient status changes.[25] Reports, such as coverage assessments, can then easily be tailored to specific needs, including or excluding certain patient status designations.

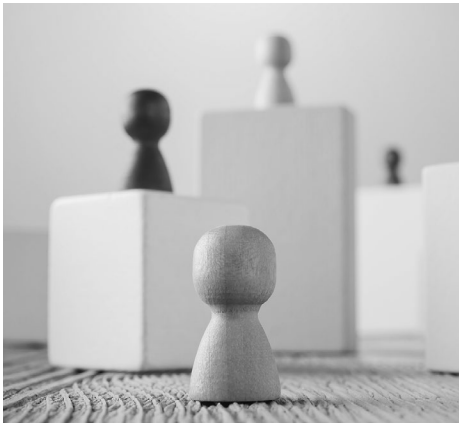
For IIS that face major barriers or delays to implementing this functionality, status may be maintained virtually by calculating it whenever it is needed. In this situation, the definitions provided here and in the MIROW guide should be used every time a report is run. Each report should include a clear statement of its parameters and definitions. Although this implementation methodology is acceptable, it is not recommended due to the time it may take some IIS to process this type of calculation (i.e., days for some IIS) because it depends on the number of patient records being analyzed.

IMPLEMENTATION GUIDANCE CHALLENGE 3:
Determining and designing the appropriate hierarchy of geographic levels in the IIS

Recommendation(s)

At a minimum, the IIS should capture patient status at the highest level of the geographic jurisdiction covered by the IIS (e.g., the state, city, county, or territory). Additional levels are used by some IIS and are based on the organizational structure and roles of public health within the IIS coverage area. For example, a statewide IIS may have additional tiers of public health, such as city or county, depending on how public health is organized in that specific state.

[25] See BR 411 in the MIROW guide.
https://repository.immregistries.org/resource/management-of-patient-status-in-immunization-information-systems/



Maintaining patient status at lower geographic jurisdictional levels can be useful to assist public health with its safety net functions and to facilitate vaccination coverage assessments and reminder/recall. Assessment done at these more granular levels can help to identify pockets of need, monitor local coverage rates over time, and provide valuable information for prioritizing resources. In some states, patient status is so well integrated into their IIS that status at the provider level affects a variety of geographic jurisdictional level reports and functions. For example, a patient who is no longer a patient at the provider level would not show up on provider reports for reminder/recall but would show up on geographic jurisdictional level reports, as follow-up then falls to the jurisdiction. In determining how to structure the geographic jurisdiction levels in an IIS, IIS staff should think ahead to the ways that patient status can support various IIS and public health functions. It may be helpful to consider the following:

1. The organizational and geographic structure of the public health authority within the jurisdictional area of coverage.
2. The role of public health as a safety net in the geographic jurisdiction, with attention to these specifics:
    a. Does public health at any level—state, county, city, or other—have a responsibility for follow-up of individuals without an immunization home (i.e., patients who are not active with any provider)? If yes, what are those geographic jurisdiction levels?
    b. Do local public health entities administer vaccinations, i.e., function as a vaccination provider?
3. The need to run coverage reports specific to public health units (areas) within the overall coverage area.
4. Based on the answers to the above questions, is there a public health need the IIS can fill to assist with these functions?

It may be helpful to look at how other IIS have set up their structure and functionality to meet their specific jurisdictional and environmental needs. An example of how one IIS has designed its structure is provided in Appendix F. Examples of geographic jurisdiction structure.

IMPLEMENTATION GUIDANCE CHALLENGE 4:
Implementing strategies for obtaining the most accurate and up-to-date address (e.g., out-of-jurisdiction addresses)

Recommendation(s)

A proven method for obtaining updated addresses for IIS patient records is the United States Postal Service (USPS) National Change of Address (NCOA) service.[26] NCOA is a secure pre-mailing process that allows mailers to submit name and address data to attempt to match to a change-of-address record to find a new address. Third-party vendors are often involved in assisting IIS with the address submission process. Use of NCOA helps IIS to identify persons who have moved out of the jurisdiction within the previous 48 months. Another tool available through the USPS is its Address Correction Service (ACS), which is a post-mailing process that determines the correct disposition of a mail piece and generates address correction back to the mailer. As there are differences in the matching processes used by NCOA and ACS, IIS need to carefully consider which best meets their needs. Updating addresses in this way can ensure that mailings go to the correct households and can help with IIS deduplication efforts and geographic-based vaccination coverage analysis. Improved address quality may help to reconcile the denominator of patients in the IIS with the actual census population by identifying individuals who have moved out of the jurisdiction. It is especially effective when combined with a public health function such as reminder/recall mail campaigns. Several IIS have used NCOA and ACS for reminder/recall mailings to specific age groups, such as 19- to 35-month-old and 11- to 12-year-old patients.[27]

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[26] Woinarowicz, M. Conducting Statewide Recall Using the NDIIS. Presented at AIRA National Conference, 2015, and personal communication with Ms. Woinarowicz, NDIIS Manager. February 14, 2018.

[27] For examples, see Appendix F of AIRA's IIS Data Quality Practices: To Monitor and Evaluate Data at Rest. https://repository.immregistries.org/resource/iis-data-quality-practices-to-monitor-and-evaluate-data-at-rest/

Address cleansing is a related component of improving address data quality. Address cleansing focuses on standardizing and validating addresses to conform with USPS requirements. It does not, by itself, provide person-specific information on address correctness. For best results, it is used in conjunction with the NCOA and/or ACS. SmartyStreets[28] is an example of one address cleansing service that is currently available to AIRA members.[29] There are costs involved in using address cleansing and address correction services. Expenses include contracting with the USPS or third-party vendors, postage costs when doing mailings, and the cost of developing the capacity to export import data files. However, offsets to the cost include improved mailing success by avoiding sending to invalid addresses, decreased cost of unnecessary postage, and discounted USPS bulk mailing rates.

IMPLEMENTATION GUIDANCE CHALLENGE 5:
Establishing rules for classifying patients as unknown - no activity for extended period of time

Recommendation(s)

Section 4. IIS Population Management includes a community consensus-based approach on when records can be considered unknown - no activity for extended period of time. Parameters to support such rules include patient age, length of time since last vaccination, and record last edited date.

[28] https://repository.immregistries.org/resource/iis-reintegration-of-cleansed-addresses-and-geocodes/
[29] IIS Reintegration of Cleansed Addresses and Geocodes Issued on September 30, 2018 by AIRA. https://repository.immregistries.org/resource/iis-reintegration-of-cleansed-addresses-and-geocodes/

IMPLEMENTATION GUIDANCE CHALLENGE 6:
Determining which statuses to include when running reminder/recall and assessment reports

Recommendation(s)

The utility of patient status designations becomes clear when examining their actual application to certain IIS activities. Specifically, vaccination coverage assessments and reminder/recall activities can be tailored to a specific need by using patient status as a filter. Typically, vaccination coverage assessments and reminder/recall at the geographic jurisdiction level will include all patients with a status of active and exclude all with inactive - outside jurisdiction or deceased status. However, the decision to include those with one of the unknown statuses is a little more complicated and is discussed below under the respective activities of reminder/recall and assessment.

Reminder/recall

Patients with the status of unknown - no address/no vaccination necessarily will be excluded from a mailing campaign but might be included for telephone follow-up if a contact number is available. On the other hand, the decision to include the status of unknown - no activity for extended period of time depends on various factors, such as the age range targeted, whether previous attempts to contact have been made, and the risk of reaching a deceased person's home. The mailing and printing costs of including those more likely to be unreachable needs to be weighed against the potential benefit of reaching individuals who just need a nudge to get vaccinated. The decision to include the "no activity" group also may depend on whether or not the IIS plans to use an address correction service and on potentially getting a new address for a patient (but only if a move has taken place in the preceding 4 years).

Vaccination coverage assessments

With any assessment, it is important to ascertain the purpose in order to determine the rules for inclusion/exclusion. Consistency over time with the rules and parameters used will make it easier to track change. The guidelines outlined in Section 4. IIS Population Management offer a consensus-based approach on when records can be considered unknown – no activity for extended period of time. Although the SME workgroup agreed each IIS should be allowed to determine when to include or exclude the unknown – no activity patient records for vaccine coverage assessments, at a high level it was recommended that these records be excluded from geographic jurisdiction level assessments.

POLICY/RULES REGARDING DECEASED DATA

Not all IIS get deceased records from Vital Records. Local rules, laws, and policies play a role in this. Yet it is important for IIS to have a system that accurately flags deceased patients. This is critical when it comes to sending reminder/recall notices in order to avoid causing family distress upon receiving notice for a deceased person, especially a child. Recording deceased status is also important for maintaining the IIS denominator at a reasonable approximation of the actual population.

Many IIS have implemented data exchange systems for death data with their vital records departments and routinely receive electronic data. Others have been unsuccessful in this effort due to technical or legal barriers (see Deceased Records Challenge 1). Some IIS encourage providers to enter deceased status for their patients who have died, although there is variation in whether date of death is required. A few IIS do not allow providers to enter death data at all (for more details, see Section 2. Provider Level Issues).

When death data is received whether by manual input, HL7 feed, or vital records source, there is significant variation in how such records are handled by IIS. Some completely remove deceased-patient records from their systems while others keep the record but limit viewing to IIS level users with special permission. Still others maintain the full record as viewable by all. At a minimum, keeping the record available on the back end facilitates reactivation if an error is discovered. It is also useful for running reports for periods prior to a patient's death (see Deceased Records Challenge 2).

A deceased status entry at the geographic jurisdiction level should always promote to the provider level and vice versa.

DECEASED RECORDS CHALLENGE 1:
Obtaining death data from vital statistics office

Recommendation(s)

It is a best practice for IIS to have a regular, ongoing process for receiving death data feeds from the vital statistics program or agency. Below are a few suggestions to achieve this recommendation.

- Become familiar with your state or geographic jurisdiction's regulations for the sharing of data. Work with your vital statistics office. Most states base their own rules on The Model State Vital Statistics Act, which allows for the sharing of vital statistics data with government entities through information sharing agreements, although there are caveats and confidentiality and privacy requirements.[30]
- Contact other IIS that have successfully developed death data exchange processes.
- Once approval is obtained, start small to learn the best ways of managing the data and the match process. Get batch loads for past data, determining time ranges to get the data in chunks. Be aware that sometimes the demographic identifiers may be limited, making it difficult to match records.
- Download data files regularly. Real-time data feeds from Vital Records are ideal; a minimum frequency of weekly loads of death data is desirable.

[30] National Association for Public Health Statistics and Information Systems (NAPHSIS) is the national nonprofit organization representing the state vital records and public health statistics offices in the United States, which has produced The Model Act.

DECEASED RECORDS CHALLENGE 2:
Handling of patient records after status changed to deceased

Recommendation(s)

It is a best practice to retain the full patient record for deceased patients in the IIS, as long as this complies with applicable local policy and law. It is also advisable to allow providers to view the record and enter administered vaccinations for a limited period of time after the death. Alternatively, the IIS may choose to "lock" a record so no further editing can occur, in which case providers should be advised to contact the IIS if additional data needs to be entered or in case the wrong patient has been marked. It is not advisable to allow a new vaccination to automatically change patient status from deceased to active, because this could incorrectly and inadvertently result in a deceased patient receiving a reminder notice. Instead, providers should be instructed to contact the IIS to discover if the wrong record has been marked as deceased or if the vaccination is being attributed to the wrong patient. IIS-level staff should have the ability to change a status from deceased back to active. Some IIS may choose to have a report available at the IIS level that lists all patients changed to deceased status by providers. While it may not be feasible for IIS staff to review all changed records, a list could provide a way to do spot-checking.

4

IIS POPULATION MANAGEMENT

SECTION 4 IIS POPULATION MANAGEMENT

Many jurisdictions have experienced an ever-expanding number of patient demographic records in the IIS due to births and migration into the geographic jurisdiction, without a corresponding removal of records for those who are deceased or moved out of the jurisdiction.

This is commonly referred to as “denominator inflation” and means that the number of patient records in an IIS are not reflective of the true population. This often results in coverage assessment results that are lower than actuals and makes it difficult to compare to other quantitative assessments. Given the challenges to obtaining updated address information, there is a need to look for other ways to compensate for data that includes patients no longer residing in the jurisdiction.

As noted earlier in the guide, a patient can be marked unknown at the geographic jurisdiction level if there is no activity for that patient for an extended period of time. However, specific numeric recommendations have not been available that define how long that time period should be. This guide now lays out a community consensus-based approach on when records can be considered unknown - no activity for extended period of time, based on parameters that include age and length of time since last vaccination or record edit.



CURRENT USE

Some IIS have developed and conducted processes to identify groups of patients who have not had any activity for extended periods of time. These processes are often referred to as mass inactivation. Ten IIS survey respondents identified one or more such processes conducted by their organization currently or in the past. Some of the processes have occurred at the provider organization level and some at the geographic jurisdiction level. Most have been performed in an ad hoc manner in response to specific situations, while a few are done on a regular basis. The majority of efforts target the adolescent population.

Examples of ad hoc processes used by IIS to move patients to an "inactive" status (status that eliminates patients from certain reports):

- At IIS level:
  - Inactivated records with only one submission that were from a specific health plan no longer in existence, with no vaccinations, no provider submissions, and inadequate demographic data to match other records (upon discovery of thousands of records of suspect quality and no way of following up)
- At provider request:
  - Inactivated records of patients over 24 years of age for pediatric providers (for provider level patient status)
  - Inactivated out-of-jurisdiction patients based on a list from a provider
- Examples of routinely conducted inactivation processes related to age and record or vaccination activity:
  - 13–17 years of age – if no vaccination within last 5 years
  - 11–12 years of age – if no vaccination within last 7 years
  - 0–18 years of age – if no vaccination within last 8 years
  - All ages – if no activity on record in past 10 years
  - All ages – address data run against the USPS National Change of Address system; any address updated to out-of-state are inactivated at geographic jurisdiction level
  - Age over certain number of years (i.e., expected maximum life span, typically set by IIS at 110–115 years of age) inactivated at geographic jurisdiction and provider level

RECOMMENDATIONS AND IMPLEMENTATION STRATEGIES

In developing recommendations for inactivation of records in the IIS, consideration must be given to the level of maturity of an IIS in regard to the completeness of its data, as well as its capture of records for different age groups. The local role of public health in conducting follow-up activities for patients with no provider should also be considered. Instead of referring to these patients as inactive, we defer to the MIROW status term of "unknown - no activity for extended period of time." The high-level assumptions listed below must be built into any processes that result in patients being moved to the "unknown - no activity" status.

HIGH-LEVEL ASSUMPTIONS

- Patient records at any geographic jurisdiction level status are eligible for a change in status to unknown - no activity for extended period of time, except those with a status of either inactive - outside jurisdiction or deceased.
- Assigning of unknown - no activity status is independent of any provider level status. Patients could have an unknown - no activity status at the geographic jurisdiction level while still having an active status at the provider level.
- Provider organizations (health care providers and public health agencies that administer vaccinations) have a responsibility to actively call back their patients for vaccinations, e.g., using reminder/recall. Although IIS would like to receive outcome data on the results of reminder/recall efforts, it is not always feasible. For example, when a provider learns that a patient has moved out of the area and will no longer be seen by them, the updated address and/or change in patient status at the provider level might never be sent to the IIS via EDE since no further vaccinations will be administered by the provider.
- It is reasonable to base the assigned period of no activity on a combination of factors such as maximum patient age for the cohort and the earliest age recommended for the previous vaccine dose series.
- The definition of "activity on a record" includes edits to the demographic or vaccination record, documentation of vaccine refusals, as well as recording of vaccinations, but excludes query-only activity

General recommendations:

- **IIS should offer the ability to record vaccine refusal.**
- **Providers should record vaccine refusals or deferrals.**
- **Documented deferrals should count as activity on a record.**

CHALLENGES/RECOMMENDATIONS PER AGE GROUP

Each age group below presents its own challenges, and recommendations have been made accordingly. For the under 18-year-old population, the following formula for each age group was used to determine the maximum interval since last receipt of a vaccination per the ACIP routine schedule:

Maximum interval formula:

Maximum age of a child in the cohort minus the earliest age they could have received last set of recommended vaccines = maximum interval

Example of 7 through 10 years of age: oldest child in cohort is one day before 11th birthday; youngest age they could have received previous set of vaccine doses is 4 years. The difference is 7 years.

AGE GROUP: 6 YEARS AND UNDER

Multiple vaccines are administered at frequent intervals to children who are 6 years of age and under. This makes it difficult to come up with a reasonable period of time that constitutes "no activity." Given the number of non-vaccinator parents, as well as children in the catch-up vaccination schedule, the risk of inappropriately removing a child from an active status at the geographic jurisdiction level is high using the interval method. Doing so could eliminate members of this vulnerable population from follow-up efforts. Thus, it is not recommended to use this method to change status for the 6 years of age and under group.

Recommendation(s)

Do not apply any mass changes to patient status based on no activity for extended period of time to the birth through 6 years of age population, unless there are special or extenuating circumstances which make it appropriate.

AGE GROUP: 7–10 YEARS OF AGE

Children who are up to date with vaccines when they reach 7 years of age do not usually receive any vaccines in the next 4 years, with a few exceptions such as flu vaccination. Using the formula described above for this age group, with a maximum interval of 7 years, we look back 7 years to identify children with no activity or vaccination during that time. Thus, for children exactly 7 years of age, we look for those with no vaccinations or activity since birth; for a child a day short of 11 years old, we look for no activity since age 4. This retrospective look for vaccinations includes the prime age groups for vaccination of birth to 2 years old and 4 to 6 years of age. Those in the "no activity" group are likely to include non-vaccinators as well as those who are truly lost to follow-up. As discussed in the 6-year and under age group above, it is usually preferable to take no action and simply allow this group to age into the next cohort, where inactivation rules are more appropriate.

Recommendation(s)

Do not apply any mass changes to patient status based on no activity for extended period of time to the 7- through 10-year age group population unless there are special circumstances that make it appropriate. If deemed appropriate, a reasonable time frame to apply may be 7 years. If the 7-year time frame is applied, it is important to make sure the inactivated records do not get automatically reactivated when aging into the 11- to 18-year age group through application of that age group's inactivation rules.[31] However, records should be automatically converted back to active once a record update/vaccination is received by the IIS.

[31] With an inactivity time frame of 7 years for 7- to 10-year-olds, an inactivated child could age into the 11- to 18-year-old age group and not meet the longer 10-year inactivity rule. Without a substantiating new vaccination, there is no reason to think the status has changed, and thus it should remain as inactive.

AGE GROUP: 11–18 YEARS OF AGE

Most IIS today have been in operation for 10 years or more, and the 11- through 18-year age group is prone to denominator inflation. For this age group, there has been more time for unidentified duplicates to be created, as well as inadequate documentation of patients who have moved out of the jurisdiction. In addition, fewer school-required vaccinations for this age group can result in fewer updates to IIS records, including address corrections. Once they've turned 11 years of age, however, patients in this age group should begin to receive several vaccines, such as meningococcal, HPV, and Tdap booster. For these reasons, some IIS have chosen to focus inactivation efforts on this age group.

For 11- and 12-year-olds, the earliest dose of the previous recommended set of vaccines would have occurred on the fourth birthday. Subtracting 4 years from the age of the oldest member of group, one day short of 13th birthday, yields an inactivity window of 9 years to examine. For 13 through 18 years of age, the earliest dose of the last recommended set of vaccines would have occurred on the 11th birthday. Subtracting 11 years from the age of the oldest member of this group, one day short of the 19th birthday, yields an inactivity window of 8 years to examine. For ease of application, both age groups can be considered together, 11 through 18 years. With a year added for a slightly more conservative interval, and to be in sync with the adult recommendation, an inactivity window of 10 years can be applied.

Recommendation(s)

Use 10 years since last activity on a record for the 11- through 18-year age group for changing status to unknown - no activity for extended period. A slightly less conservative approach, i.e., affecting fewer individuals, could also be considered: using an 8-year time frame for the 11 through 12 years of age population and a 9-year time frame for the 13 through 18 years of age population. If the 8- and 9-year intervals are selected by the IIS, as noted above in the 7- to 11-year-old section, it is important to make sure that the 11- to 12-year-olds do not get automatically reverted to active when aging into the 13- to 18-year age group. Rather, records should be automatically converted back to active once a record update/vaccination is received by the IIS.

AGE GROUP: OVER 18 YEARS OF AGE (ADULTS)

There is considerable variation in the degree to which IIS are populated with adult records. While some IIS are underpopulated for adults, older IIS that have included adults for more than 20 years now have an excess of adult records. In addition, the quality of data for adult records may be poorer than that for children, especially for demographic data, because of the decreased frequency of record updates and consequent degradation of data accuracy. Compounding the problem is the reported lower quality of adult demographic data because of the variety of provider types administering adult vaccinations. Some IIS report that clinics, such as stand-alone clinics (e.g., for flu), are sometimes unable to provide complete and accurate demographic data. This makes it difficult to match a patient with existing records in the IIS, resulting in multiple fragmented records for a single patient.

Another factor to consider is the role of public health and the actual amount of intervention used to find adult patients who are past due for vaccinations. Some public health jurisdictions play a very active role in reminder/recall efforts and have protocols in place that require continued search for patients who are past due. In these circumstances, an IIS may consider implementing a shorter period of time with no activity, knowing that efforts have been made to reach the patients. If the IIS is able to track the number of reminder/recall attempts, they can also use the results to inactivate records. In conversation with health plans and providers, one IIS determined that 3 years is commonly used as an appropriate period of no activity for adults when outreach has been unsuccessful.[32]

Recommendation(s)

Use 10 years since last activity on a record for the 19 years and above population for changing status to unknown - no activity for extended period. In specific situations, a 3- to 5-year period may be considered, primarily when lacking valid address data. For example, a record with flu vaccine only, in combination with incomplete address data, may be subject to a 3-year period only. A record with a vaccine type in addition to flu, but still lacking good address data, may be subject to a 5-year period of no activity.

[32] MCIR, Region 1. Verbal communication. Wendy Nye. 7/22/19.

IMPLEMENTATION PROCESS FOR CHANGES TO STATUS OF UNKNOWN - NO ACTIVITY FOR EXTENDED PERIOD

Following are some steps to take as you determine the proper course of action for implementing a process to inactivate, i.e., change patient status to unknown - no activity for extended period of time.

STEP 1 MAKE THE DECISION TO IMPLEMENT AN INACTIVATION PROCESS

When to apply parameters to change patient status at the geographic jurisdiction level depends on several factors that include:

- The maturity of the IIS in terms of how long an IIS has been collecting data and how complete the records are for the age groups under consideration. For example, if the IIS has been collecting birth data since 2001, then the oldest child in the IIS through birth records would be 18 years of age in 2019. With the addition of child records from other sources over the 18-year period of time, the IIS may have a considerable inflation of this age group (through unmatched duplicates and through out-migration).
- Familiarity with data so that when comparing the numbers in each age group to census data any anomalies can be explained.
- Data quality—for example, extent of incomplete or missing demographic data.
- Level of outreach being done at the geographic jurisdiction level and how public health functions as a safety net for the population.

STEP 2 DETERMINE PARAMETERS TO USE

Refer to the recommendations for status change by age group discussed above. Select the age groups of interest based on knowledge of your data. If possible, select a very small cohort for an initial query and then manually review records that would be affected. If unsure about your data, err on the conservative side with longer time periods recommended. Balance ensuring the safety net functions of your public health system with the practicality of continuing to include unreliable records of poor data quality (probable duplicates) in your IIS. Be sure to include recording of patient refusal and exemptions as activity on a record. This will help to pick up (and avoid inactivating) non-vaccinators. Look at dates of any updates to both vaccination and demographic records.

STEP 3 DECIDE ON METHOD FOR PRODUCING STATUS CHANGE

Should an inactivation report be accessed via a user interface at the IIS level or through a script to be run on the back end? Having a configurable report, available to certain IIS-level staff, will allow the user to adjust parameters and compare results without needing technical support every time a report is desired.

STEP 4 DETERMINE FREQUENCY OF PROCESS

The IIS should determine the frequency of conducting the process based on its own business needs. Considerations for the timing and frequency include the number of manual processes required and the time it takes for the IIS database to process large scripts. Running such a process too frequently could be unmanageable or a strain on the system. Annually may be a logical and reasonable period of time, especially if it coincides with recurring reporting periods, such as annual IIS reports.

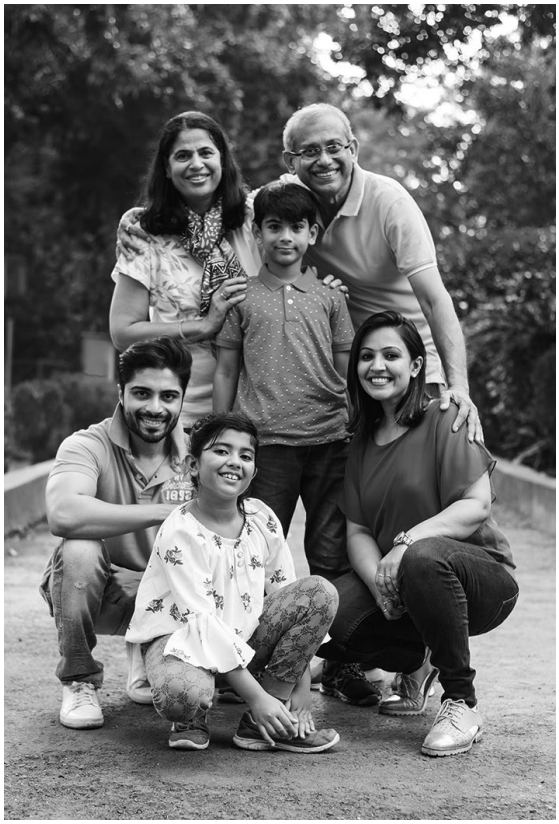
CONCLUSION

Patient status is an underutilized concept that can help with a variety of IIS activities—from data quality improvement to reminder/recall and vaccination coverage assessments to fulfilling public health and provider responsibility for ensuring patient vaccination.

As identified during this project, the MIROW Patient Status guidance has been inconsistently applied among IIS, with geographic jurisdiction level patient status implementation especially limited. Surveys and interviews within the IIS and EHR community identified a strong need for practical guidance related to implementation and management of patient status.

Both IIS and EHR survey respondents identified significant issues regarding the sending of patient status data via EDE. While receiving data electronically is the ultimate goal, additional work with the EHR provider organization community needs to occur to resolve the current barriers related to patient status collection and data submission to the IIS. AIRA has identified the topic of EHR submission of patient status as a potential future project in need of best practices/consensus. In addition to involvement of the EHR community and technology experts in such a project, it will also be important to involve policy makers to support recommended changes. Meanwhile the onus falls to provider organizations and to IIS to find alternative ways to make manual patient status data entry feasible. To that end, the guide presents strategies for issues related to IIS functionality and provider usage, including recommendations for incorporating deceased data into the IIS.

For geographic jurisdiction level patient status, the guide explores challenges related to functionality and makes suggestions for setting up distinct data fields and for determining and designing an appropriate hierarchy of geographic jurisdictional levels. Specific recommendations also are made for addressing challenges, such as obtaining the most accurate, up-to-date patient addresses to help flag patients as inactive - outside of jurisdiction. The guide also suggests ways to use patient status to include or exclude patients in vaccination coverage assessments and reminder/recall. In addition, the importance of getting death data from the local vital records agency on a regular basis is stressed, with practical steps for doing so. Finally, strategies for IIS population record management are described, including recommendations for moving batches of patients to an unknown - no activity for extended period status, based on patient age, time since last vaccination, and other parameters while noting parameters that should not exclude records, such as vaccine refusals.



Lastly, readers are advised to use this guide in conjunction with the MIROW Patient Status guide, which contains detailed information on patient status principles and business rules.[33] The MIROW guide is especially helpful when designing new patient status functionality and when evaluating current implementation of patient status in the IIS.

[33] https://repository.immregistries.org/resource/management-of-patient-status-in-immunization-information-systems/

APPENDICES

APPENDIX A ABBREVIATIONS

ABBREVIATION	
AAP	American Academy of Pediatrics
ACIP	Advisory Committee on Immunization Practices
ACS	Address Correction Service (a term of the USPS)
ADT	Admissions, Discharges, and Transfers
AFIX	Assessment, Feedback, Incentives, and Exchange (now referred to as IQIP)
AIRA	American Immunization Registry Association
ASC	Assessment Steering Committee
BR	Business Rule
CDC	Centers for Disease Control and Prevention
DQA	Data Quality Assurance
EDE	Electronic Data Exchange
EHR	Electronic Health Record
HL7	Health Level Seven
IIS	Immunization Information System
IISAR	Immunization Information System Annual Report (a CDC report required of each IIS annually)
IQIP	Immunization Quality Improvement for Providers
MIROW	Modeling of Immunization Registry Operations Workgroup
MOGE	Moved or gone elsewhere (means individual is no longer a specific provider's patient)
NAPHSIS	National Association for Public Health Statistics and Information Systems
NCIRD	National Center for Immunizations and Respiratory Diseases (part of CDC)
NCOA	National Change of Address (a term of the USPS)
SME	Subject Matter Expert
UI	User Interface
USPS	United States Postal Service
VFC	Vaccines for Children
VXU	Unsolicited Vaccine Update

APPENDIX B GLOSSARY OF TERMS

1–1 and 1–Many approach – refers to the system for assigning responsibility to providers for patient vaccination. The 1–1 approach means there is only one provider responsible for each patient (i.e., a single patient can be active with only one provider at a time.) The 1–Many (1–M) approach means patients can have multiple providers responsible for their vaccination (i.e., a single patient shows up as active for multiple providers). The system used is determined by each IIS based on its community needs.

ADT – a type of HL7 message for sending demographic-only data, such as the patient's name, address, phone number, gender. ADT is typically triggered at an admission, discharge, or transfer of a patient.

AFIX (Assessment/Feedback/Incentives/Exchange) – a quality improvement program conducted by CDC's immunization program awardees to support VFC providers in their geographic jurisdiction, with the goal of increasing vaccination of children and adolescents with all Advisory Committee on Immunization Practices (ACIP)-recommended vaccines by reducing missed opportunities to vaccinate and improving immunization delivery practices at the provider level. Replaced by IQIP.

Core data elements – a set of data elements endorsed by CDC that are needed by an IIS to record patient demographics and vaccination events to meet the IIS Functional Standards v4.0.

Coverage assessment – the process used to determine the estimated percentage of people in a given area, or associated with a single provider or provider group, who have received specific vaccines.

Denominator inflation – a phenomenon experienced by IIS where there is an expanding number of patient demographic records in the IIS due to births and migration into the geographic jurisdiction, without a corresponding removal of records for those who are deceased or have moved out of the jurisdiction. This means the number of patient records in an IIS is not reflective of the true population.

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

Electronic health record (EHR) – system utilized by the provider organization. EHR generally refers to the technology and all the software of an electronic recordkeeping system used in health care. The term electronic medical record (EMR) is often used interchangeably with EHR and specifically refers to the medical records maintained in an EHR system.

Functional standards – describe the operations, data quality, and technology needed by IIS to support immunization programs, vaccination providers, and other immunization stakeholders and their immunization-related goals. CDC works with IIS stakeholders to update the Functional Standards when needed to address changes in technology, business process, and best practices in immunization services.

Geocoding – the process of transforming a description of a location—such as a pair of coordinates, an address, or a name of a place—to a location on the earth's surface. You can geocode by entering one location description at a time or by providing many of them at once in a table. The resulting locations are output as geographic features with attributes that can be used for mapping or spatial analysis.

Geographic jurisdiction level – physical area identified by a governing authority. In this guide, the area covered by a specific IIS (state, municipality, territory).

Health Level Seven (HL7) – an internationally recognized standard for electronic data exchange between systems housing health care data.

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

Interface – the electronic connection between the IIS and sources of immunization data, such as EHRs, Vital Statistics, and others, for electronic data exchange between these systems.

Immunization Quality Improvement for Providers (IQIP) – replaced AFIX as CDC's national immunization quality improvement program on July 1, 2019. Promotes and supports implementation of provider-level immunization quality improvement strategies designed to increase vaccine uptake among children and adolescents in adherence to the routine schedule recommended by the Advisory Committee on Immunization Practices (ACIP).

Modeling of Immunization Registry Operations Workgroup (MIROW) – is a workgroup of AIRA that uses consensus-based processes to develop best practice operational guidelines related to IIS operations.

Opt-out – an indication that patient has opted out of participation in the IIS, with rules and laws that vary by jurisdiction. Per MIROW P316, opting out of IIS should not impact patient status but should be handled as an additional consideration (filter) for selecting a cohort for reminder/recalls and coverage assessments.

Practice Management System (PMS) – a form of software found in medical offices that is designed to deal with day-to-day operations using desktop software, client-server software, and internet-based software for financial and administrative functions, sometimes tied in with electronic medical records.

Patient status – an indicator of an organization's accountability for a patient's vaccinations.

Patient status at geographic jurisdiction level – patient status with respect to an immunization program/public health entity.

Patient status at provider organization level – a patient's status with respect to a provider organization.

Provider organization – an organization that provides vaccination services or is accountable for an entity that provides vaccination services. A provider organization can be a solo practice with one clinical site or can contain a collection of related providers (e.g., clinicians, physicians, nurses) with multiple sites. In this document, the term provider is used interchangeably with provider organization. For IQIP/AFIX, the term applies to providers at a single geographic location, utilizing a unique Vaccines for Children identifier number.

Reminder/recall – an activity, which can be a report, a mailing, or another method that identifies and contacts one or more patients with one or more recommended vaccinations past due, due now, or due in the future.

Safety net – "core safety-net providers" are defined by the Institute of Medicine as providers who by mandate or mission offer access to care regardless of a patient's ability to pay and whose patient population includes a substantial share of uninsured, Medicaid, and other vulnerable patients. Safety-net providers are distinguished by their commitment to provide care to people with limited or no access to care.

SmartyStreets – a software services company that provides address validation, standardization, and geocoding services.

APPENDIX C RESOURCES AND REFERENCES

- AIRA. Data Validation Guide for the IIS Onboarding Process. 2017. http://repository.immregistries.org/files/resources/58a601d626d7a/aira_data_validation_guide_-_final_new_logo.pdf
- AIRA. IIS Data Quality Practices: Monitoring and Evaluating Data Submissions. September 2017. http://repository.immregistries.org/files/resources/59cabe6404421/data_quality_phase_ii.pdf
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- AIRA. Management of Patient Active/Inactive Status in Immunization Information Systems: Replacement of 2005 Guidelines. American Immunization Registry Association (AIRA) Modeling of Immunization Registry Operations Workgroup (MIROW). April 2015. http://repository.immregistries.org/resource/management-of-patient-active-inactive-status-in-immunization-information-systems-1/
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- AIRA. IIS Functional Guide Vol. 2. CDC Endorsed Data Elements. January 25, 2019. https://repository.immregistries.org/files/resources/5a83216a1d369/aira_functional_guide_vol2_final.pdf
- AIRA. IIS Reintegration of Cleansed Addresses and Geocodes. September 30, 2018. https://repository.immregistries.org/resource/iis-reintegration-of-cleansed-addresses-and-geocodes/
- AIRA Discovery Session. Our Vital Records Partners – New and Emerging Issues. April 1, 2019. What You Need to Know About Vital Records and Why You Should Care. Mariah Pokorny, Sandra Lyles. Recording can be found at https://vimeo.com/329166956.
- CDC. HL7 Version 2.5.1 Implementation Guide for Immunization Messaging, version 1.5, November 2014, and Addendum. July 2015. https://www.cdc.gov/vaccines/programs/iis/technical-guidance/hl7.html
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- LeBeau, T. Utilizing the SDIIS to Improve Accuracy of Patient Status Field and Ensure Patients Have a Medical Home. South Dakota Department of Health. October 7, 2013.
- Woinarowicz, M. Conducting Statewide Recall Using the NDIIS. Presented at AIRA National Conference, 2015.
- NAPHSIS. Model State Vital Statistics Act and Regulations. CDC, National Center for Health Statistic. 2011 Revision. https://naphsis-my.sharepoint.com/personal/cldmn_naphsis_onmicrosoft_com/Documents/Shared%20with%20Everyone/FinalMODELLAWSeptember72011.pdf

The following organizations provided internal materials on patient status:

ORGANIZATION	RESOURCE
Envision Technology Partners	PAIS Requirements and Specifications for WebIZ. Document Version 1.13. May 2017
Iowa IIS	Immunization Assessment Definition Moved or Gone Elsewhere (MOGE). Iowa Department of Public Health, Division of Acute Disease Prevention & Emergency Response. Immunization Program. March 1, 2010
New York IIS	Manage Patient Status Training Handout. NYSIIS
Rhode Island IIS	New Features: Patient List Report for Providers. Rhode Island Department of Health. Kidsnet
Tennessee IIS	Manage Population Module. A quick reference guide. Tennessee Immunization Information System. Revised June 28, 2018, iWeb v15.5.2
Scientific Technologies Corporation	PAIS Management of Patient Active/Inactive Status
Washington IIS	Washington State Immunization Information System Reference Guide Managing Patient Ownership and Status. Washington Department of Health. August 2018
Wyoming IIS	Manage Patient Population Quick Reference Guide. Wyoming Immunization Registry. Rev. April 2018

APPENDIX D EHR IMPLEMENTATION GAPS

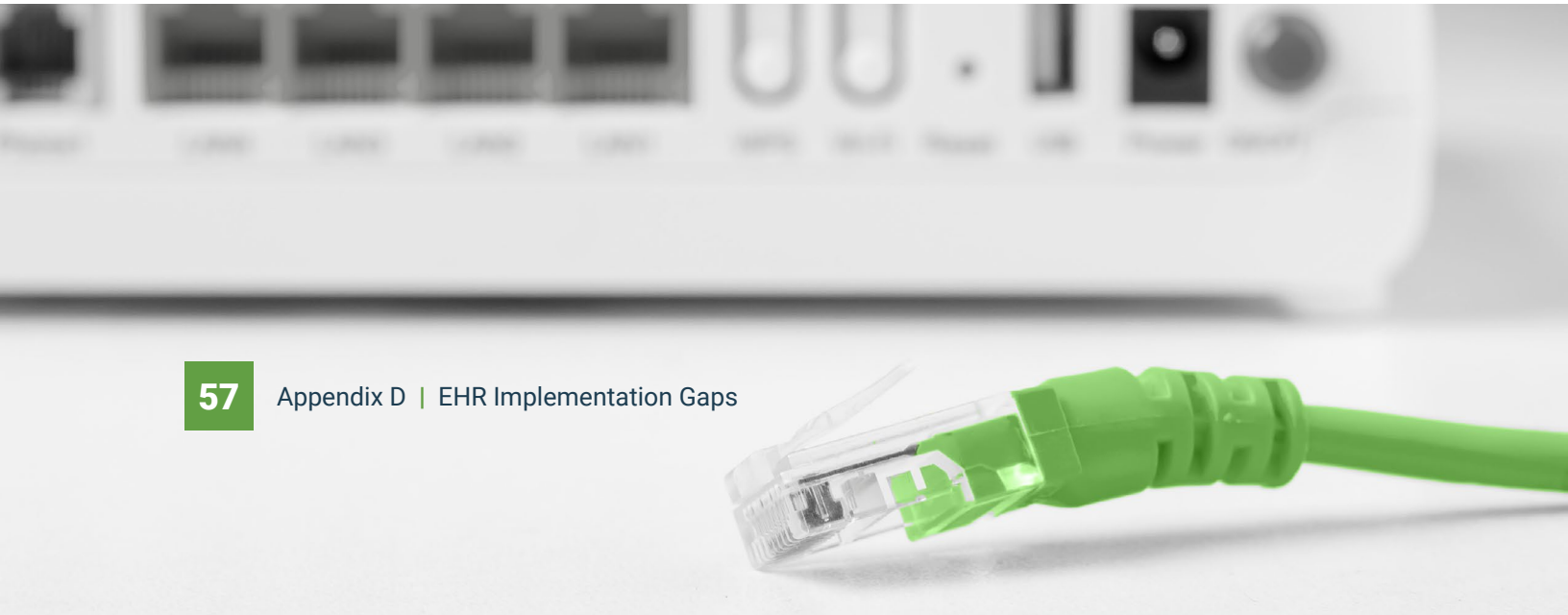
Three big implementation barriers to collecting and sending patient status data were identified by EHR respondents during the initial survey/interview phase of the project.

1. The MIROW recommendations are not part of the HL7 standard nor part of EHR certification.
2. Most EHR systems trigger messages only when there is an administered vaccination.
3. Most EHR systems don't have a provider workflow where patient status is distinctly captured.

Although there is a specific MIROW guidance document on patient status, these recommendations are not part of the HL7 VXU transaction standard. It appears that most EHRs are not aware of the document, nor are they required under most certification standards to adhere to it. Therefore, the patient status classifications that IIS are recommended to track are not a requirement for EHRs.

If an address or patient status is updated within an EHR, there is usually no trigger to send that data to the IIS. Rather, most EHRs trigger VXU messages only when a vaccination has been administered. If a provider is notified of an address change or that a patient is deceased, that data might never be sent to the IIS unless, in the case of the address change, a subsequent vaccination is given at a later time.

In many large practices (e.g., hospital systems and multiple facility organizations), there is a separate admission or registration process that captures patient address information. This may or may not occur in a separate part of the EHR and may also never trigger an update to the IIS. The actual clinicians might never see the updated information when they see the patient. Their interaction with the patient record often includes only clinical information, such as vaccination administration, if it occurs.



APPENDIX E TEMPLATE FOR PROVIDER GUIDANCE ON PATIENT STATUS MANAGEMENT

Note to IIS staff: This is a template of basic information that could be included in instructions to providers about the use of the patient status field. The intent is to provide a short, easy-to-understand explanation of patient status and management. Each IIS should adapt the wording to fit its own situation and terminology. It should be formatted for ease of reading. In addition, each IIS can add instructions for changing patient status, which may include use of a patient management module.

WHO IS THIS INFORMATION FOR?

This guide is intended for providers who run vaccination coverage or reminder/recall reports who want to have more accurate patient lists from the IIS and for staff responsible for updating patient status in the IIS.

WHAT IS PATIENT STATUS?

Patient status tells you which providers/practices are responsible for the immunization of a specific patient. A patient's status can be active, inactive, or deceased. In the IIS, a patient record automatically defaults to "active" for your practice when you create a new record or enter the most recent vaccination event. Patients are considered inactive when they are no longer your patients.

Definitions of patient status categories:

- Active = currently your patient
- Inactive = not your patient
- Subcategories of inactive
  - No longer your patient: if you have received requests for medical records from another primary care provider; if the patient has informed you that they have changed providers; if you know the patient has moved out of the area and no longer seeks care from you; if you have not seen the patient in x years.
  - Lost to follow-up: if you have no means to contact a patient (no phone, no address) or if you have made at least three attempts to contact a patient, after 90 days this designation can be made.
- Deceased = patient has died. (May be entered by IIS with data from Vital Records or by provider upon notification by a family member or other health care provider.)

HOW DOES PATIENT STATUS GET UPDATED IN THE IIS?

Whenever a vaccination is submitted to the IIS by your provider organization, whether by manual data entry into the IIS or electronic data submission, the patient's status is automatically updated to be "active" for your practice. Most electronic health record systems, however, are not yet capable of submitting data to the IIS when a patient moves out of the state or leaves your practice or dies. For this reason, it is important for providers to check their IIS patient records and update them for patients who have moved away, left the practice, or died.

WHY CARE ABOUT PATIENT STATUS?

It is important to update patient status so that your list of current patients is accurate, thus ensuring that reminder/recall and vaccination coverage reports are limited to patients now active in your practice. Updating your patient list on a regular basis will improve the accuracy of all reports and assist in identifying those patients who need follow-up for additional immunizations. In addition, having an accurate list ensures you are being credited for the work you do and not penalized for patients who are no longer in your practice.

WHEN SHOULD I UPDATE PATIENT STATUS?

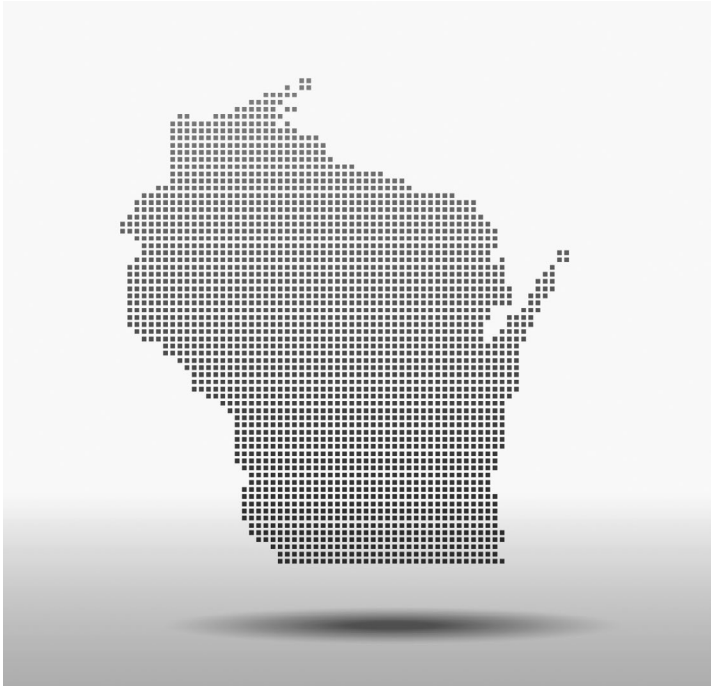
You should update patient status routinely. Being aware of your active patients in the IIS should be a best practice for your facility. By reviewing patient status on a regular basis, you will be able to ensure that reports correctly associate patients to your practice. Patients no longer in your practice will be excluded from vaccination coverage reports and will not skew your results to be lower than they actually are. Special attention should be given to patient status prior to conducting both reminder/recall activities and vaccination coverage assessments:

- When preparing to run reminder/recall notices through the IIS, making sure your patient population is as accurate as possible ensures that the patients you contact are the right patients. This can help save you time and resources by not contacting patients no longer being seen at your practice.
- After an initial quality improvement visit from your local public health immunization team (IQIP visit), you may need or want to improve your vaccination coverage rate reports before the next visit. Updating the status of your patients will help to make sure you are including only patients who are truly active in your practice.

APPENDIX F EXAMPLE OF GEOGRAPHIC JURISDICTION STRUCTURE

The Wisconsin IIS is an example of a statewide IIS that has implemented a variation on the concept of geographic jurisdiction level patient status.

Wisconsin has focused on a lower-level geographic jurisdictional status that enables local public health to fulfill its responsibility to ensure vaccination of its residents. Local public health is a safety-net provider and is regarded by the IIS as a provider type that is not allowed to inactivate patients. The separate need for state-level status is met by a "registry active indicator." This indicator applies to the entire IIS and gets populated based on statuses at the local health department geographic jurisdiction level and the provider level, as well as death date or death indicator. The registry active indicator is used along with a few other exclusion criteria when pulling IISAR reports, as it looks at all statuses within the IIS for both providers and local health departments. The registry status can be seen only in tables on the back end when running queries. Users can see only the patient status of their level, as there is not a separate "state status" viewable within the user interface.[34]



[34] Information provided by Danielle Sill, Epidemiologist, Wisconsin Immunization Registry, July 15, 2019.

APPENDIX G SUMMARY OF CHALLENGES AND RECOMMENDATIONS

PROVIDER LEVEL CHALLENGES AND RECOMMENDATIONS

IIS FUNCTIONALITY

FUNCTIONALITY CHALLENGE 1: MISSING PATIENT STATUS CATEGORIES

Recommendation(s):

All IIS should include, at a minimum, the three main patient status designations: active, inactive, and deceased. Having these patient status categories available is essential for the IIS to produce accurate reports at the provider level. The three inactive subcategories (no longer a patient, lost to follow-up, and unspecified) are desirable but not required. They are nice to have so that providers can document the reason a patient was inactivated and in case the IIS or providers make decisions based on this information.

FUNCTIONALITY CHALLENGE 2: VARIABILITY IN PATIENT STATUS NOMENCLATURE

Recommendation(s):

Many patient status naming conventions exist across the IIS community. Questions have arisen about the importance of changing terminology to align with the MIROW terms. The project's SME group determined that, as long as terminology variations can be mapped to the minimum recommended patient status designations (i.e., active, inactive, deceased), it is not necessary for IIS to change their nomenclature. For example, an IIS using the designation "MOGE," which historically has been known as "moved or gone elsewhere," can continue to use it, assuming that it can be mapped to inactive or inactive - no longer a patient. Rationale for this recommendation stems from the time it would take to reeducate providers about changes in terminology, as well as potential system costs of the changes, for questionable benefit overall.

FUNCTIONALITY CHALLENGE 3: NEED FOR EFFICIENT STATUS UPDATE TOOLS FOR PROVIDERS

Recommendation(s):

In order to make patient status easier for providers to manage, it is recommended that IIS automate the updating of patient status wherever possible and create easy-to-use tools to facilitate manual updates. These two strategies are described in more detail below.

PROVIDER USAGE

PROVIDER USAGE CHALLENGE 1: ENTERING PATIENT STATUS IN AN IIS IS OUTSIDE THE NORMAL WORKFLOW FOR PROVIDER STAFF

Recommendation(s):

Workflow and IIS usage at each practice vary significantly, making it hard to offer specific recommendations. Nonetheless, until EHRs are capable of sending patient status updates, IIS should continue to encourage providers to take the time to manually enter patient status. This may mean exploring with provider staff best strategies for accessing appropriate information in their EHRs. As part of onboarding and ongoing check-ins with providers, IIS should strongly recommend that designated provider staff be assigned IIS user accounts for the purpose of overall quality control. In addition to checking for import and export errors, these staff can be asked to compare their IIS active patient lists to their internal system list and to update records accordingly.

IIS NEED FOR ADDITIONAL GUIDANCE

ADDITIONAL GUIDANCE CHALLENGE 1: NEED FOR PROVIDER LEVEL GUIDANCE

Recommendation(s):

AIRA has developed a one-page template for IIS to use with providers (see Appendix E. Template for Provider Guidance on Patient Status Management). The template includes:

- Definitions of patient status categories in clear, easy-to-understand language
- Why it is important to keep patient status updated
- When to update—recommending routinely, with emphasis on preparing for IQIP visits to improve accuracy of reports and on preparing to run reminder/recall lists

IIS programs will need to adapt the template to meet the needs of their individual programs. The language in the template could be combined with a more detailed how-to guide specific to the IIS patient status functionality.

POLICY/RULES REGARDING DECEASED DATA

DECEASED RECORDS CHALLENGE 1: ALLOWING PROVIDERS TO ENTER DEATH DATA

Recommendation(s):

It is a best practice to allow providers to change a record status to deceased. This should be allowed both through manual data entry and through EDE. Even with successful vital records exchange, not all deaths occur in-state, so not all death events will be received from the vital records office. In some cases, providers may have the information before the vital records data is received. In order to ensure timely and complete entry of deceased status, it is important to offer multiple paths for the data to come into the IIS, such as through providers. Below are a few suggestions to achieve this recommendation:

- A date of death field should be available in the UI but should not be required to complete. Providers may receive a telephone report of a patient's death without the date, and the importance of recording the death outweighs the importance of having the date.
- An optional feature is to include a "pop-up" dialog that warns users they are about to mark this patient as deceased for the entire IIS. This can serve as an added safeguard or double-check on the status change.
- For IIS that have great concern about allowing a provider to mark a record as "deceased," the IIS could provide an interim step that allows a provider to flag a record without changing the status, which then prompts review/confirmation by IIS staff. Automatically withholding these "provisional" death records from reminder/recall activities should be considered until the official death record is received or until another vaccination is added. In addition, a security level could be available that allows only approved provider users to enter death data.

GEOGRAPHIC JURISDICTIONAL LEVEL CHALLENGES AND RECOMMENDATIONS

IIS FUNCTIONALITY

FUNCTIONALITY CHALLENGE 1: MISSING PATIENT STATUS CATEGORIES

Recommendation(s):

All IIS should include, at a minimum, the patient status designations at the geographic jurisdiction level of active, inactive - outside jurisdiction, and deceased. Having these patient status categories available is necessary to produce accurate reports at the geographic level. The two unknown categories (no address - no vaccination and no activity for extended period of time) are desirable but not required. They are especially nice to have when running coverage assessments and reminder/recall, as they assist public health to identify patients to include in outreach and follow-up.

FUNCTIONALITY CHALLENGE 2: VARIABILITY IN PATIENT STATUS NOMENCLATURE

Recommendation(s):

Many patient status naming conventions exist across the IIS community. Questions have arisen about the importance of changing terminology to align with the MIROW terms. The project's SME group determined that, as long as terminology variations can be mapped to the minimum recommended patient status designations (i.e., active, inactive - outside jurisdiction, deceased), then it is not necessary for IIS to change their nomenclature. For example, an IIS using the designation "permanently inactive" can continue using this term, as long as it can be mapped to "deceased." However, IIS in the process of developing geographic jurisdiction level functionality for the first time are encouraged to use the standard terms as currently defined in the MIROW guide.

IIS NEED FOR IMPLEMENTATION GUIDANCE

IMPLEMENTATION GUIDANCE CHALLENGE 1: BENEFITS OF PATIENT STATUS AT GEOGRAPHIC JURISDICTION LEVEL

Recommendation(s):

Understanding the benefits of this functionality is an important first step to adopting it. Some of the benefits to maintaining a discrete geographic jurisdiction level status include the ability to:

- Produce more accurate coverage assessment reports at the geographic jurisdiction level
- Facilitate age-appropriate reminder/recall information mailings
- Identify those patients active at the geographic jurisdiction level but not at the provider level for safety-net service by public health
- Meet national functional standards
- More easily produce certain reports, such as the Immunization Information System Annual Report (IISAR)

IMPLEMENTATION GUIDANCE CHALLENGE 2: IMPLEMENTING A DISTINCT DATA FIELD FOR PATIENT STATUS

Recommendation(s):

IIS should have a distinct field designating geographic jurisdictional level patient status for each patient record. Having a separate field (i.e., data element) for patient status at the geographic jurisdiction level enables traceability and the ability to view patient status changes.[35] Reports, such as coverage assessments, can then easily be tailored to specific needs, including or excluding certain patient status designations.

IMPLEMENTATION GUIDANCE CHALLENGE 3: DETERMINING AND DESIGNING THE APPROPRIATE HIERARCHY OF GEOGRAPHIC LEVELS IN THE IIS

Recommendation(s):

At a minimum, the IIS should capture patient status at the highest level of the geographic jurisdiction covered by the IIS (e.g., the state, city, county, or territory). Additional levels are used by some IIS and are based on the organizational structure and roles of public health within the IIS coverage area. For example, a statewide IIS may have additional levels of public health, such as city or county, depending on how public health is organized in that specific state.

[35] See BR 411 in the MIROW guide. https://repository.immregistries.org/resource/management-of-patient-status-in-immunization-information-systems/

IMPLEMENTATION GUIDANCE CHALLENGE 4: IMPLEMENTING STRATEGIES FOR OBTAINING THE MOST ACCURATE AND UP-TO-DATE ADDRESS (E.G., OUT-OF-JURISDICTION ADDRESSES)

Recommendation(s):

A proven method for obtaining updated addresses for IIS patient records is the United States Postal Service (USPS) National Change of Address (NCOA) service.[36] NCOA is a secure pre-mailing process that allows mailers to submit name and address data to attempt to match to a change-of-address record to find a new address. Third-party vendors are often involved in assisting IIS with the address submission process. Use of NCOA helps IIS to identify persons who have moved out of the jurisdiction within the previous 48 months. Another tool available through the USPS is its Address Correction Service (ACS), which is a post-mailing process that determines the correct disposition of a mail piece and generates address correction back to the mailer. As there are differences in the matching processes used by NCOA and ACS, IIS need to carefully consider which best meets their needs. Updating addresses in this way can ensure that mailings go to the correct households and can help with IIS deduplication efforts and geographic-based vaccination coverage analysis. Improved address quality may help to reconcile the denominator of patients in the IIS with the actual census population by identifying individuals who have moved out of the jurisdiction. It is especially effective when combined with a public health function such as reminder/recall mail campaigns. Several IIS have used NCOA and ACS for reminder/recall mailings to specific age groups, such as 19- to 35-month-old and 11- to 12-year-old patients.[37]

IMPLEMENTATION GUIDE CHALLENGE 5: ESTABLISHING RULES FOR CLASSIFYING PATIENTS AS UNKNOWN - NO ACTIVITY FOR EXTENDED PERIOD OF TIME.

Recommendation(s):

Parameters that include age and length of time since last vaccination or record edit are provided. See Section 4. IIS Population Management for a community consensus-based approach on when records can be considered unknown - no activity for extended period of time.

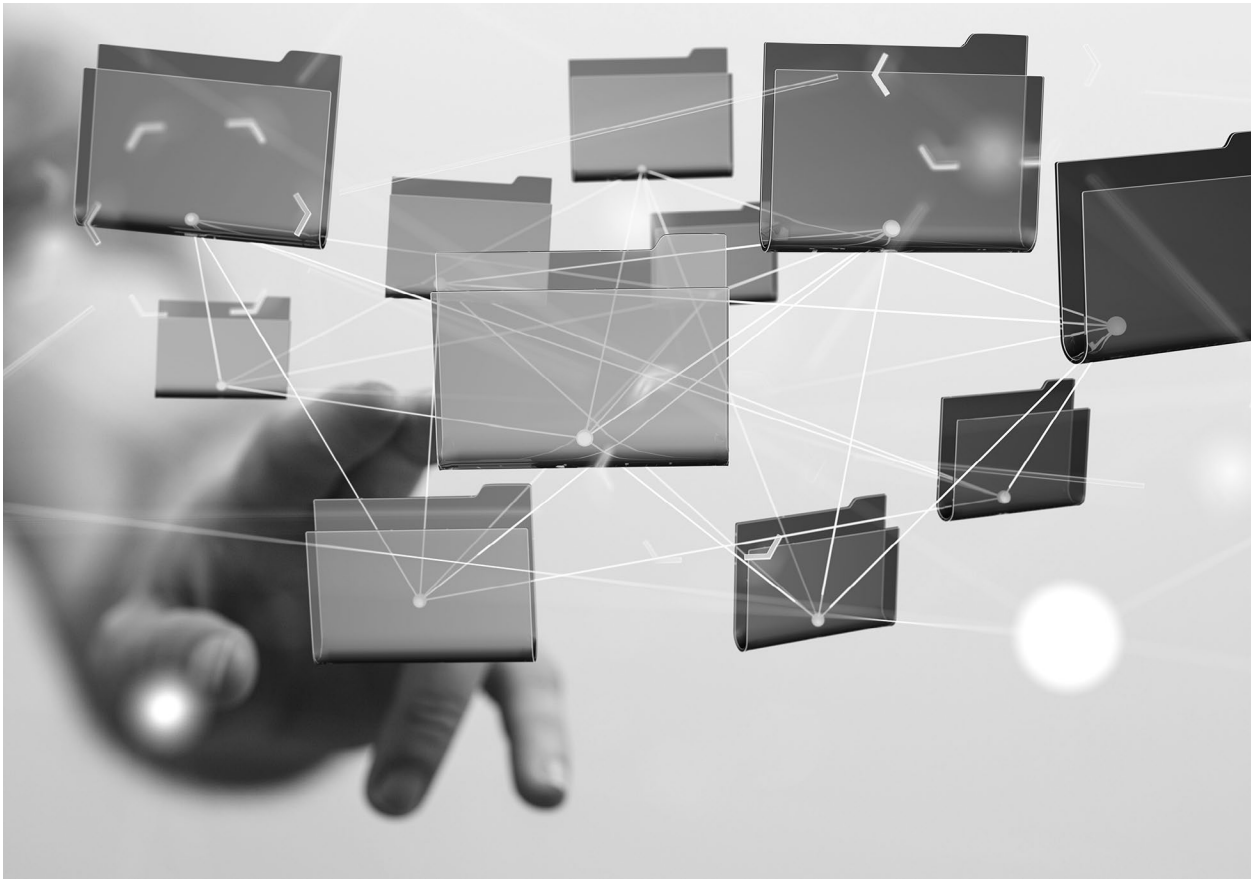
[36] Woinarowicz, M. Conducting Statewide Recall Using the NDIIS. Presented at AIRA National Conference, 2015, and personal communication with Ms. Woinarowicz, NDIIS Manager. February 14, 2018.

[37] For examples, see Appendix F of AIRA's IIS Data Quality Practices: To Monitor and Evaluate Data at Rest. https://repository.immregistries.org/resource/iis-data-quality-practices-to-monitor-and-evaluate-data-at-rest/

IMPLEMENTATION GUIDANCE CHALLENGE 6: DETERMINING WHICH STATUSES TO INCLUDE WHEN RUNNING REMINDER/RECALL AND ASSESSMENT REPORTS

Recommendation(s):

The utility of patient status designations becomes clear when examining their actual application to certain IIS activities. Specifically, vaccination coverage assessments and reminder/recall activities can be tailored to a specific need by using patient status as a filter. Typically, vaccination coverage assessments and reminder/recall at the geographic jurisdiction level usually will include all patients with a status of active and exclude all with inactive - outside jurisdiction or deceased status. However, the decision to include those with one of the unknown statuses is a little more complicated and is discussed under the respective activities of reminder/recall and assessment.



POLICY/RULES REGARDING DECEASED RECORDS

DECEASED RECORDS CHALLENGE 1: OBTAINING DEATH DATA FROM VITAL STATISTICS OFFICE

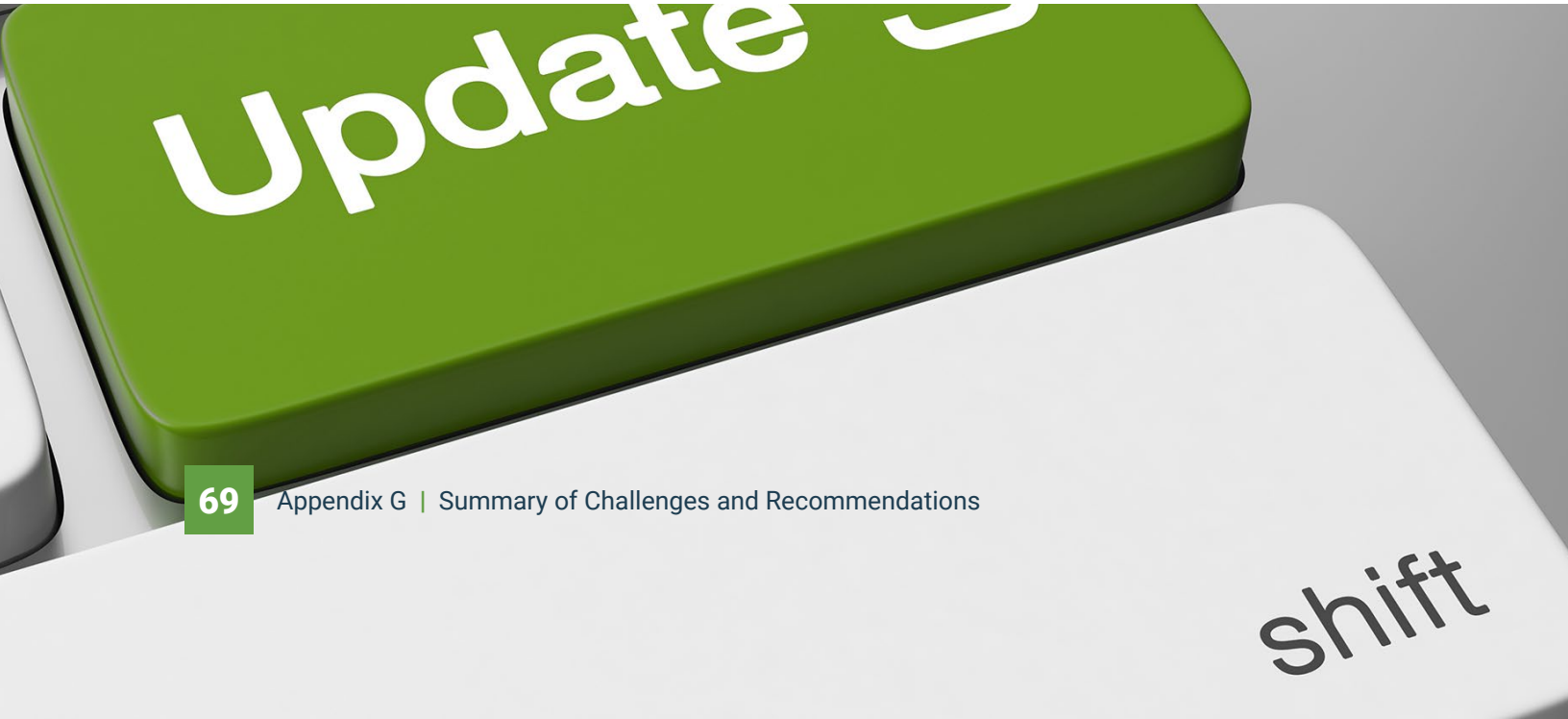
Recommendation(s):

It is a best practice for IIS to have a regular, ongoing process for receiving death data files from the vital statistics program or agency.

DECEASED RECORDS CHALLENGE 2: HANDLING OF PATIENT RECORDS AFTER STATUS CHANGED TO DECEASED

Recommendation(s):

It is a best practice to retain the full patient record for deceased patients in the IIS, as long as this complies with applicable local policy and law. It is also advisable to allow providers to view the record and enter administered vaccinations for a limited period of time after the death. Alternatively, the IIS may choose to "lock" a record so no further editing can occur, in which case providers should be advised to contact the IIS if additional data needs to be entered or in case the wrong patient has been marked. It is not advisable to allow a new vaccination to automatically change patient status from deceased to active, because this could incorrectly and inadvertently result in a deceased patient receiving a reminder notice. Instead, providers should be instructed to contact the IIS to discover if the wrong record has been marked as deceased or if the vaccination is being attributed to the wrong patient. IIS-level staff should have the ability to change a status from deceased back to active. Some IIS may choose to have a report available at the IIS level that lists all patients changed to deceased status by providers. While it may not be feasible for IIS staff to review all changed records, a list could provide a way to do spot-checking.



IIS POPULATION MANAGEMENT

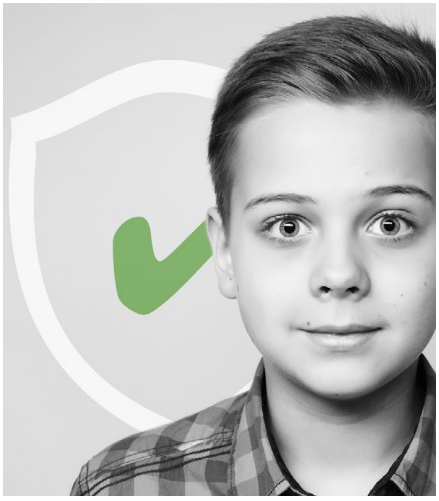
Each age group below presents its own challenges, and recommendations have been made accordingly.

AGE GROUP: 6 YEARS AND UNDER

Multiple vaccines are administered at frequent intervals to children who are 6 years of age and under. This makes it difficult to come up with a reasonable period of time that constitutes “no activity.” Given the number of non-vaccinator parents, as well as children in the catch-up vaccination schedule, the risk of inappropriately removing a child from an active status at the geographic jurisdiction level is high using the interval method. Doing so could eliminate members of this vulnerable population from follow-up efforts. Thus, it is not recommended to use this method to change status for the 6 years of age and under group.

Recommendation(s):
Do not apply any mass inactivation of records to the birth through 6 years of age population unless there are special or extenuating circumstances which make it appropriate.

AGE GROUP: 7–10 YEARS OF AGE



Children who are up to date with vaccines when they reach 7 years of age do not usually receive any vaccines in the next 4 years, with a few exceptions such as flu vaccination. Using the formula described above for this age group, with a maximum interval of 7 years, we look back 7 years to identify children with no activity or vaccination during that time. Thus, for children exactly 7 years of age, we look for those with no vaccinations or activity since birth; for a child a day short of 11 years old, we look for no activity since age 4. This retrospective look for vaccinations includes the prime age groups for vaccination of birth to 2 years old and 4 to 6 years of age. Those in the "no activity" group are likely to include non-vaccinators as well as those who are truly lost to follow-up. As discussed in the 6-year and under age group above, it is usually preferable to take no action and simply allow this group to age into the next cohort, where inactivation rules are more appropriate.

Recommendation(s):
Do not apply any activity-based mass inactivation of records to the 7- through 10-year age group population unless there are special circumstances that make it appropriate. If deemed appropriate, a reasonable time frame to apply may be 7 years. If the 7-year time frame is applied, it is important to make sure the inactivated records do not get automatically reactivated when aging into the 11- to 18-year age group through application of that age group's inactivation rules.[38] However, records should be automatically converted back to active once a record update/vaccination is received by the IIS.

[38] With an inactivity time frame of seven years for 7- to 10-year-olds, an inactivated child could age into the 11- to 18-year-old age group and not meet the longer 10-year inactivity rule. Without a substantiating new vaccination, there is no reason to think their status has changed, and thus it should remain as inactive.

AGE GROUP: 11–18 YEARS OF AGE

Most IIS today have been in operation for 10 years or more, and the 11- through 18- year age group is prone to denominator inflation. For this age group, there has been more time for unidentified duplicates to be created, as well as inadequate documentation of patients who have moved out of the jurisdiction. In addition, fewer required vaccinations for this age group can result in fewer updates to IIS records, including address corrections. Once they've turned 11 years of age, however, this age group should begin to receive several vaccines, such as meningococcal, HPV, Tdap booster. For these reasons, some IIS have chosen to focus inactivation efforts on this age group.

Recommendation(s):

Use 10 years since last activity on a record for the 11- through 18-year age group for inactivation, i.e., changing status to unknown - no activity for extended period. A slightly less conservative approach, i.e., inactivating fewer individuals, could also be considered: using an 8-year time frame for the 11 through 12 years of age population and a 9-year time frame for the 13 through 18 years of age population. If the 8- and 9-year intervals are selected by the IIS, as noted above in the 7- to 11-year-old section, it is important to make sure that the 11- to 12-year-olds do not get automatically reactivated when aging into the 13- to 18-year age group. Rather, records should be automatically converted back to active once a record update/vaccination is received by the IIS.

AGE GROUP: OVER 18 YEARS OF AGE (ADULTS)

There is considerable variation in the degree to which IIS are populated with adult records. While some IIS are underpopulated for adults, older IIS that have included adults for more than 20 years now have an excess of adult records. In addition, the quality of data for adult records may be poorer than that for children, especially for demographic data, because of the decreased frequency of record updates and consequent degradation of data accuracy. Compounding the problem is the reported lower quality of adult demographic data because of the variety of provider types administering adult vaccinations. Some IIS report that clinics such as stand-alone clinics (such as for flu) are sometimes unable to submit complete and accurate demographic data. This makes it difficult to match a patient with existing records in the IIS, resulting in multiple fragmented records for a single patient.

Recommendation(s):

Use 10 years since last activity on a record for the 19 years and above population for inactivation, i.e., changing status to unknown - no activity for extended period. In specific situations, a 3- to 5-year period may be considered, primarily when lacking address data. For example, a record with flu vaccine only, in combination with incomplete address data, may be subject to a 3-year period only. A record with a vaccine type in addition to flu, but still lacking good address data, may be subject to a 5-year period of no activity.

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