

# 2009 NASCIO Recognition Award Nomination

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## *IPHIS*

### **Integrated Public Health Information System**

Maine Center for Disease Control and Prevention

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**Category:** Digital Government; Government to Government

**Title of Nomination:** IPHIS  
Integrated Public Health Information System

**State:** Maine

# State of Maine Integrated Public Health Information System

## B. Executive Summary

**Business Need:** As the first federal bioterrorism planning efforts reached states after 9/11, the critical need for improved approaches to disease surveillance, resource tracking, alerting and communication, and data integration became evident in order to improve the State's ability to detect, prevent, respond, and evaluate public health events. The State of Maine had identified more than 20 disparate public health legacy systems, with various approaches to data collection, storage, and reporting, using various data standards and definitions. The challenges to the data integration and interoperability required by public health were significant. Data exchange and system interoperability standards are essential to ensure appropriate communication and collaboration with local and national partners.

**Solution Implemented:** The IPHIS project is a State public health department enterprise platform designed to implement standardized approaches to data exchange, integration, communications and system interoperability. The project integrates electronic infectious disease laboratory reports from the State public health laboratory information systems and national reference laboratories. National Notifiable Diseases Reports are transmitted to the Federal CDC via a secure transport mechanism. Key program users for the first deployment include the State Public Health Emergency Preparedness and Infectious Disease Divisions. In the past year, the Environmental Public Health Tracking Program leveraged the IPHIS portal structure to implement the first phase of their public health tracking data interface. Contractual relationships exist for data exchange with Maine's Health Information Exchange and the Maine HealthInfoNet, a private, non profit. Initially funded through federal public health preparedness, infectious disease epidemiology, and environmental public health funds, a cost-sharing model is now under development to leverage IPHIS services to other public health programs such as chronic disease and maternal and child health.

IPHIS includes the most current electronic tools available to manage state public health activities. Maine was the first state in the nation to bring the NBS infectious disease surveillance system live with the electronic laboratory reporting functionality. Additionally, the tools imbedded in the IPHIS platform provide the ability to sustain standardized electronic messaging with tools proven in the market above and beyond the federal public health tools. This provides ongoing sustainability if the federal tools are phased out in the future.

### **C. Business Problem and Solution**

As the first federal bioterrorism planning efforts reached states after 9/11, the critical need for improved approaches to disease surveillance, resource tracking, alerting and communication, and data integration became evident in order to improve the State's ability to detect, prevent, respond, and evaluate public health events. In a public health systems' assessment prior to the IPHIS project initiation in 2002, the State of Maine identified more than 20 disparate public health legacy systems, with various approaches to data collection, storage, and reporting, using various data standards and definitions. The challenges to the data integration and interoperability required by public health were significant. Data exchange and system interoperability standards are essential to ensure appropriate communication and collaboration with local and national partners.

Meanwhile, the increasingly mobile, global world population and emergent concerns about public health threats of natural and malevolent origins required improved approaches to surveillance that offered flexible, comprehensive approaches able to be implemented in short timeframes. In 2001, the federal government launched the Public Health Information Network, which included data format and messaging standards but all of the states and the majority of the existing public health information systems lacked the capacity to meet these standards.

The Maine Center for Disease Control and Prevention saw the critical need to meet the federal standards to ensure that the citizens of the State of Maine would benefit from health data that was more easily shared and analyzed by both federal and state health organizations so the State of Maine IPHIS project was launched. The Maine CDC appointed senior level managers from both the IT and business areas to the Steering Committee to give the project the level of support it would require to meet their very aggressive goals and objectives.

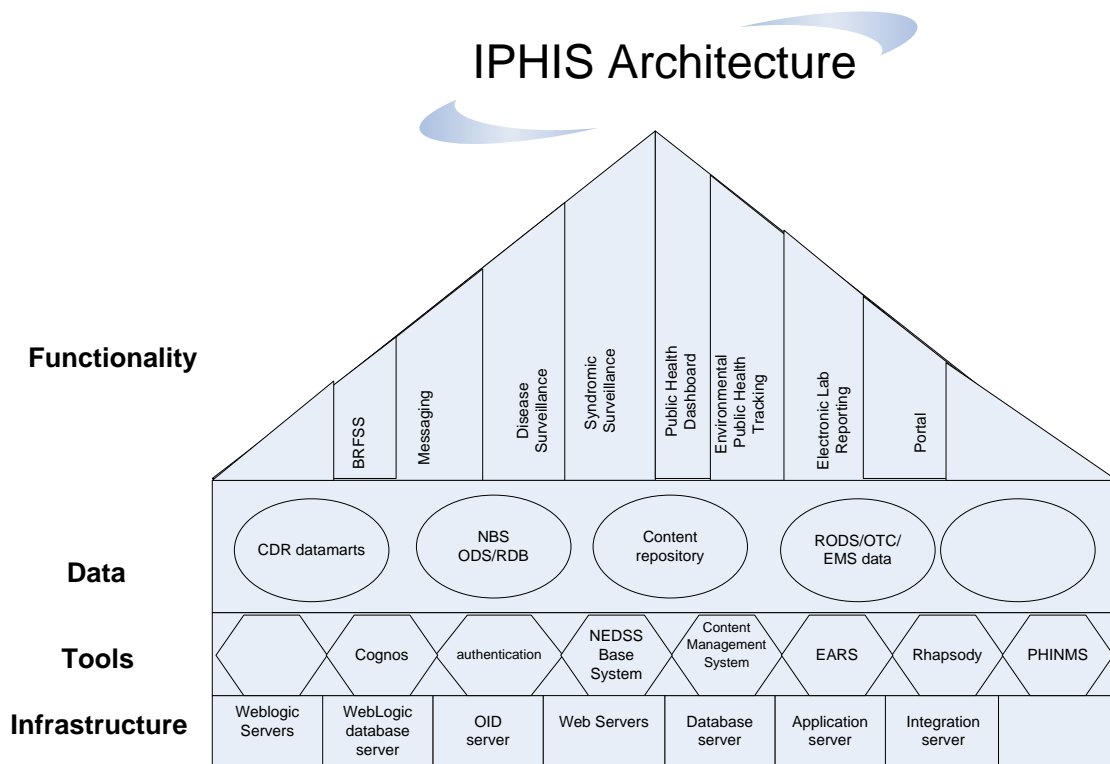
After an in-depth analysis process the team produced detailed business requirements and statement of work and then a competitive Request for Proposal process was used to select the most qualified implementation vendor and their proposed toolset for the IPHIS platform. The RFP specified requirements for the integration of commercially available tools, CDC supplied applications and new technical development. A comprehensive review of bidder proposals was undertaken to evaluate and rank Bidder qualifications and their proposed technical solutions.

The Implementation project management team included both a state and vendor project manager working with an independent QA project manager. The State of Maine adopted the TenStep Project Management Methodology during the implementation and the project was managed accordingly, transitioning to more standardized templates from project and vendor developed forms.

The technology and standards required for the project proved to be challenging for the State's IT infrastructure and staff, as well as for health officials who were now seeing changes to their business processes.

The project team recognized in the first year that the technical challenges could be minimized by a phased deployment so they worked with the Senior Staff of the Chief Information Officer to develop the approach. Once that was accomplished, the team then reviewed the functionality that the project would provide and determined that their first priorities would be the public health disease investigation and electronic lab reporting. Having defined this they moved forward and were able to successfully deploy this initial phase in July of 2006 with the full technical platform following in October 2007.

The new architecture deployed is best described in layers – the foundation is based at the server layer, with a three tier architecture consisting of load balanced web portal servers, application servers and database servers. The integration components are hosted on a separate server. The next layer is the tools layer which consists of 3rd party tools such as the integration broker, PHINMS and the applications systems. The next layer is the data layer which consists of the major data bases such as the CDR. All this is the foundation for the supported functionality.



## D. Significance of the Project

The IPHIS project significantly impacted the operational processes within State and Federal health organizations, streamlining work processes and ensuring the most up to date health information is available to advert and/or advise on any health crises. Some specific changes that were a result of the project are:

- Electronic laboratory reporting on notifiable conditions was implemented on system go-live from the State public health laboratory as well as two national reference laboratories. Recent national scientific studies have shown electronic laboratory reporting to improve the completeness and timeliness of disease surveillance, in one recent study leading to identifying 4.4 times as many cases as traditional methods, and identifying those cases 7.9 days earlier than spontaneous methods.
- Maine's local public health workers and management benefited from improved access to infectious disease data and communications as a result of participation in the web-based platform.
- Flexibility for disease investigation and containment work was provided on system go-live for future work. For example, in the emerging H1N1 influenza outbreak, epidemiologists were able to modify the data fields in the Laboratory Information System to transmit electronic lab reports for Influenza A into the NBS infectious disease surveillance system, and locally defined fields were added to the NBS to allow epidemiologists additional analytical capacity.
- Electronic notifications of notifiable diseases from State to federal government was improved by implementing standardized messaging tools, and replacing older, less efficient notification processes and using a standardized vocabulary developed by the CDC.
- Business process improvements implemented by a redesign effort around the IPHIS technical platform were implemented in the summer of 2008, and technical changes that resulted from this effort benefited in real time notification of infectious disease cases to epidemiologists, eliminating delays in both hours and days between notification and the beginning of case work-up.
- Using the IPHIS central data repository, the barriers to access state specific data in the NBS were overcome, and data reports were built for epidemiologists and infectious disease managers to improve their ability to identify and contain infectious disease outbreaks.

In addition to the IPHIS portal and the functionality there, it also created an infrastructure that will allow the State of Maine to facilitate data exchange with the private sector, further expanding capabilities of the Maine CDC.

### **E. Benefits of the Project**

On average the IPHIS project had 20 full time staff (internal and contracted) from various disciplines assigned throughout each phase at a cost of approximately 4.5 million dollars.

While this is not a project where the State of Maine can demonstrate a financial return on the investment, the Department of Health and Human Services recognized this project would provide significant improvements in Maine's ability to manage critical health care data, and therefore the ROI was the value to the state's citizens.

In addition to rolling out a major functional technical platform, the IPHIS project also required the MCDC to increase proficiency and adoption with data exchange standards and project management standards. Project leadership quickly realized the significant challenges to public health managers, working with extremely scarce resources and minimal staffing, to manage the implementation of significant technical projects. As a direct result of the significance of the informatics work encompassed in the IPHIS project, the MCDC created by charter an Office of Public Health Informatics as a strategic mechanism to ensure that informatics standards and competencies are institutionalized throughout Maine's public health infrastructure, and to ensure that the agency implemented a portfolio management and governance structure over the significant technical investments required to ensure optimal public health activities statewide.

The leadership team also authorized a full assessment of remote access during this project which led to upgrades in the equipment and connectivity for system users. The benefit was that desktops were replaced with laptops and remote connections were enhanced to provide improved performance. Eventually the momentum to electronic processes led to the development of alerting functionality of cases ready for investigation and epidemiologists migrating from cell phones to blackberry devices the allow remote access even in Maine's vast rural areas where staff must work to follow infectious disease investigations.

The project provided immediate benefit to the state and local public health preparedness and infectious disease workforce, including managers, epidemiologists, laboratorians, and planners by implementing automated workflows to manage emerging infectious disease events and investigations. As a result, all of the stakeholders of infectious disease containment activities, including the healthcare sector, schools, and citizens of the state will benefit from more efficient and effective disease surveillance and containment activities.

Public health programs throughout the state will benefit from the technical tools available to advance standardized approaches to data exchange and system interoperability.

The project also provides significant improvements in the security safeguards around sensitive infectious disease data – eliminating reliance on paper copies and ensuring appropriate role-based access to programmatic data. All NBS users are required to provide two factor authentication in order to access data in the system.

The global H1N1 influenza outbreak, emerging as this nomination is written, demonstrates the critical need for public health tools to provide rapid access to data from a variety of surveillance and monitoring mechanisms. Now on the brink of a possible pandemic, public health will need to continuously collect, integrate and display data as close to real time as possible, in flexible configurations to monitor the spread and magnitude of the virus, rapidly track morbidity and mortality, assess healthcare resources throughout the state, and activate broad public and professional communication and alerting protocols. The IPHIS project has greatly enhanced Maine's ability to manage and contain successive waves of such a disease outbreak.