



Immunization Information System (IIS) Functional Model

The IIS Functional Model presents a framework and terminology for conveying and communicating the core functions, capabilities and attributes of IIS. These systems, whether as a single integrated IIS or as a set of interoperable modules, support public health immunization programs in achieving the **CDC IIS Functional Standards*** and in providing trusted data and information to improve clinical immunization practice, increase vaccination and reduce vaccine-preventable disease.

The model also serves as a companion and index to the **IIS Baseline Requirements Traceability Matrix (RTM)**, which provides detailed requirements across IIS functions, capabilities and attributes. The RTM and other requirements tools can be found at phii.org/iis-requirements.

IIS Core Functions and Capabilities

These functions and capabilities represent core functionality of IIS. Refer to the **IIS Baseline RTM** for descriptions and functional requirements associated with each.

Administer System		Manage Organizations & Facilities		Manage Users	
<ul style="list-style-type: none"> Hierarchy configuration System configuration 	<ul style="list-style-type: none"> User roles & permissions System alerts 	<ul style="list-style-type: none"> Organization/facility search Add, edit, inactivate organization/facility 	<ul style="list-style-type: none"> VFC/vaccine program enrollment Organization/facility outreach 	<ul style="list-style-type: none"> User search Add, edit, inactivate user 	<ul style="list-style-type: none"> Authentication & authorization Password management
Support Interoperability		Ensure Data Quality		Evaluate & Forecast	
<ul style="list-style-type: none"> Onboarding Interfaces 	<ul style="list-style-type: none"> Data exchange 	<ul style="list-style-type: none"> Patient matching & deduplication 	<ul style="list-style-type: none"> Vaccination event matching & deduplication 	<ul style="list-style-type: none"> Clinical decision support Reminder/recall 	<ul style="list-style-type: none"> Coverage reports
Manage Patient & Immunization Records		Manage Vaccine Inventory		Provide Data Access	
<ul style="list-style-type: none"> Patient search Add, edit patient demographics Patient status Patient consent 	<ul style="list-style-type: none"> Add, edit patient immunization Print/export record Mass vaccination 	<ul style="list-style-type: none"> Vaccine inventory search Add, edit vaccine inventory Vaccine ordering Review/approve order Vaccine decrementing 	<ul style="list-style-type: none"> Vaccine inventory reconciliation Vaccine transfer Vaccine wastage Vaccine expiration 	<ul style="list-style-type: none"> Standard reports Print/export reports 	<ul style="list-style-type: none"> Ad hoc queries & reports Consumer access

IIS Attributes

These attributes represent the technical characteristics of an IIS necessary to support immunization programs and stakeholders. Refer to the **IIS Baseline RTM** for descriptions and non-functional requirements associated with each.

Performance Efficiency	Usability	Reliability	Security	Maintainability	Portability
<ul style="list-style-type: none"> Time behavior Resource utilization Capacity 	<ul style="list-style-type: none"> Operability User error protection Accessibility 	<ul style="list-style-type: none"> Availability Fault tolerance Recoverability 	<ul style="list-style-type: none"> Confidentiality Non-repudiation Accountability Authenticity 	<ul style="list-style-type: none"> Analyzability 	<ul style="list-style-type: none"> Adaptability Installability

* <https://www.cdc.gov/vaccines/programs/iis/func-stds.html>

This resource was developed by the Public Health Informatics Institute in 2020, in collaboration with AIRA and CDC, with financial support from CDC under Cooperative Agreement number 6- NU38OT000316. Questions, comments and suggestions are welcomed at phii.org/iiscontact.

IIS Core Functions and Capabilities

<p>Administer System Management of global system settings and alerts, including set up of user roles and permissions</p>	<p>Manage Organizations & Facilities Management of organizations and facility accounts</p>	<p>Manage Users Management of user accounts</p>
<p>Hierarchy configuration: Ability to create hierarchy that informs the association between geographical levels within the jurisdiction and among organizations, facilities, providers and users</p> <p>System configuration: Ability to define system-wide settings, such as management of code tables</p> <p>User roles and permissions: Ability to define and manage user roles and user role permissions to perform a function, activity or task</p> <p>System alerts: Ability to broadcast communication to IIS users viewable upon logging into the system</p>	<p>Organization/facility search: Ability to look up and retrieve an organization or facility account</p> <p>Add, edit, inactivate organization/facility: Ability to add, edit or inactivate an organization or facility; ability for an organization to initiate enrollment and re-enrollment in the IIS</p> <p>VFC/vaccine program enrollment: Ability to enroll and re-enroll a provider organization in VFC and/or other vaccine program(s)</p> <p>Organization/facility outreach: Ability to communicate with organization/facility representatives</p>	<p>User search: Ability to define parameters to look up and retrieve a user account</p> <p>Add, edit, inactivate user: Ability to add, edit or inactivate a user account</p> <p>Authentication and authorization: Ability to validate a user's identity, entity and system permissions</p> <p>Password management: Ability to administer, change and reset user passwords</p>
<p>Support Interoperability Manage interfaces to exchange data between the IIS and other systems</p>	<p>Ensure Data Quality Deduplication and consolidation of records</p>	<p>Evaluate & Forecast Determine the validity of past immunizations administered as a basis for determining immunizations due</p>
<p>Onboarding: Ability to establish/re-establish/modify an interface with another information system for the electronic exchange of demographic and/or immunization data</p> <p>Interfaces: Ability to facilitate electronic data exchange with other information systems, including EHRs, VTrckS, jurisdictional vital records and the IZ Gateway</p> <p>Data exchange: Ability to exchange data electronically and monitor and troubleshoot data exchange</p>	<p>Patient matching and deduplication: Ability to identify and manage duplicate and potential duplicate patient records</p> <p>Vaccination event matching and deduplication: Ability to identify and manage duplicate and potential duplicate vaccination entries</p>	<p>Clinical decision support: Ability to evaluate and forecast immunizations for a patient per ACIP guidelines and in alignment with CDSI specifications</p> <p>Reminder/recall: Ability to identify and notify patients who are due for upcoming immunizations (reminder) and/or are past due (recall)</p> <p>Coverage reports: Ability to create reports to support immunization coverage assessment at the provider and geographic levels including reports for the CDC's VFC provider-level immunization quality improvement program (IQIP)</p>
<p>Manage Patient & Immunization Records Manage patient demographics and patient immunization records</p>	<p>Manage Vaccine Inventory Order publicly-purchased vaccine and manage vaccine inventory</p>	<p>Provide Data Access Provision of access to data and information</p>
<p>Patient search: Ability to look up and retrieve a patient record</p> <p>Add, edit patient demographics: Ability to add, edit or inactivate a patient record</p> <p>Patient status: Ability to manage the assignment of a specific patient to a provider organization or jurisdiction</p> <p>Patient consent: Ability to manage patient agreement to participate in the IIS in accordance with jurisdictional policy</p> <p>Add, edit patient immunization: Ability to add, edit an immunization record</p> <p>Print/export report: Ability to print or export either a patient or immunization record</p> <p>Mass vaccination: Ability to capture a large volume of demographic and immunization</p>	<p>Vaccine inventory search: Ability to look up and retrieve vaccine doses in inventory</p> <p>Add, edit vaccine inventory: Ability to manage vaccine inventory, including ordering, storing and handling, and reconciliation of vaccine doses</p> <p>Vaccine ordering: Ability to order publicly funded vaccines as authorized</p> <p>Review/approve order: Ability to review, edit and authorize an organization's vaccine order for approval, submission and fulfillment</p> <p>Vaccine dose decrementing: Ability to automatically decrement vaccine doses from inventory when matched vaccine doses are reported as administered</p> <p>Vaccine inventory reconciliation: Ability to maintain an accurate count of vaccine doses available based on doses administered, wasted, transferred and expired</p> <p>Vaccine transfer: Ability to transfer vaccine from one VFC provider organization to another in certain situations</p> <p>Vaccine wastage: Ability to manage nonviable vaccine reporting</p> <p>Vaccine expiration: Ability for notification and management of vaccine inventory expired and due to expire</p>	<p>Standard reports: Ability to generate pre-configured reports available and accessible in the IIS</p> <p>Ad hoc queries and reports: Ability to create, save and schedule data queries and customized reports on demand</p> <p>Print/export report: Ability to generate data to print or use in other systems</p> <p>Consumer access: Ability for authorized consumers to directly access IIS data for which they are authorized</p>

IIS Attributes

<p>Performance Efficiency Performance efficiency relative to the amount of resources used under stated conditions</p>
<p>Time behavior: Degree to which the response and processing times and throughput rates of a product or system, when performing its functions, meet requirements</p> <p>Resource utilization: Degree to which the amounts and types of resources used by a product or system, when performing its functions, meet requirements</p> <p>Capacity: Degree to which the maximum limits of a product or system parameter meet requirements</p>
<p>Usability Degree to which a product or system can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use</p>
<p>Operability: Degree to which a product or system has attributes that make it easy to operate and control</p> <p>User error protection: Degree to which a system protects users against making errors</p> <p>Accessibility: Degree to which a product or system can be used by people with the widest range of characteristics and capabilities to achieve a specified goal in a specified context of use</p>
<p>Reliability Degree to which a system, product or component performs specified functions under specified conditions for a specified period of time</p>
<p>Availability: Degree to which a system, product or component is operational and accessible when required for use</p> <p>Fault tolerance: Degree to which a system, product or component operates as intended despite the presence of hardware or software faults</p> <p>Recoverability: Degree to which, in the event of an interruption or a failure, a product or system can recover the data directly affected and re-establish the desired state of the system</p>
<p>Security Degree to which a product or system protects information and data so that persons or other products or systems have the degree of data access appropriate to their types and levels of authorization</p>
<p>Confidentiality: Degree to which a product or system ensures that data are accessible only to those authorized to have access</p> <p>Non-repudiation: Degree to which actions or events can be proven to have taken place so that the events or actions cannot be repudiated later</p> <p>Integrity: Degree to which a product or system maintains a firewall for protecting the environment</p> <p>Authenticity: Degree to which the identity of a subject or resource can be proved to be the one claimed</p>
<p>Maintainability Degree of effectiveness and efficiency with which a product or system can be modified to improve it, correct it or adapt it to changes in environment, and in requirements</p>
<p>Analyzability: Degree of effectiveness and efficiency with which it is possible to assess the impact on a product or system of an intended change to one or more of its parts, or to diagnose a product for deficiencies or causes of failures, or to identify parts to be modified</p>
<p>Portability Degree of effectiveness and efficiency with which a system, product or component can be transferred from one hardware, software or other operational or usage environment to another</p>
<p>Adaptability: Degree to which a product or system can effectively and efficiently be adapted for different or evolving hardware, software or other operational or usage environments</p> <p>Installability: Degree of effectiveness and efficiency with which a product or system can be successfully installed and/or uninstalled in a specified environment</p>