Immunization Information System (IIS) Core Competency Model

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IIS Core Competency Model

The IIS Core Competency Model is the updated version of an earlier model, developed in 2015. It has been extensively revised by the PHII team and reviewers (see the Acknowledgements section on page 16) to provide behaviorally-based competencies that define an effective IIS workforce. The model creates a framework for learning and professional development by ensuring a direct relationship between key performance behaviors and training. Additionally, it provides IIS staff a tool for workforce planning that serves as a roadmap for building a high-performing IIS team.

The driving question used by PHII in revising this model was, “What does an IIS program have to know and do to be high-performing?”

The 2021 model contains:

- Core competency domains - The eleven domains outline key areas of IIS performance.
- Core competency domain definitions - The definitions convey the meaning and scope of each core competency domain.
- Competency statements - Each domain has a number of statements that outline the required knowledge, skills and abilities. These are the functional, behaviorally-based tasks or processes that can be observed or measured and are required for the successful, high-performing functioning of an IIS. Where possible, published documents that define performance (such as best practices or standards guides) were included by title and, where possible, are accessible through a hyperlink.
- Glossary of terms - A glossary of terms is included at the end. Terms included in the glossary are bolded on first usage throughout the document.

The IIS Core Competency Model supports a wide spectrum of IIS staffing models, defining how IIS performance success aligns with national immunization goals and recognized operational strategies.
Leadership and management

Definition
Leadership and management is the application of strategic thinking and operational skills to fully leverage the IIS in support of immunization and other public health goals.

Knowledge, skills and abilities to:
Work closely with the immunization program manager to:

1. Create and maintain strong collaborative relationships by communicating with IIS stakeholders to build support for the IIS and ensure its ongoing, effective use.
2. Engage health department leadership and other stakeholders to anticipate and address changing priorities to ensure IIS credibility and utility.
3. Establish strategic priorities that meet the needs of the immunization program, health department leadership, external stakeholders and the IIS team to advance the IIS.
4. Establish and monitor performance targets needed to achieve immunization program and IIS priorities.
5. Understand and manage the interaction and interdependence among people, policies, processes and technology that together impact IIS credibility and effectiveness.
6. Assess organizational and staffing capacity needs to achieve program priorities and performance targets.
7. Develop IIS workforce to support staff advancement and retention through activities such as mentorship, training and coaching to achieve necessary workforce competency.
8. Monitor and promote integration of the IIS into the immunization program components described in the Immunization Program Operations Manual (IPOM).
9. Collaborate within and across IIS platform groups to share resources, including IIS source code, to achieve economies of scale.
10. Develop funding goals and proposals that align with the priorities of funders as well as internal and external IIS users.
11. Contribute to/create budgets, monitor and adjust budgets, and ensure expenditures are appropriate for the respective funding source(s).
12. Negotiate and advocate for human, financial, technical and other resources to improve IIS operations and effectiveness.
13. Develop procurement solicitations that address program needs by working closely with the health department and/or jurisdiction’s procurement staff.
14. Negotiate, execute and monitor contracts and service level agreements with IT product and/or services vendors in support of the IIS program.
15. Work with jurisdictional legal counsel and legislative liaisons to propose and justify laws, policies and regulations to promote IIS advancement and use.
16. Document, develop and maintain clearly defined standard operating procedures (SOP) to support execution of important tasks and improve new project staff learning.
Law and policy

Definition
Law and policy refer to the process of ensuring IIS alignment with federal and jurisdictional laws as well as advocacy for laws and policies which support effective IIS operations.

Knowledge, skills and abilities to:

1. Align IIS policy, procedures, **authorization agreements** (e.g., data use agreements, IIS user agreements, confidentiality statements or memoranda of understanding) and system decisions with laws and regulations.
2. Communicate to internal and external stakeholders the laws and regulations related to IIS participation (e.g., data access and use, opt-in/out-out, data sharing consent requirements, redisclosure limits, emergency powers).
3. Work with jurisdictional legal counsel, legislative liaisons and community partners to propose, justify and advocate for laws and regulations to promote IIS data quality and data use, ensuring an appropriate balance between privacy protections and the need for complete and available data.
4. Develop, execute, monitor and enforce data sharing, confidentiality and other agreements based on laws and regulations and in accordance with [AIRA](https://www.aira.org), [CDC](https://www.cdc.gov) and the [Network for Public Health Law](https://www.networkhealthlaw.org) guidance.
5. Ensure authorization agreements are executed prior to data access, sharing or use and are maintained per record retention requirements.
6. Implement written and approved confidentiality policies in consultation with jurisdictional privacy and security officers to protect the privacy and maintain the trust of the individuals whose data is in the IIS and those organizations that submit data.
**Communication**

**Definition**
Communication is engaging internal and external stakeholders to build and sustain effective use of the IIS and its data.

**Knowledge, skills and abilities to:**

1. Conduct analyses to identify stakeholders and determine their levels of interest and influence in IIS data, operations and outcomes.
2. Develop and implement IIS communication plans and messaging tailored to specific audiences to achieve a desired end (e.g., call to action, a change in procedures, or some other behavioral/measurable or informational change).
3. Use multiple communication channels to disseminate IIS information and ensure effective audience reach.
4. Communicate the value of the IIS to internal and external stakeholders.
5. Provide relevant and timely updates to IIS end users (e.g., planned downtimes, IT releases, vaccine updates, immunization policies, immunization recommendations) and maintain up-to-date contact information on individual users.
6. Communicate accurate demographic, statistical, programmatic and scientific information to peers and other stakeholders (e.g., CDC, AIRA) to advance the IIS body of knowledge.
7. Share knowledge and practices across the IIS and broader public health communities (e.g., present at conferences and in webinars, develop manuscripts for journals).
8. Summarize and present IIS immunization coverage reports and other information to educate and/or persuade audiences.
9. Evaluate the effectiveness of communications strategies in achieving desired outcomes and make modifications for improvement as needed.
Data use

Definition
Data use is the translation of IIS data into actionable information to support clinical practice, immunization program operations and other purposes that protect and promote the health of individuals and communities.

Knowledge, skills and abilities to:

1. Provide actionable information to authorized stakeholders for individual, clinic, population and public health purposes.
2. Create and follow a protocol to document, evaluate, manage and follow up on data requests in a manner that increases IIS utility and credibility while adhering to jurisdictional laws and policies.
3. Ensure patient privacy by applying appropriate controls on data access, such as masking/suppressing data to ensure patient privacy when sharing IIS data.
4. Analyze IIS data using sound, reproducible methods and document results that communicate methodology, findings and limitations to peers and other stakeholders (e.g., CDC, IIS).
5. Use a data model and a data dictionary provided by vendor/implementer to support effective querying and interpretation of IIS data.
6. Use data to assess provider coverage rates and support quality improvement in clinical immunization practice, as per the Immunization Quality Improvement Program (IQIP).
7. Use data to support immunization program activities and goals such as VFC program management, perinatal Hepatitis B prevention, surveillance, and outbreak preparedness and response.
8. Use data to increase immunization compliance in child care and school settings (e.g., data sharing with school information systems, enable parental access to records, provide reports for monitoring).
9. Use data to assess and monitor immunization coverage rates as noted in AIRA Analytic Guide for Assessing Vaccination Coverage Using an IIS for specific geographic areas and identify at-risk/vulnerable populations referencing AIRA’s Identifying Immunization Pockets of Need — Small Area Analysis of IIS Data to Detect Undervaccinated Populations.
10. Use data to facilitate individual reminder/recall and vaccine product recall referencing AIRA’s Reminder/Recall in Immunization Information Systems and Conducting Centralized Reminder/Recall Using an IIS.
11. Use data to support vaccine adverse event investigations.
12. Share aggregate and/or record level de-identified data with the CDC to support the generation of national coverage estimates and other purposes.
Data quality

Definition
Data quality is the application of methods to ensure the integrity of IIS data and to enable stakeholder trust and use of that data.

Knowledge, skills and abilities to:

1. Assess and monitor overall data quality across defined characteristics (e.g., complete, timely, available, valid, accurate, consistent and unique) to regularly monitor and evaluate data as noted in the CDC IIS Data Quality Blueprint.
2. Assess and monitor data quality by immunization providers/data submitters according to AIRA IIS Data Quality Practices Monitoring and Evaluating Data Submissions.
3. Identify strengths and weaknesses in data quality using AIRA Measurement and Improvement (M&I) Aggregate Analysis Reporting Tool (AART) feedback and prioritize activities to improve data quality.
4. Develop and implement strategies, protocols and activities (e.g., using external data sources, conducting outreach to data submitters) to monitor, prevent and address demographic and vaccine data quality problems.
5. Develop and integrate data quality checks into the IIS onboarding process, according to AIRA Data Validation Guide for the IIS Onboarding Process and AIRA Onboarding Consensus-based Recommendations.
6. Ensure that all CDC-endorsed Core Data Elements For IIS Functional Standards are collected and stored.
7. Apply record matching practices to incoming data to prevent duplicate demographic records and/or vaccination event records referencing AIRA Vaccination Level Deduplication in Immunization Information Systems.
8. Develop and implement protocols for data at rest to automatically and manually address merging of potential duplicate demographic and vaccination records and to unmerge incorrectly merged records using AIRA Consolidating Demographic Records and Vaccination Event guidance and AIRA IIS Data Quality Practices - To Monitor and Evaluate Data at Rest.
9. Format, validate and geocode IIS addresses to USPS standards (e.g., using SmartyStreets) referring to AIRA IIS Implementation Guidance for a Shared Address Cleansing & Geocoding Service and IIS Reintegration of Cleansed Addresses and Geocodes.
10. Validate the accuracy of individuals' IIS addresses using methods such as LexisNexis and/or reminder-recall.
11. Actively manage patient status at all levels (e.g., geographic jurisdiction and provider organization) according to AIRA MIROW guide Management of Patient Status in Immunization Information Systems.
12. Ensure IIS immunization evaluation and forecasting aligns with the Advisory Committee on Immunization Practices (ACIP) recommendations, using the CDC CDSi Logic Specifications and AIRA Aggregate Analysis Reporting Tool (AART).
13. Conduct **evaluation** of data quality strategies, protocols and activities at least annually to identify areas needing improvement.
14. Use what is learned from ongoing data quality experience to continually enhance automated deduplication processes for demographic and vaccination records.
Interoperability

Definition
Interoperability is the utilization of IIS technical standards, infrastructure and processes to accurately and securely exchange information between IIS and other systems, including other IIS.

Knowledge, skills and abilities to:

1. Establish and maintain interfaces (e.g., immunization provider, vital records, VTrckS, IZ Gateway) for receipt/exchange of data using CDC-approved interoperability standards (e.g., the most recent CDC-endorsed HL7 Implementation Guide and transport standard) between the IIS and other systems.
2. Ensure new immunization providers are onboarded based on best process guidance such as AIRA Data Validation Guide for the IIS Onboarding Process and AIRA Onboarding Consensus-based Recommendations.
3. Ensure that complete, secure, timely and accurate immunization data are submitted to the IIS by evaluating messages and resolving conformance issues through routine engagement with data submitters using the most recent CDC-endorsed HL7 Implementation Guide and AIRA Data Quality Guidance.
4. Utilize testing strategies and tools for ensuring data quality for incoming and outgoing messages, such as AIRA’s Message Quality Evaluator (MQE) and National Institute of Standards and Technology (NIST) interoperability testing resources/tools (e.g., Implementation Guide Authoring and Management Tool [IGAMT] and Immunization Test Suite).
5. Apply record matching practices to incoming data to prevent duplicate records of individuals and vaccination events.
6. Document data exchange and data quality processes by utilizing business process analysis techniques to ensure optimal efficiency, clarity and transparency.
7. Protect patient privacy in the collection, storage and exchange of immunization data by applying a common and approved set of policies and technical strategies compliant with AIRA Confidentiality and Privacy: Considerations for IIS, AIRA Security Guidance Considerations for Immunization Information Systems and jurisdictional and national public health laws and regulations.
8. Validate and encourage authorized users to access IIS data via HL7 query and response to improve immunization coverage and improve EHR-IIS synchronization.
9. Incorporate the collection of legacy data into the onboarding process to improve data saturation as noted in AIRA’s Importing Legacy Data to Improve Data Saturation guide.
Information systems management

Definition
Information systems management is the application and administration of technologies to securely and effectively meet IIS program and user needs.

Knowledge, skills and abilities to:

1. Use a systems development life cycle (SDLC) framework to plan and implement secure system design or modification projects where applicable.
2. Ensure system optimization by routinely monitoring system technical attributes (e.g., performance, usability, reliability, security maintainability and portability as noted in AIRA Security Guidance Considerations for Immunization Information Systems) using documented metrics and addressing any deficiencies.
3. Ensure sufficient processing capacity, bandwidth, storage and redundancies are maintained for current needs and planned for future needs.
4. Develop plans to anticipate changes in IIS infrastructure needs (e.g., increased processing power or data storage).
5. Identify, document and use functional and non-functional requirements and specifications to ensure business needs are met (e.g., for evaluating available products or for developing, documenting and testing system enhancements and usability).
6. Implement thorough testing (e.g., documented test scripts, regression testing, user acceptance testing) to ensure the required results are achieved, utilizing test cases as developed through AIRA's Aggregate Analysis Reporting Tool (AART) when possible.
7. Examine and redesign workflows to identify needed system changes to meet business needs or address inefficiencies that hamper performance or introduce errors.
8. Collaborate with IT and/or vendor to implement change control practices for software enhancements, bug fixes and maintenance patches.
9. Implement account management policies and practices that address both individual/user and organizational accounts that are consistent with jurisdictional policies.
10. Develop and maintain system documentation (e.g., functional and technical requirements, management plans, release schedules, implementation plan, operations and maintenance plan, service level agreements, security plan, contingency/recovery plans, testing plans, operations manual and related training materials) as noted in Immunization Program Operations Manual (IPOM) and CDC IIS Functional Standards.
**Project management**

**Definition**
Project management is the application of appropriate methods and tools to achieve defined IIS-related objectives within the available time, human, technical and budgetary resources.

**Knowledge, skills and abilities to:**

1. Use industry standard project management frameworks (e.g., project management lifecycle framework) to ensure a structured and shared methodology.
2. Use a work breakdown structure (WBS) to document the project phases, activities, due dates, assigned resources and dependencies to actively manage a project’s scope and timeline.
3. Document project deliverables in unambiguous language to ensure a shared understanding among stakeholders of project goals and success.
4. Document performance work statements (PWS)/statements of work (SOW) for procurement of IT products and services following jurisdictional regulations, policies and procedures.
5. Monitor performance of a vendor/implementer on an ongoing basis to ensure the provisions of the PWS are fully met and to ensure effective performance in support of IIS.
6. Solicit internal and external stakeholder input in project planning and execution.
7. Maintain immunization program and IIS project team engagement and communication through frequent and various communication methods (e.g., project status reports, verbal and documented sharing in team meetings, and remote work collaboration tools with vendors/implementers).
8. Develop and manage project budgets to accurately monitor expenditure/spend-down rates and to forecast budgetary needs.
9. Document and manage project risks, issues and scope changes using defined tools and templates.
**Change management**

**Definition**
Change management is the application of methods and tools to engage and support stakeholders through changes in IIS policies, processes and/or technologies.

**Knowledge, skills and abilities to:**

1. Identify opportunities for constructive change in IIS policies, processes and/or technologies, and communicate the value case for change to relevant internal and/or external stakeholders.
2. Assess the readiness for change of internal and external stakeholders at the outset of a change initiative.
3. Develop and implement change management plans for internal and external stakeholders to build support, communicate, train and/or provide technical assistance.
4. Build support for change initiatives by engaging internal and external stakeholders.
5. Develop and implement training and technical assistance for internal and external stakeholders to support change initiatives.
Training

Definition
Training is the planning and execution of learning activities for internal and external users to expand their knowledge and use of the IIS.

Knowledge, skills and abilities to:

1. Assess training needs and skill gaps for internal and external IIS users for policy, process and systems changes.
2. Develop training plans to address the identified training needs of IIS stakeholders.
3. Identify existing resources and learning opportunities (e.g., quick guides, face-to-face tutorials, workshops, on-demand tutorials, webinars, forums, seminars) to meet the training needs identified in the training plan.
4. Develop and deliver learning opportunities (e.g., face-to-face training, workshops, on-demand tutorials, webinars, forums, seminars) and materials (e.g., quick reference guides, job aides) to meet gaps between the training plan and existing learning, using evidence-based theories of adult learning.
5. Conduct evaluations to measure the impact of IIS training for internal and external users using learning evaluation models (e.g., Kirkpatrick model, Learning-Transfer Evaluation Method).
6. Review and update IIS training materials regularly to ensure alignment with IIS functionality (e.g., as new versions of software are released and new workflows or processes are implemented).
Evaluation

Definition
Evaluation is the application of methods and data (from IIS as well as other sources) to determine the relevance, effectiveness and impact of immunization program policies and activities and to improve IIS operations.

Knowledge, skills and abilities to:
1. Use a structured approach to plan and implement evaluation such as the CDC Framework for Program Evaluation.
2. Design and implement studies (e.g., process and outcome evaluations) to measure the effectiveness of immunization program policies and activities (e.g. reminder/recall efforts, data quality, help desk support, systems development life cycle).
3. Design, implement and evaluate methods to accurately assess vaccination coverage as noted in AIRA Analytic Guide for Assessing Vaccination Coverage Using an IIS and utilize vaccination coverage data to inform program improvements.
4. Design, implement and evaluate methods to accurately assess vaccine accountability for publicly-purchased vaccine.
5. Improve alignment with the CDC IIS Functional Standards to improve or correct program performance.
6. Monitor and promote the integration of the IIS into immunization program components described in the Immunization Program Operations Manual (IPOM).
7. Evaluate the usability of the IIS to facilitate reporting and access.
8. Evaluate effectiveness of communications in achieving desired outcomes.
9. Conduct evaluations to measure the impact of IIS training for internal and external users.
10. Share evaluation knowledge and practices across the IIS community (e.g., present at conferences and in webinars, develop manuscripts for journals).
Glossary

**Authorization agreements** - Formal or legal agreements between an organization submitting and/or using immunization data and the jurisdiction in which the terms for participating in the IIS are outlined per jurisdictional policy. Examples include data use agreements, IIS user agreements, confidentiality statements or memoranda of understanding.

**IIS body of knowledge** - Set of concepts, terms, guidance and standards relating to IIS as defined by the relevant professional associations—e.g., American Immunization Registry Association (AIRA), Association of Immunization Managers (AIM), federal agencies (including Centers for Disease Control and Prevention [CDC] and Office of the National Coordinator for Health IT [ONC]), or standards development organizations, such as HL7 International.

**Competency** - A defined set of observable and measurable knowledge, abilities, skills and behaviors that must be applied to achieve results aligned with the goals of the functioning IIS.

**Evaluation** - The systematic and objective examination of activities to determine their relevance, effectiveness and/or impact.

**Immunization information system (IIS)** - Immunization information systems (IIS) are confidential, population-based, computerized databases that record all immunization doses administered by participating providers to persons residing within a given geopolitical area.\(^1\) Refers to the collective functions, capabilities and attributes that support the information needs and goals of immunization programs and their stakeholders. May be a single integrated system or a system composed of interoperable component modules.

**Jurisdiction/jurisdictional** - A geopolitical area identified by a governing authority.

**Laws** - Statutes, case law, rules and/or regulations enacted by legislative bodies and promulgated by executive branch agencies such as health departments. Provides the statutory authority for an IIS to operate and/or to receive and share immunization information (with or without consent).

**Systems development life cycle (SDLC)** - A conceptual model used in information system design and development that defines the stages in bringing a project from inception to completion.

**Stakeholder** - Persons and organizations that have an interest or concern in the functioning, data or use of an IIS.

**User/authorized user** - A person who is authorized to access and use data from an IIS.

**Vendor/implementer** – An organization or organizational unit that provides IT support for IIS software. This can be a private vendor with a commercial IIS product, an internal software development/IT unit within the jurisdiction, or an organization that supports implementation and use of open source software.

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\(^1\) Adapted from https://www.cdc.gov/vaccines/programs/iis/about.html
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