

New York State Immunization Information System (NYSIIS)

New York State Department of Health

Digital Government: Government to Business (G to B)

Executive Summary The New York State Immunization Information System's (NYSIIS) goal is to ensure that each child is up-to-date with his or her immunizations and that New York State (NYS) communities maintain high immunization rates. NYSIIS is available to all NYS healthcare providers, and it allows providers access to a complete and consolidated immunization record on children in NYS (excluding New York City).

NYSIIS was developed based on the following factors:

- By the age of 2, children need up to 20 vaccinations.
- One in five children receives at least one unnecessary immunization.
- Over 20% of U.S. children have seen more than one health care provider in their first two years, resulting in scattered medical records.

The New York State Department of Health (NYSDOH), Bureau of Immunization began the development of NYSIIS in 1993. Project guidelines included that participation by medical providers would be voluntary and that parental consent would be required to share information. The original design funded the development of regional registries that would eventually be connected by a state hub or central registry. Client-server technology was initially used by the regions, and it required the application to be installed directly on providers' computers. Medical offices would periodically send immunization data to the regional server, which would then submit it to the hub.

However, the system did not work as it was originally intended to because the data flow was not bidirectional, and providers did not have access to immunization information submitted by other providers.

In 2003, NYSDOH hired an independent consultant to review the state's immunization information system and subsequently provide recommendations on how to revise the system to meet the national Healthy People 2010 goal of having 95% of the children less than six years of age with two or more shots in the immunization information system. The final report found there were no regional differences in the application, and recommended replacing the existing systems with a centralized, web-based application.

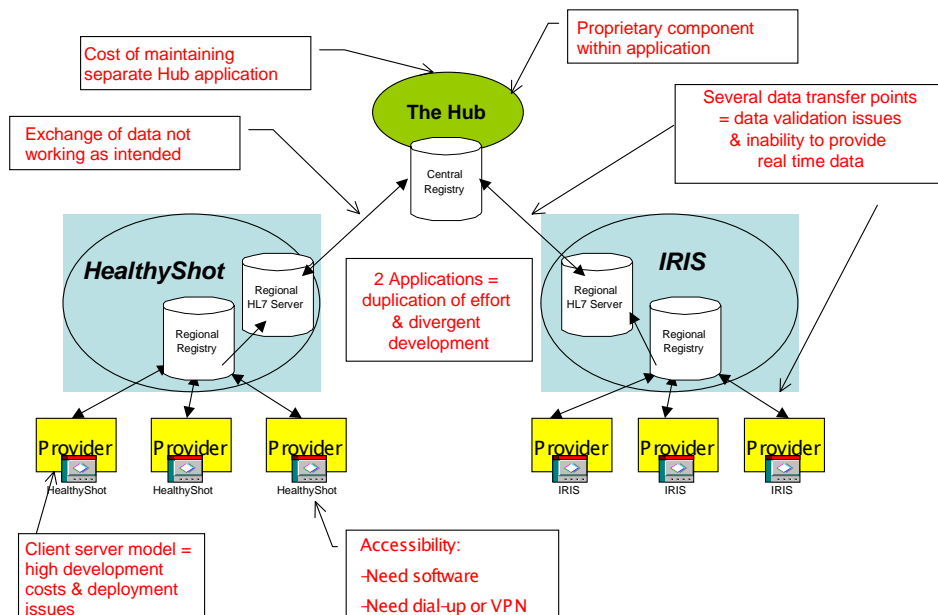
In August 2006, legislation was signed into law which mandated all immunizations given to persons less than 19 years of age be reported beginning January 1, 2008. With this critical component in place, the NYSDOH selected Electronic Data Systems (EDS) as the contract vendor. Their proposal was to modify the Wisconsin Immunization Registry (WIR) application to meet NYS requirements. To prevent the duplication of efforts, the NYSDOH Bureau of Immunization eventually decided to host a centralized web-based application in the New York State Office for Technology's (NYSOFT) data center. In addition, it was decided to utilize best practices in project management methodology to help ensure its success.

EDS began development of the web-based system in January 2007. The new, web-based NYSIIS application officially went live on February 25, 2008. As of May 2009, the system is operational with more than 6,200 users, 2.2 million patients, and 24.7 million immunizations recorded.

C. Description of the business problem and solution

The original immunization information system design was two primary legacy systems (HealthyShot, and Immunization Registry and Information Source, IRIS), linked to a central hub at the New York State Department of Health (NYSDOH). These two legacy systems were in need of replacement/upgrade due to limited and varying states of functionality, maintainability, technology, and user satisfaction. NYSDOH wanted to acquire an integrated statewide replacement or upgraded immunization information system to achieve maximum integration, commonality, and information capture and sharing. Additionally, NYSDOH wanted to maximize the benefits from its existing investment in systems and capabilities to the extent they were able to be part of the eventual solution.

The figure below highlights problems that existed with the legacy application architecture.



In February 2003, NYSDOH contracted with New York State Technology Enterprise Corporation (NYSTEC), an independent not-for-profit consulting company, to assess the existing applications and make recommendations for the future of registry efforts in New York State.

NYSTEC assisted NYSDOH with systems engineering and provided technical support to review the legacy NYSIIS design, analyze the two legacy systems, determine the applicability of web applications, and provide an acquisition approach for going forward.

Solution

NYSTEC recommended removing the duplication of effort by moving to a single, centralized, web-based application based on a three tiered architecture, which would

replace the existing software applications. The NYSIIS Program Plan that NYSTEC developed included timelines, staffing requirements, budget estimates, and technical recommendations. Using the COntstructive COst MOdel (COCOMO), NYSTEC estimated the cost for the new application to be \$2-3 million dollars. NYSTEC also recommended pursuing mandated reporting by providers to replace the voluntary approach currently in place.

There were a number of challenges NYSDOH needed to address in order to move forward with the NYSIIS project. These challenges and solutions included:

- **Consent to share information and provider participation was voluntary.** NYSDOH worked with the Governor's Office, New York State Legislature and other appropriate government officials to develop legislation requiring participation. In August 2006, legislation was signed mandating reporting of immunizations by providers for immunizations administered to people less than 19 years of age as of January 1, 2008.
- **Sustained resources including personnel.** An RFP was issued in 2005 and Electronic Data Systems (EDS) was hired in 2007 to implement NYS requirements based on the Wisconsin Immunization Registry (WIR) application.

The project was coordinated by the NYSDOH Bureau of Immunization with application support provided by an independent vendor (EDS); user account and security support provided by NYSDOH Information Systems and Health Statistics Group (ISHSG); and standard three tiered architecture housed in the NYSOFT data center.

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- **Training and Outreach.** Significant planning and resources were put forth to train a very large and diverse user community using a multi-focal regional roll out approach. Communication and outreach were also key components to the implementation plan.
- **Multitude of medical system vendors/reduction of data entry.** Providers with Electronic Medical Records (EMRs) did not want to duplicate data entry into NYSIIS. The inclusion of the data exchange module allowed for both standard HL7 and ASCII files to be submitted. The success of the data exchange module is demonstrated by its use by more than 200 providers' offices for reporting to NYSIIS. In addition, birth records are received daily from NYS Vital Statistics and files are received bi-weekly from the New York City Immunization Registry.

Consistent with the national direction for electronic medical records, NYSIIS is looking to expand and integrate other DOH information that both providers and public health officials could benefit from.

Measurements

We defined several key measures to evaluate our progress. These included the number of trainings and participants, the number of organizations electronically submitting data, the number of patients and immunizations recorded, the number of participating providers (VFC providers in particular), and the number of children less than 6 years of age with two or more immunizations recorded in NYSIIS. We monitored progress weekly during the first few months post launch, then monthly thereafter. We established ambitious quarterly benchmarks.

Success

With the aggressive implementation strategy and an annual cohort of 126,883 births in New York State, outside of New York City, we expected the NYSIIS database to build rapidly. As of May 2009, NYSIIS now contains more than 2.2 million patient records and 24.7 million immunizations. There are more than 6,200 users from 2,200 health care provider organizations and 875 schools participating in NYSIIS.

During the first year of NYSIIS implementation, 201 classroom sessions and 109 live webinars were held. In addition, participants were provided the opportunity to listen to pre-recorded webinars or access online training tools.

The percentage of children less than six years of age with two or more immunizations in NYSIIS has more than tripled, from 15% in October 2007 to 58% in May 2009. This ensures a complete and accurate record is being compiled for every child, which is especially important as they reach school age and interact more frequently with their peers.

Users can enter data directly through the user interface or through the data exchange module, which allows HL7 or flat file transmissions. Staff assisted 30 different vendors, representing more than 200 organizations, in electronically submitting data to NYSIIS. The data exchange accounts for more than half of records received weekly.

D. Significance: The success of NYSIIS is realized in the complete and accurate information available to providers allowing them to properly immunize children against vaccine preventable diseases.

The NYSIIS project has worked diligently to align itself with policies, strategies, and goals associated with various governmental entities at all levels. At the state level the NYSIIS project partnered with OFT to ensure that the architectural framework for NYSIIS complimented the state information technology enterprise planning underway at that time. In addition, NYSDOH program managers and project managers agreed to house the application within the OFT Data Center to ensure optimum and most efficient use of state resources. NYSIIS has also participated in the statewide HEAL-NY effort by providing standardized formats for potential bidders to use in order to create proposals for health information technology data sharing. At the federal level, NYSIIS

continues to strive to obtain the programmatic goals and objectives of the Healthy People 2010 initiative. The core application itself comes from an application in Wisconsin, which is now used by 14 other projects and allows for cost sharing partnerships for enhancements.

E. Benefit of the Project:

The New York State Immunization Information System (NYSIIS) was developed based on the following factors:

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Our goal is to ensure that each child is up-to-date with his or her immunizations and that New York State communities maintain high immunization rates. NYSIIS is available to all NYS healthcare providers, and it allows providers access to complete and consolidated immunization records on children in NYS (excluding New York City).

Description of the outcomes from this project

With the intention of reaching the goals and objectives of the Healthy People 2010 public health initiative, the following would be expected outcomes of this project:

- Have immunizations given by all providers available in a central location
- Allow schools and health care providers to view an accurate record of an individual's complete vaccine history
- Make sure that individuals receive immunizations according to recommended guidelines
- Prevent duplicate vaccinations of individuals

Description of types of benefits and the impact of the benefits on both the agency nominating the project and the groups which benefited from the project

With an increasingly mobile society, families may move from one location to another resulting in changing health care providers. Immunization information systems, like NYSIIS, consolidate vaccination records from multiple providers into one reliable record. This saves time and reduces paperwork associated with providing accurate immunization histories for patients, schools, camps, day-care centers and colleges.

NYSIIS also clarifies complex and changing immunization schedules and emerging vaccine combinations, and it provides patient-specific reminders of vaccine doses recommended, due or overdue and invalid doses. This keeps a child's vaccination schedule up-to-date and prevents over immunization.

The system generates reports that track vaccination levels of children at a population level and help guide interventions to control vaccine-preventable diseases. Specific

populations at high risk can be identified during an outbreak and the system can manage vaccine usage and inventory.

Financial Return on Investment

NYSIIS contributes significantly toward streamlining provider record keeping, reducing the amount of paperwork or record keeping that schools must maintain regarding children's immunization information, and consistency of medical information both for children and parents. While we have not specifically quantified the value of the savings generated by these benefits, the resources saved by providing the benefits listed would be significant. In addition, in the event of a public health disaster, the new application is expected to greatly reduce the effort and cost in making immunization information available when needed by appropriate governmental authorities.

Non-Financial Return on Investment

NYSIIS is a confidential, population-based computerized system that contains information regarding children's vaccinations. It is becoming a critical tool for increasing and sustaining vaccination coverage. NYSIIS is well on its way toward reaching the national Healthy People 2010 objective, which is to have 95% of children less than six years of age included in a fully operational population-based immunization information system. The new system has provided a stable secure health information technology environment which forms the foundation for NYSIIS to operate.