Moving Needles
A CDC FUNDED INITIATIVE

AIRA
AMERICAN IMMUNIZATION REGISTRY ASSOCIATION

Improving Immunization Interoperability Between Post-Acute and Long-Term Care and Public Health:

Challenges, Opportunities, and Consensus Recommendations

Contents

Funding provided by CDC Cooperative Agreement NH23IP922655

Executive Summary

Improving immunization rates in post-acute and long-term care (PALTC) settings is imperative to help protect vulnerable residents from morbidity and mortality from preventable diseases. Despite evidence for the effectiveness of resident and staff vaccination in reducing disease burden among PALTC residents, persistent gaps remain in ensuring adequate and timely vaccination. Improving the interoperability of immunization information between PALTC electronic health record systems (EHRs) and public health immunization information systems (IIS) is a key strategy to improve immunization rates among residents. This paper explores the current connectivity landscape between PALTC EHRs and IIS, articulates a vision for this connectivity, and offers consensus recommendations to advance this connectivity, with an overarching goal of reducing the burden of disease among residents.

As population-based systems designed to consolidate immunization records from across health care providers, IIS offer critical information to support care provision and population health in PALTC settings. Connectivity between PALTC EHRs and IIS supports access to residents' complete evaluated immunization histories and clinical decision support for immunization, within PALTC administrative and clinical workflows. Despite the widespread adoption of certified health information technology among healthcare providers and long-standing public health support for standards-based immunization data exchange, there is a lack of interoperability between PALTC EHRs and IIS.

Addressing this gap requires a multi-faceted approach to overcome the lack of awareness of and benefits associated with connectivity, limited resources, and operational and technical challenges associated with establishing and maintaining interoperability between PALTC EHRs and IIS. Guiding principles and consensus recommendations are offered to address these barriers. Guiding principles apply across recommendations and highlight the vulnerability of this population and the need for sustainable funding to resource this critical work. Specific recommendations are offered across three priority categories:

1. Ensure awareness and understanding of connectivity benefits to strengthen and monitor collaborative action;
2. Positively incentivize connectivity; and
3. Reduce the operational and technical burden of connectivity.

In addition, facilitating recommendations are offered that apply to the broader health information technology ecosystem in which PALTC and IIS operate.

Realizing the benefits of immunization interoperability between PALTC and IIS requires collective action. Acting on these consensus recommendations will help move the needle in ensuring timely immunization among PALTC residents.

Introduction

Background

Immunization in post-acute and long-term care[1] (PALTC) settings is a critically important strategy for reducing the spread of infectious diseases in these facilities. PALTC residents' age, living conditions, and health conditions contribute to heightened vulnerability to morbidity and mortality from infectious diseases. As evidenced by the COVID-19 pandemic, disease spread in these settings can have devastating impacts. According to the Kaiser Family Foundation, early in the COVID-19 pandemic, pre-vaccine, a disproportionate number of COVID-19 cases occurred among nursing home residents and staff,[i] with nearly half of COVID-19 deaths occurring among nursing home residents.[ii]

To reduce transmission of vaccine-preventable disease, PALTC residents and employees are recommended to be up to date on immunizations. For residents, solely offering annual influenza vaccination is no longer sufficient, with COVID-19, Td/Tdap, pneumococcal, shingles, and RSV vaccines also recommended for older adults.[iii] With the workforce being the principal vector of transmission for nursing home COVID-19 infection,[iv,v] staff vaccination provides an added layer of protection. In addition to COVID-19, influenza vaccination among PALTC staff has been shown to reduce influenza-like illness, hospitalizations, and mortality among residents.[vi, vii]

Ensuring adequate immunization among PALTC residents and staff requires dedicated effort. Time and resources are needed to review individuals' vaccination histories, understand individuals' vaccination needs, ensure the administration of recommended immunizations, and monitor ongoing immunization coverage. Resident care transitions from other healthcare settings, PALTC staffing challenges, and the diversity of care provided across PALTC settings add to the complexity of ensuring resident immunization.

Purpose

Health information technology (IT), and specifically, interoperability between long-term care electronic health record systems (EHRs) and public health immunization information systems (IIS), can help PALTC address these challenges. This paper reviews the current connectivity landscape between PALTC EHRs and IIS, articulates a vision for connectivity, and offers consensus recommendations to advance this connectivity.

This information is intended for the PALTC community, the public health immunization and IIS community, and for federal policymakers to inform and support action in this space, with an overarching goal of reducing the burden of disease among residents.

Additional work is needed to address opportunities associated with the use of IIS for occupational health immunization needs among PALTC staff, as staff vaccination is typically handled outside of PALTC EHRs.

[1]Post-acute and long-term care is used as an inclusive term to refer broadly to the multitude of care settings in this sector.

Methods

The findings and recommendations discussed draw from previous work examining the use of IIS to support adult immunization efforts.[viii, ix] In addition, stakeholder interviews and information gathering conducted between March and December 2023 provided additional insight into the current landscape as it relates to PALTC EHR capabilities, PALTC EHR-IIS connectivity, and opportunities. Specifically, insights were drawn from the following:

- A PALTC23 conference panel discussion among PALTC medical directors and EHR vendors on PALTC EHR-IIS connectivity hosted by AMDA - The Society for Post-Acute and Long-Term Care Medicine, Inc. (AMDA);
- Facilitated discussions on PALTC among a small, targeted group of public health jurisdictions as well as a discussion of PALTC amongst IIS managers across jurisdictions;
- A discussion with Centers for Disease Control and Prevention (CDC) National Healthcare Safety Network (NHSN) representatives;
- A discussion with HIMSS Long-Term and Post-Acute Care Committee staff;
- Individual facilitated interviews with four PALTC EHR vendors; and
- PALTC EHR vendor submission of a self-assessment workbook to gather information on current capabilities related to standards-based immunization data exchange.

Based on the information gathered, draft recommendations to advance connectivity and interoperability between PALTC EHRs and public health IIS were developed. These draft recommendations were reviewed with stakeholders from across the PALTC and public health IIS community as part of a roundtable discussion. Roundtable participants were asked for feedback on clarity, approval, feasibility, current/planned work in progress, gaps, and priorities.

Recommendations were refined based on roundtable feedback, with guiding principles added and recommendations organized into four categories. The refined recommendations were sent out to stakeholders for additional review. Recommendations included in this paper represent consensus feedback to improve connectivity between PALTC EHRs and IIS, to support PALTC immunization efforts. Organizations and individuals who contributed to this effort are listed in the Acknowledgments.

Current Landscape

Over 68,000 PALTC providers served an estimated 7.3 million people in the United States in 2020.[x] These providers span seven care settings, including residential care communities (AKA assisted living), adult day service centers, nursing homes (including skilled nursing facilities), home health agencies, hospice providers, inpatient rehabilitation facilities, and long-term care hospitals. Overall, the adoption and use of EHR technology in PALTC has been slow relative to other healthcare providers. These facilities were excluded from federal EHR incentive programs initiated in 2009; without these incentives, cost has been a significant barrier to EHR connectivity to other systems.[xi] Over time, EHR adoption and use in PALTC settings has grown, with 84% of nursing homes reporting use of an EHR in a 2018 nationwide survey.[xii] However, most nursing homes cannot use these systems to communicate with external systems and facilities.[xii, xiv]

This lack of interoperability is also evident in the lack of connectivity between PALTC EHRs and public health IIS. IIS operate as confidential, population-based computerized databases that aim to record all immunization doses administered by participating providers within a jurisdiction. There are 61 IIS in operation across the United States and US territories.[2] IIS support clinical practice and population health by providing consolidated immunization histories, clinical decision support for immunization, and data and tools to support tracking and improvement in immunization rates across a population.[xv]

As of 2022, nearly 94% of provider site connections with IIS were via HL7-based exchange, in accordance with interoperability standards specified in the **National Implementation Guide for Immunization Messaging, Version 2.5.1, Release 1.5, and Addendum**.[xvi] However, we were unable to confirm instances of HL7 connectivity between PALTC EHRs and IIS. Rather, stakeholders indicated use of IIS user interfaces to look up and report immunization information, use of non-standard formats to report immunization data (e.g., flat file and Microsoft Excel® file submissions), data reporting via pharmacy-IIS interfaces, and potential data reporting gaps. Immunization submission via a pharmacy-IIS interface was noted for PALTC facilities where pharmacy staff administer resident immunizations.

Stakeholder interviews also revealed how current PALTC processes to check residents' immunization histories and needs are often laborious. A resident's immunization information may be sent to a PALTC facility in a Continuity of Care Document (CCD) as part of a care transition. However, the information may not be complete, may not be trusted, and is rarely incorporated into the PALTC medical record. In addition to asking a resident and his/her family about immunization history, staff may also retrieve and review the CCD if available, and they may log into an IIS user interface to look up immunization information. PALTC EHRs also lack sophisticated clinical decision support for immunizations, with staff relying on personal recall of immunization recommendations, stand-alone web tools, Excel® workbooks with macros, and/or IIS forecasting accessed via user interface login to help identify immunization needs.

[2]There are 61 IIS operating in each of the 50 states as well as American Samoa, the Commonwealth of the Northern Mariana Islands, the District of Columbia, the Federated States of Micronesia, Guam, New York City, Philadelphia, Puerto Rico, the Republic of the Marshall Islands, the Republic of Palau, and the US Virgin Islands.

Current Landscape *(continued)*

Most of the PALTC EHR vendors interviewed reported working to enhance capabilities to support immunization practice and the electronic exchange of immunization information. Despite cited minimal demand from PALTC organizations and resource challenges for this work, vendors reported work on enhancements to reduce manual processes and to support standards-based connectivity with IIS.

Challenges to advancing this connectivity were multi-faceted, including:

- Lack of understanding of and limited appreciation for the benefits of PALTC EHR-IIS connectivity.
- Public health and PALTC staff turnover and resource limitations for IIS staff, PALTC providers, and PALTC EHR vendors, making it difficult to prioritize and sustain work on PALTC EHR-IIS connectivity.
- Operational challenges in understanding and navigating varying jurisdictional laws, processes, and requirements related to IIS enrollment and IIS onboarding (i.e., establishing successful connectivity), especially among PALTC organizations and vendors operating in multiple jurisdictions.
- Technical limitations, with (current) lack of PALTC support for interoperability standards used in connectivity.

These factors, along with a general sense of vaccine fatigue in PALTC settings, depress the demand for connectivity among PALTC organizations and limit progress on this work.

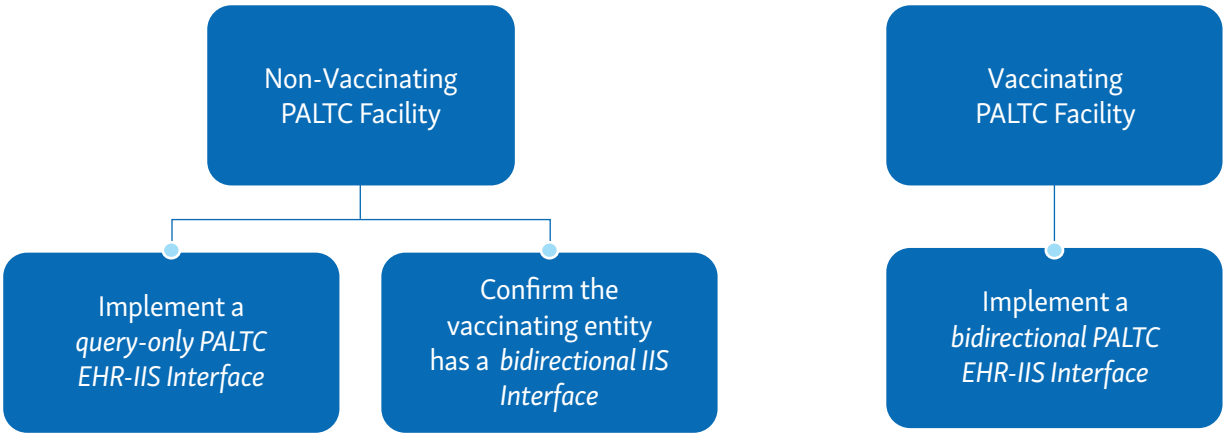
Finally, for PALTC staff, we learned that staff vaccination was monitored and recorded in systems outside the PALTC EHR, thus limiting opportunities to address staff vaccination via PALTC EHR-IIS connectivity.[3]

[3]Recording staff vaccination outside of an EHR system is common across health care providers. This information is usually only included in a provider EHR system when the staff person is vaccinated as a patient of the facility.

Vision for PALTC EHR-IIS Connectivity

Based on these findings, Figure 1 depicts a vision for how PALTC EHR-IIS connectivity can benefit PALTC facilities across the care spectrum. For all PALTC settings, IIS interfaces can help ensure residents are up to date for recommended immunizations.

Figure 1. PALTC EHR-IIS Connectivity Vision



- ✓ Assure and monitor resident immunization status
- ✓ Review immunizations administered by the vaccinating entity

- ✓ Review a resident's consolidated and evaluated immunization history
- ✓ Obtain clinical decision support for immunization
- ✓ Report immunizations administered

For non-vaccinating PALTC facilities, where a third-party entity (e.g., a pharmacy partner) is responsible for administering immunizations, the suggestion is two-fold:

1) Implement a query-only[4] PALTC EHR-IIS interface and

2) Confirm the vaccinating entity has a bidirectional[5] interface with the IIS.

The query-only interface will allow PALTC staff to access a resident's consolidated immunization history and list of immunization needs from within the EHR workflow. If the vaccinating entity has a bidirectional IIS interface in place, the query-only interface will allow PALTC staff visibility into immunizations administered historically, as well as by the vaccinating entity, and assure and monitor immunization coverage.

[4]A query-only interface supports HL7 query/response messaging for querying an IIS for patient immunization information (I.e., QBP/RSP messaging).

[5]A bidirectional interface supports HL7 query/response and submission/acknowledgement messaging for both querying an IIS for patient immunization information and submission of immunization information to an IIS (I.e., QBP/RSP and VXU/ACK messaging).

Vision for PALTC EHR-IIS Connectivity *(continued)*

For vaccinating PALTC facilities, where immunizations are administered by PALTC staff, a bidirectional PALTC EHR-IIS interface should be pursued. A bidirectional interface supports query/response messaging, to access a resident's consolidated, evaluated immunization history and clinical decision support, and submission/acknowledgment messaging, to report immunizations administered to the IIS.

For public health, this vision helps ensure PALTC residents receive recommended immunizations on time, via processes built into clinical and administrative workflows. Given the high staff turnover in PALTC facilities, electronic interfaces can reduce staff time spent training new PALTC staff on processes and procedures associated with logging into the IIS user interface and with non-standard data reporting. This is also critical given IIS resource challenges and staffing turnover in IIS programs. Finally, these interfaces also help ensure more comprehensive immunization data capture in IIS, supporting all IIS users in accessing timely information to support clinical practice and population health.

Swimlane diagrams further depicting the interactions between systems for non-vaccinating and vaccinating PALTC facilities are provided in Appendix A.

Recommendations

The following consensus-based guiding principles and recommendations are provided to help overcome the challenges of PALTC EHR-IIS connectivity and realize the vision of immunization interoperability between PALTC and public health.

Guiding principles

The statements below represent fundamental guidelines to inform and support collective action to advance PALTC EHR-IIS connectivity. These principles apply across recommendations.

- Residents in PALTC settings are at heightened risk of morbidity and mortality from vaccine-preventable disease; understanding resident immunization history via IIS connectivity is a key component in helping these individuals receive recommended immunizations and preventing the spread of disease. Settings without electronic connectivity to an IIS should access IIS information via user interface login to obtain consolidated immunization history and report immunizations administered (if applicable).
- PALTC EHR-IIS connectivity can benefit PALTC facilities across the care spectrum, from independent and assisted living to skilled nursing facilities; however, interface needs will vary by care setting depending on the party responsible for immunizing residents and the system used to track resident medical records (see Appendix A).
- Information on immunizations administered should ideally be recorded in the electronic medical record by the immunizing entity, with IIS connectivity supporting the visibility of this information across organizations as authorized. Without PALTC EHR-IIS connectivity, immunization information should be submitted to the IIS via another means (e.g., manual entry into the IIS user interface if staff capacity allows for timely reporting).
- Positive incentives encouraging PALTC EHR-IIS connectivity will be viewed more favorably than mandates.
- Sustainable funding is needed for PALTC and public health to act on these recommendations, support initial connectivity, and maintain successful interfaces.

Priority recommendations

Priority recommendations to advance PALTC EHR-IIS connectivity are presented across three categories:

1. Ensure awareness and understanding
2. Positively incentivize connectivity
3. Reduce the operational and technical burden of connectivity

Recommendations within these categories represent opportunities the collective PALTC and public health IIS community can take to spur action.

1 Ensure awareness and understanding of connectivity benefits to strengthen and monitor collaborative action

A critical first step in advancing connectivity is to ensure greater awareness and understanding of the opportunities and benefits of PALTC EHR-IIS connectivity, for PALTC organizations and staff, PALTC EHR vendors, and public health. Both the lack of awareness that connectivity with IIS represents more than a data reporting mechanism and the minimal demand for connectivity highlight opportunities to increase dialogue and establish or deepen relationships in this space. Leveraging existing relationships between local public health and PALTC facilities in their jurisdictions can help advance this effort.

- ✓ Articulate and promote the value of PALTC EHR-IIS connectivity across PALTC settings.
- ✓ Ensure greater awareness of PALTC among public health. For example, types of care settings, immunization practices by setting, state of health IT, health IT vendors, pharmacy role, and connectivity needs and benefits.
- ✓ Ensure greater awareness of IIS among PALTC organizations and staff. For example, jurisdictional role, jurisdictional laws and policies, enrollment needs and processes, and connectivity/interface options and processes.
- ✓ Ensure PALTC staff have access to on-demand training materials on IIS, including IIS query and response via an EHR interface, IIS submission and acknowledgment via an EHR interface, and patient lookup and record review within an IIS user interface.
- ✓ Promote and discuss PALTC EHR-IIS connectivity in jurisdictional and federal meetings and conferences on immunization and PALTC. For example, jurisdictional immunization conferences, AMDA chapter meetings, jurisdictional conferences focused on care quality in PALTC settings, regional conferences hosted by the American Health Care Association/the National Center for Assisted Living (AHCA/NCAL), the AHCA/NCAL Annual Convention and Expo, the American Immunization Registry Association (AIRA) National Meeting, the National Adult and Influenza Summit Meeting, AMDA's National Meeting, and the CDC National Immunization Conference.
- ✓ Ensure PALTC representation in federal immunization meetings and discussions. For example, the Advisory Committee on Immunization Practices and the National Vaccine Advisory Committee.
- ✓ Promote holistic discussion of immunization in PALTC settings, highlighting immunization needs across vaccine groups for PALTC residents and providing resources to implement comprehensive immunization programs in these settings.
- ✓ Identify and track key metrics to monitor PALTC EHR-IIS connectivity and intended outcomes (improved access to immunization information and increased vaccination rates in PALTC settings); share progress and best practices across the PALTC, public health, and IIS communities.

Priority recommendations *(continued)*

2 Positively incentivize connectivity

In addition to greater awareness and understanding, financial, policy, and operational incentives are needed to motivate action. Specifically, positive incentives are needed, given the historical lack of investment in PALTC EHR capabilities and resource challenges inherent to realizing the PALTC EHR-IIS connectivity vision. The actor(s) to incentivize and the means to incentivize may vary, depending on the care setting and policy lever(s) pursued. For example, assisted living facilities are regulated by the states, without federal oversight, while other settings within PALTC are federally regulated.

- ✓ Pursue federal incentives where appropriate to motivate and support PALTC EHR-IIS connectivity.
- ✓ Pursue local/jurisdictional incentives where appropriate to motivate and support PALTC EHR-IIS connectivity.
- ✓ Provide guidance to PALTC operators on recommended contractual requirements for pharmacy partners/third-party vaccinators to support PALTC EHR-IIS connectivity.
- ✓ Ensure alignment and coordination among federal partners (Centers for Medicare and Medicaid Services (CMS), Office of the National Coordinator for Health Information Technology (ONC), and CDC) to support PALTC EHR-IIS connectivity.
- ✓ Re-assess PALTC immunization data reporting requirements to the National Healthcare Safety Network (NHSN) given potential opportunities presented by PALTC EHR-IIS connectivity; ease PALTC immunization data reporting burdens where possible.

Priority recommendations *(continued)*

3

Reduce the operational and technical burden of connectivity

Finally, a third priority category is to reduce the operational and technical burdens associated with establishing and maintaining connectivity. Establishing connectivity between over 68,000 PALTC providers and 61 jurisdictional IIS represents a significant undertaking. While the CDC IZ Gateway infrastructure supports centralized routing of immunization messages from a provider system to appropriate IIS, it is unclear if PALTC EHR-IIS connectivity will be mediated by the IZ Gateway or if it will be direct with jurisdictional IIS.[6] This requires clarification.

Regardless of data flow, guidance is needed to assist PALTC organizations and vendors in preparing for and navigating processes and requirements associated with IIS enrollment and connectivity. On the public health side, accelerating IIS standardization in HL7 implementation and onboarding processes will help advance connectivity.

- ✓ Explore the potential for the **CDC IZ Gateway** to support centralized coordination, management, and routing of PALTC EHR-IIS connectivity, especially for PALTC organizations and EHR vendors operating in multiple jurisdictions. Identify anticipated timelines for onboarding if applicable.
- ✓ Develop guidance for PALTC EHR vendors on standards for IIS connectivity (see Appendix B for guidance developed to serve this purpose).
- ✓ Clarify IIS community expectations for data elements that may be open to interpretation and/or challenging for PALTCs to populate in HL7 messages (e.g., patient address, next of kin, vaccine funding program eligibility, etc.).[7]
- ✓ Accelerate efforts to develop guidance to support EHR vendors in operationalizing IIS exchange (e.g., workflows and triggers to initiate HL7 query by parameter (QBP) messages, unsolicited vaccination record update (VXU) messages[8], and reconciliation of data returned in an HL7 segment pattern response (RSP) message).
- ✓ Accelerate AIRA IIS **Measurement and Improvement efforts** and IIS validation to harmonize IIS implementation of data exchange standards where feasible.
- ✓ Accelerate AIRA **Onboarding Shared Services** efforts to streamline and standardize jurisdictional onboarding processes, per consensus-based recommendations for establishing and testing IIS interfaces.
- ✓ Establish a shared service center for PALTC and other providers and EHR vendors interested in establishing connectivity with public health IIS, to consult on questions and challenges related to connectivity and interoperability of immunization information.
- ✓ Develop guidance for PALTC organizations and EHR vendors on navigating jurisdictional IIS enrollment and IIS onboarding processes.

[6] To date, the IZ Gateway has focused on supporting immunization interoperability between IIS and between federal agencies/health IT systems (e.g., Department of Veterans Affairs) and IIS.

[7] See *Preparing for Immunization Interoperability with Public Health: Keys to Connectivity for Post-Acute and Long-Term Care Electronic Health Record Vendors*, Appendix B, Data Elements for Further Clarification.

[8] The AIRA Standards and Interoperability Steering Committee is currently working on a project to define triggers for when query and update messages should be sent to an IIS, with publication expected in 2024.

Additional facilitators

In addition to recommendations spanning the priority categories, the following are identified as additional facilitators to support the interoperability of immunization information. These recommendations apply to the broader health IT ecosystem in which PALTC and IIS operate.

- Accelerate efforts to harmonize interoperability standards. Expand the **US Core Data for Interoperability** to include additional elements needed to support immunization interoperability.[9]
- Ensure PALTC involvement in the **Helios FHIR Accelerator** efforts, including the IIS Bulk Data Query use case, to pilot FHIR bulk data query to support immunization assessment across an PALTC population.[10]
- Develop additional resources to support the adoption and use of health IT in PALTC settings, potentially using work done to support the **use of certified health IT** in pediatric care settings as a model for this effort.
- Increase the value of recognition and certification programs related to immunization interoperability, including IIS validation status[11] in the AIRA Measurement and Improvement program and ONC certification for transmission to immunization registries.[12] Consider opportunities to further promote public health jurisdictions and EHR vendors that have achieved validation/certification.
- Provide greater transparency around plans for the CDC IZ Gateway, including prioritized data exchange partners, timelines for connectivity, and connectivity options/guidance for lower priority or non-prioritized provider organizations.
- Explore opportunities to advance connectivity between occupational health systems used in PALTC and other health care settings and IIS.

[9]See previously submitted AIRA feedback on USCDI as it relates to interoperability of immunization data.

[10]See an update on the FHIR Accelerator work in progress on bulk data access.

[11]See a description of the validation and IIS validation by content area.

[12]See the ONC certified health IT product list; use advanced search to identify products certified for criterion 170.315(f)(1): Transmission to Immunization Registries.

Conclusion

Comprehensive infection prevention and control in PALTC settings is critical to prevent morbidity and mortality in this high-risk population. Ensuring PALTC residents receive recommended immunizations is an ongoing need, complicated by transitions of care, the need for administration of multiple doses and/or recurring vaccination according to the latest immunization recommendations, and PALTC resource challenges. Connectivity between PALTC settings and public health IIS can help address these challenges, by helping to ensure residents receive the right vaccines at the right times.

While recommendations for tracking and improving vaccination rates among PALTC staff is beyond the scope of this analysis, it must be acknowledged that this is a key vulnerability in keeping PALTC patients and residents safe. Unvaccinated staff remain a principal vector of transmission of infectious disease in PALTC settings, putting residents and co-workers at risk. Significant work remains to bolster staff vaccination in PALTC settings; as of December 2023, fewer than 10% of nursing home staff were up to date for COVID-19 vaccination.[xvii]

Realizing the vision and benefits of immunization interoperability between PALTC settings and public health requires collective action by these communities and federal partners. Consensus recommendations identified by these stakeholders will move the needle on these actions, helping to make routine adult immunization a standard of care for PALTC residents.

Acknowledgments

AIRA and AMDA would like to acknowledge and thank the following individuals and organizations for their contributions to this project:

PALTC and pharmacy representatives who contributed their expertise through facilitated discussions and/or document review:

Maggie Cameron, Netsmart
Lisa Conrad, Yardi
Brandon Gardiner, Yardi
Elise Guerrier, PointClickCare
Michael Healey, Saisystems
Roger Smith, Netsmart
Claire Stephens, American HealthTech
Fil Southerland, Yardi
Chad Worz, American Society of Consultant Pharmacists

Jurisdictional IIS representatives who contributed their expertise through facilitated discussions and/or document review:

Fred Bailey, Delaware Department of Health and Social Services
Tania De Castilhos, Michigan Department of Health and Human Services
Christy Gray, Virginia Department of Health
Rashid Malik, Maryland Department of Health
Brett Oakland, South Dakota Department of Health
Joann Parris, Washington State Department of Health
Doug Smith, Michigan Department of Health and Human Services
Patricia Swartz, Maryland Department of Health
Lizz Wenzell, Minnesota Department of Health
Mary Woinarowicz, North Dakota Department of Health

CDC representatives who contributed their expertise through discussions and document review:

Jeneita Bell, CDC, National Center for Emerging and Zoonotic Infectious Diseases
Amy Parker Fiebelkorn, CDC, National Center for Immunization and Respiratory Diseases

Acknowledgments *(continued)*

AIRA and AMDA would like to acknowledge and thank the following individuals and organizations for their contributions to this project:

The AIRA and AMDA project team who led the project:

Elizabeth Abbott, AIRA
Jody Dial, AIRA
Mary Beth Kurilo, AIRA
Erin Roche, AIRA
Heather Roney, AMDA
Elizabeth Sobczyk, AMDA

Additional AIRA and AMDA representatives who contributed to discussions and/or document review

Eric Larson, AIRA
Chris Laxton, AMDA
Melissa McClung, AIRA

Appendix A

Swimlane Diagrams

Figure 2. Non-Vaccinating Post-Acute and Long-Term Care Facility: Query-Only PALTC EHR-IIS Interface and Bidirectional Vaccinator-IIS Interface

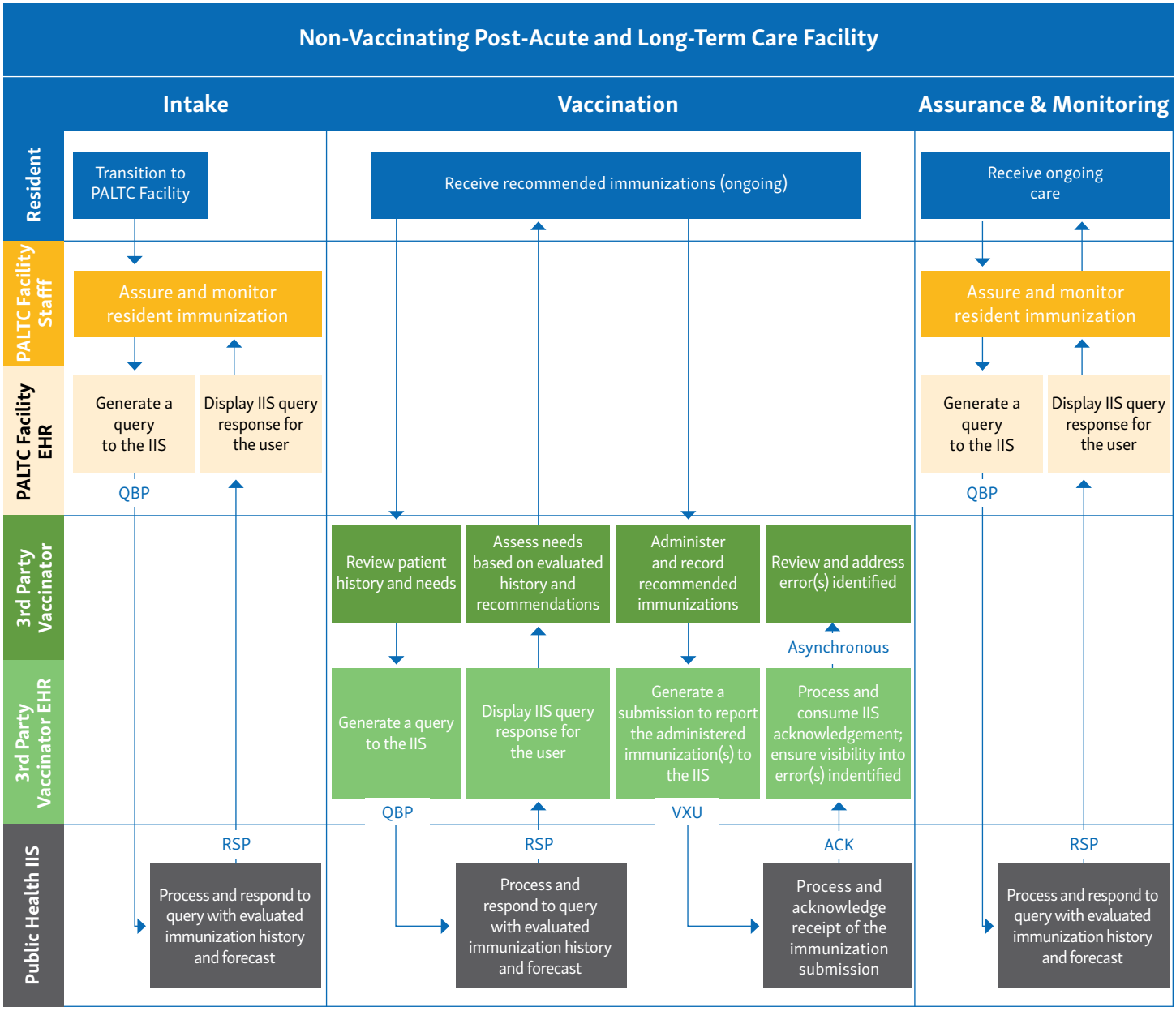
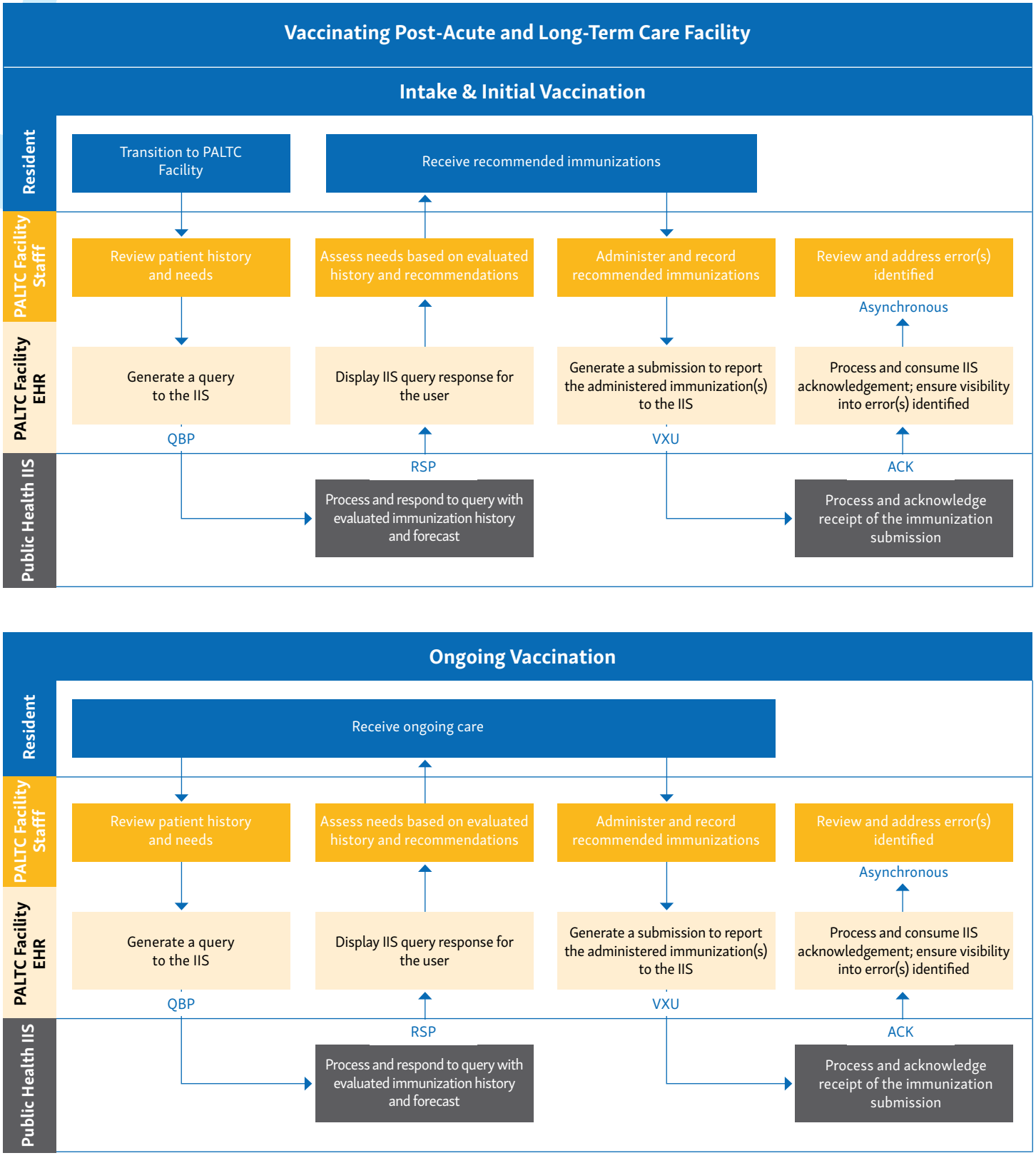


Figure 3. Vaccinating Post-Acute and Long-Term Care Facility: Bidirectional PALTC EHR-IIS Interface



Appendix B

Resources to Support PALTC EHR Vendor Technical Readiness for Connectivity

Electronic health record vendors working in the post-acute and long-term care space are encouraged to use the following resources in preparing for connectivity with public health IIS.

Preparing for Immunization Interoperability with Public Health: Keys to Connectivity for Post-Acute and Long-Term Care Electronic Health Record Vendors

This resource reviews five keys to connectivity to support PALTC EHR vendor technical readiness for immunization data exchange:

1. Support SOAP-based web service exchange
2. Support HL7 v2.5.1 messaging
3. Support interface configurability, to align with jurisdictional laws and policies
4. Ensure workflows to capture and manage data elements
5. Prepare for processes associated with connectivity: onboarding and ongoing monitoring and maintenance

Supporting Immunization Interoperability Self-Assessment Workbook

This workbook supports EHR vendor self-assessment of the capabilities and data elements needed to support successful immunization interoperability, across several domains:

- Transport
- Format
- Vocabulary and code sets
- Data elements

For copies of these resources, email **movingneedles@paltc.org**.

References

[i]Kaiser Family Foundation, 2021. Is the End of the Long-Term Care Crisis Within Sight? New COVID-19 Cases and Deaths in Long-Term Care Facilities Are Dropping. Accessed December 2023 at https://www.kff.org/policy-watch/is-the-end-of-the-long-term-care-crisis-within-sight-new-covid-19-cases-and-deaths-in-long-term-care-facilities-are-dropping/

[ii]Kaiser Family Foundation, 2020. Key Questions About the Impact of Coronavirus on Long-Term Care Facilities Over Time. Accessed December 2023 at https://www.kff.org/report-section/key-questions-about-the-impact-of-coronavirus-on-long-term-care-facilities-over-time-issue-brief/

[iii]CDC. Adult Immunization Schedule by Age. Accessed December 2023 at https://www.cdc.gov/vaccines/schedules/hcp/imz/adult.html

[iv]McGarry B.E., Barnett M.L., Grabowski D.C. and Gandhi A.D., 2022. Nursing Home Staff Vaccination and COVID-19 Outcomes. New England Journal of Medicine, 386:397-8. Accessed December 2023 at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8693685/

[v]McGarry B.E., Shen, K., Barnett M.L., Grabowski D.C. and Gandhi A.D., 2021. Association of Nursing Home Characteristics With Staff and Resident COVID-19 Vaccination Coverage. JAMA Internal Medicine, 181(12):1670-1672. Accessed December 2023 at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8446903/

[vi]Influenza Working Group, National Adult and Influenza Immunization Summit, 2019. Guidance for Leaders/Administrators in Post-Acute and Long-Term Care Facilities Who Plan to Improve Staff Influenza Vaccination Compliance through Vaccination Requirement Policies. (See Policies Requiring Influenza Vaccination of Health Care Personnel: Rationale and Supporting Evidence). Accessed December 2023 at https://www.izsummitpartners.org/content/uploads/2019/02/guidance-for-developing-a-flu-vax-reqt-policy-for-hcp-in-post-acute-and-ltcf.pdf

[vii]AIRA, 2020. An Environmental Scan on Progress, Challenges, and Opportunities: Expanding Immunization Information Systems for Adults in the United States. Accessed December 2023 at https://repository.immregistries.org/resource/aira-adult-iis-literature-review/

[viii]AIRA, 2021. Landscape Analysis Report: Capture and Utilization of Adult Vaccination Data in IIS. Accessed December 2023 at https://repository.immregistries.org/resource/landscape-analysis-report-capture-and-utilization-of-adult-vaccination-data-in-iis/

[ix]CDC, 2020. Biennial Overview of Long-term Care in the United States. Accessed December 2023 at https://www.cdc.gov/nchs/npals/webtables/overview.htm

[x]Kruse CS, Mileski M, Alaytsev V, Carol E, Williams A., 2015. Adoption factors associated with electronic health record among long-term care facilities: a systematic review. BMJ Open. Accessed December 2023 at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4316426/

[xi]Vest JR, Jung HY, Wiley K Jr, Kooreman H, Pettit L, Unruh MA, 2019. Adoption of Health Information Technology Among US Nursing Facilities. J Am Med Dir Assoc. December 2023 at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6591108/

[xii]Ibid

[xiii]Alexander GL, Liu J, Powell KR, Stone PW, 2022. Examining Structural Disparities in US Nursing Homes: National Survey of Health Information Technology Maturity. JMIR Aging. Accessed December 2023 at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9449826/

[xiv]CDC. About Immunization Information Systems. Accessed December 2023 at https://www.cdc.gov/vaccines/programs/iis/about.html

[xv]CDC, 2022. IISAR Survey Data. Accessed December 2023 at https://www.cdc.gov/vaccines/programs/iis/iisar-survey-data.html

[xvi]CDC. Nursing Home COVID-19 Vaccination Data Dashboard. Accessed December 2023 at https://www.cdc.gov/nhsn/covid19/ltc-vaccination-dashboard.html

Moving Needles

A CDC FUNDED INITIATIVE

This work is part of the Moving Needles Initiative, supported by CDC Cooperative Agreement NH23IP922655.

MOVINGNEEDLES.ORG