



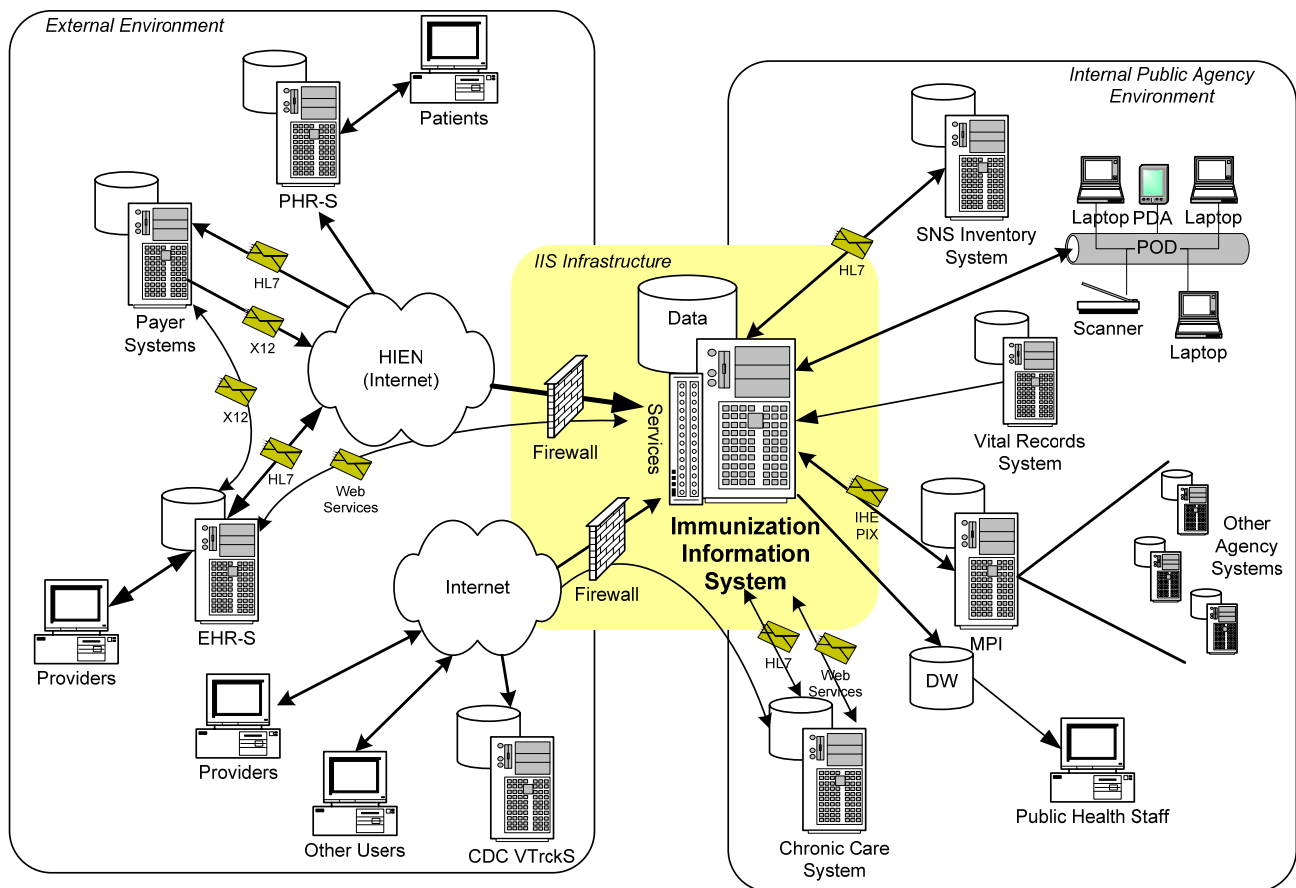
Immunization Information System Interoperability Model

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(v2)**

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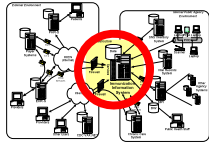
Immunization Information Systems (IIS) are defined by the Centers for Disease Control and Prevention (CDC) as, "...confidential, population-based, computerized databases that record all immunization doses administered by participating providers to persons residing within a given geopolitical area."¹ For providers, access to IIS has always been a key objective to support clinical care, develop quality measures, and provide coverage information required by public health agencies to perform their population-level monitoring and assurance functions. Providers traditionally accessed IIS directly through web-based clients, but increasingly providers access IIS data more indirectly through their local EHR systems (EHR-S) as the CMS EHR Incentive Programs have accelerated the deployment of EHR systems and promoted the development of a wide variety of features within EHR-S.²

There is a growing phenomenon in the United States towards deployment of electronic data systems of many kinds to improve effectiveness and efficiency. The near ubiquity of the Internet has fueled even stronger desires to promote electronic information over paper-based records and has enabled system-to-system sharing of data more easily than ever before. The following diagram, explained section by section below, shows potential system interactions with IIS by placing the IIS at the "center of the world" and displaying related systems around it:

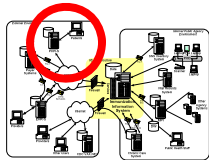


¹ <http://www.cdc.gov/vaccines/programs/iis/about.html>

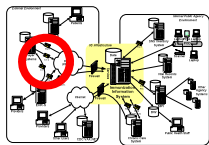
² <http://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/index.html>



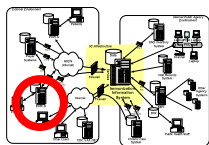
IIS Infrastructure: The IIS provides data and services to various healthcare activities, both in the public and private sectors. It is usually a centralized system that contains a database and one or more applications for online access. A set of services may provide more transparent access to IIS data or features by outside systems. All access to IIS data is governed by strict privacy and security rules dictated by both Federal and state/local legislation.



Personal Health Record System: Patients and their guardians may access immunization data through a Personal Health Record System (PHR-S). Those systems provided by an organization with which the patient has an affiliation (health plan or insurer, employer) are referred to as “tethered” systems; those provided by an independent entity are referred to as “un-tethered.” A PHR-S may acquire its data directly from the patient, from provider EHR systems (see below) or even from an IIS. It is important for IIS managers to recognize the potentially growing important these systems may have in the system landscape.

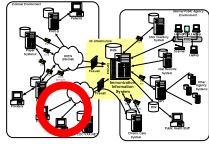


Payer Systems: Payers have always played a big part in IIS activities. They are anxious to collect data from IIS for HEDIS measures or to support other quality improvement activities. They can be a source of primarily administrative data for an IIS when their records are considered accurate and complete enough. Often this is not the case as some claims data received from providers may not have all the required data for an immunization event (e.g., sometimes the type of vaccine administered is not included in the claims data). Payer systems receive claims in X12 format but need to be prepared to also receive immunization data eventually in HL7 format from IIS and other sources. For the near term, many of these interactions will take place through the use of flat files whose format and contents are defined for specific purposes.

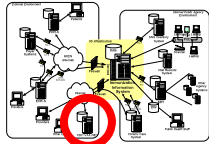


Electronic Health Record System: Providers use an Electronic Health Record System (EHR-S) to automate their clinical practice and serve as an electronic version of their patients’ records. An EHR-S exchanges data with the IIS via HL7 and, if so equipped, can access its services through a published Web Services³ interface. These services might include an immunization forecast scheduler whose algorithm can be applied to EHR-S data independent of the IIS, or tools such as practice assessment or reminder/recall capabilities. A typical EHR-S system does not contain these special features and may welcome the ability to access them from the IIS via Web Services. The EHR-S may also provide insurance claims directly to a payer system via X12. Providers access an EHR-S in their offices through many types of interfaces, including web-based application, client/server applications, and even Personal Digital Assistants (PDA).

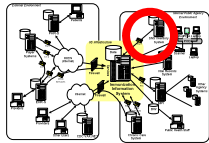
³ Web services refers to a set of technologies that implement a Services-oriented architecture (SOA) which features software components that are assembled in a modular way to facilitate reuse and standard interfaces. See <http://www.webservices.org/>



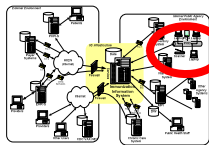
Direct Online IIS Access: Providers who do not have an EHR-S, as well as other users from schools, pharmacies, visiting nurse associations, and others access an IIS directly using an online application (usually web-based or web-presented) provided by the IIS project. For commercially- or public health-acquired IIS software these applications are provided with the system; for others these products are developed in-house. Over time, it might be expected that use of these stand-alone applications will diminish as more and more stakeholders acquire primary systems of their own that can interface with the IIS to provide access to its data.



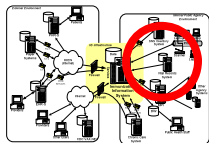
CDC VTrcks: CDC uses this system to automate the ordering and distribution of Federally-provided vaccines. Some projects use the IIS as the primary interface for its providers to this ordering system. In the short run, this may increase the use of direct online IIS applications; over time it is expected that service-based interfaces to these ordering functions will let primary systems interoperate with the IIS to support the necessary processes.



SNS Inventory System: Many jurisdictions have deployed an inventory system to support their potential use of the Strategic National Stockpile in the event of a large-scale emergency. Vaccine is just one type of materiel that might be involved in a public health response. The IIS may be called upon either during or after an event to store vaccine administration data. It may require an interface to the SNS Inventory System to support this activity.

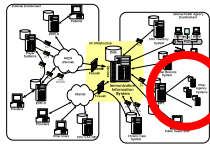


Points of Dispensing Support: During an emergency response, jurisdictions use Points of Dispensing (POD) as the locations where vaccines and medications may be distributed to the population. These PODs are often temporary locations – schools, recreation centers, churches, or mobile locations – pressed into service during an emergency with little or no permanent public health infrastructure. PODs may support data management products of their own or may access the IIS directly through standard or special applications. In some cases, stand-alone applications may collect data that later needs to be integrated into the IIS database after-the-fact. Data may also be collected through alternate means such as scanning of paper forms or via a mobile interface to account for high volume or difficult conditions.

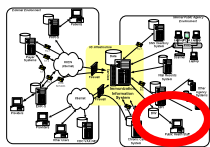


Vital Records: Children's records in the IIS are often initialized from Vital Records data within the jurisdiction which may or may not be housed within the same agency. This data transfer is usually conducted under a Memorandum of Agreement or similar instrument that dictates how and when this data can be used. CDC Minimum Functional Standards stipulate that this transfer happen within six weeks of birth, but most IIS strive to have the data transfer occur more expeditiously. IIS projects need to be careful to abide by state law related to disclosure of birth records under conditions of adoption or foster care, and also need to be diligent in updated

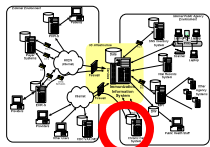
official name changes and in recording deaths to prevent accidental transmission of reminder/recall information for a deceased child.



Other Agency Systems: Most agencies have additional internal systems that manage other aspects of their programs to which IIS either interoperates or is integrated. At minimum, there is usual some exchange of data (in one direction or both) with Vital Records systems (for electronic birth and death records), WIC systems (for providing immunization history for assessment by WIC personnel), and service-encounter systems (that support automation of services offered in public health clinics) should they exist. More sophisticated implementations may use a Master Patient Index (MPI) as a central registration point and clearinghouse for patient-related data in the agency.



Public Health Staff: IIS data supports Immunization Program functions including surveillance, coverage assessment, quality assurance at provider sites (AFIX), vaccine management and storage, and communication with stakeholders. The more widely available data is within the agency the more important this data management function. Some agencies deploy a data warehouse parallel to the production system to facilitate data query and reporting with less impact on operations.



Chronic Care System: Many jurisdictions are deploying specific systems targeted at management of chronic conditions within the population. Typically focused on clinical support, these systems provide features that an EHR-S does not yet have. Chronic Care System exchanges immunization information and accesses vaccine forecast from IIS. Some users access through their EHR-S, some directly through a “lite” client. Chronic Care Systems should also be able to access IIS functions via Web Services for a more transparent integration of these capabilities into the system.