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Commonwealth of Virginia

Virginia Vital Events and Screening Tracking System

Category:

Cross Boundary Collaboration

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2011 Commonwealth of Virginia NASCIO Award Submission
Category: Cross Boundary Collaboration
Project: Virginia Vital Events and Screening Tracking System

Executive Summary

The Virginia Department of Health (VDH) developed and implemented a new, integrated and collaborative information technology (IT) system in April 2010, to make tracking and reporting of vital events and screening registry data more efficient and accurate. The Virginia Vital Events and Screening Tracking System (VVESTS) application today is a Web-based suite of products that utilizes strict role-based access to a central database for defined input and output capability. VVESTS includes modules for birth registration, certificate issuance, newborn hearing screening and birth defects recording via one tightly integrated system. More modules are in development.

Business rules, role-based and multiple layers of security and restriction of access features are incorporated in system design. A scalable, flexible, service-oriented architecture anticipates future modular and user additions. One record per resident is created; the system automatically checks for duplicate entries. Stringent validations meet data requirements from the National Center for Health Statistics (NCHS).

VVESTS enables cost reductions and avoidance while significantly improving data quality, functionality and analysis over time and across programs. It provides operational efficiencies to VDH, its local, state and federal, public and private partners and to the citizens it serves. VVESTS meets specific, clearly defined business requirements of participants and seamlessly integrates previously disparate systems. The system has been designed with future growth in mind; the success of its initial applications indicates that the system's value will continue to be leveraged and grown.

VVESTS projects a 27.8% return on investment within three years. The system saves a measurable \$202,343 per year. Providers have quickly and widely adopted the system. 99.6% of in-state resident live births and 51,121 unique infant records were captured in the first six months of operation; by comparison, only 7,315 infant records (13.5% of all resident births) were created electronically during the same period the preceding year. Participating hospitals realize an average savings of 8,935 man hours per year. Citizens now complete the birth certificate application process onsite at birth, with measurably reduced errors, a much faster processing time and elimination of an in-person visit.

This innovative and collaborative approach to health data governance, access and maintenance has attracted national attention. The federal Center for Disease Control and Prevention recently used VVESTS to demonstrate best practice implementation to other states.

Description of the business problem

Citizens begin their interaction with the Virginia Department of Health (VDH) at birth, and continue that interaction with health-related incidents through death. Other agencies provide allied services also related to individual health, both preventive and curative. Over the course of a lifetime, multiple interactions, many mandated by *Code of Virginia*, create an extensive record for each individual. However, records have been stove-piped and fragmented; access has been available through transactional groupings rather than a more holistic person-based view.

Paper-based processes continued to dominate the life cycle; electronically-recorded data was isolated. Demographic information was entered multiple times by providers for birth certificates, hearing screenings and birth defect data. The existing system depended upon a slow dial-up modem for reporting. Other typical problems associated with this type of governance were observed, including low confidence in data quality, varying maintenance of incident-based modules and difficulty in aggregate reporting, though multiple reports are regularly required. Stringent security and privacy requirements required ongoing staff work. Audits required extensive time.

Every level of government – local, state and federal – has touch points for this data; multiple state agencies in Virginia are involved in creation and maintenance. Hospitals, clinics and medical staff dominate data generation. Citizens regularly are required to access their own data, particularly the birth record, to complete transactions with government such as social security registration, driver's licenses, work and travel permits. Growing demands for electronic health reporting and records have heightened the importance of a secure depository for citizen health information.

Solution

To make reporting of vital events and registry data more efficient and accurate, VDH staff developed and implemented the Virginia Vital Events and Screening Tracking System (VVESTS) application, which launched in April 2010.

Business requirements:

- Improve ability of VDH to assist families in improving health and well being of children by facilitating timely and comprehensive identification and follow up of children with or at risk for special health care needs
- Enhance VDH's ability to develop, plan, implement, conduct surveillance and use resulting data for improving health outcomes
- Foster communication between agencies involved in surveillance; enable easier provision of referral services to families in need
- Accommodate current users, including the Division of Vital Records, Division of Health Statistics, Office of Family Health Services, Office of the Chief Medical

Examiner, medical facility staff including birth registrars and child hearing screening coordinators

- Allow parents to request a birth certificate at the time of delivery

Technology system design requirements:

- Replace the cumbersome client-server system
- Provide 24x7x365, anytime/anywhere access
- Integrate disparate systems into one central database
- Reduce data duplication
- Improve accuracy, quality and reliability of data
- Expand and expedite data reporting, processing and management capability
- Provide secure access for multiple users including government and providers
- Reduce IT development and maintenance costs
- Minimize risk associated with security and confidentiality of data
- Provide access adaptable to changing client (PC) hardware configurations
- Comply with a variety of legal requirements
- Enable creation of a variety of reports and streamline audits
- Begin development of a person-centric view of health events
- Enable future development through use of service-oriented, flexible architecture

VVESTS today is a Web-based suite of products which utilizes strict role-based access to a central database for defined input and output capability. The new IT system currently includes an Electronic Birth Certificate (EBC) and the Virginia Infants Screening and Infants Tracking System (VISITS) in one tightly integrated system. Further module development is underway, including Electronic Death Certificates.

Technology tools employed by the team include Oracle Designer 10g and PL/SQL Web Toolkit to create the web pages. Java Script and AJAX validations are integrated with Oracle. An Apache Web server, CISCO PIX firewall and Oracle Certificate Authority are employed to mitigate risks associated with external Web requests and data sensitivity. Oracle Application Server 10g is used for application access using industry strength 128 bit encryption provided by Entrust certificate authority. An Oracle 11g database houses all data, additionally secured by Oracle Advanced Security Transparent Data Encryption.

Business rules are incorporated in system design. In recognition of future modular and user additions, a scalable, flexible, service-oriented architecture directs the system. One record per resident is created; the system automatically checks for duplicate entries.

Application security is of utmost concern due to the private health data contained. Role-based and multiple layers of security and restriction of access features were included in

design. Stringent validations consistent with data requirements from NCHS were employed. To access VVESTS, the user's computer must be equipped with an Oracle Digital Certificate, provided by VDH's Office of Information Management.

Significance to the improved operation of government

VVESTS creates cost reductions while significantly improving data quality, functionality and data analysis over time and across programs. It provides operational efficiencies to the Department of Health and its local, state and federal, public and private partners by seamlessly integrating previously disparate systems into one central database:

- Provides technical efficiencies through migration to a single operating, database and application system, reducing IT development and maintenance costs.
- Maximizes use of IT resources related to reporting, processing and managing data by hospitals and VDH.
- Minimizes security and confidentiality of data risks through a secure system accessible by and adaptable to changing client (PC) hardware configurations.
- Reduces data duplication significantly.
- Improves overall accuracy and quality of captured data while expanding and increasing reporting capabilities.
- Improves birth certificate request process through ability to request a certificate at the time of delivery.
- Improves ability of VDH to assist families in improving health and well being of children by facilitating timely and comprehensive identification and follow up of children with or at risk for special health care needs.
- Enhances ability of VDH to develop, plan, implement, and conduct surveillance for hearing loss and birth defects and use resulting data for improving health outcomes.
- Fosters communication between agencies involved in surveillance, and increases the potential to provide referral services to families in need.

VVESTS aligns with the agency strategic plan, the Commonwealth Strategic Plan for IT and the long-term goals of the Commonwealth as stated in [Virginia Performs](#).

VDH has and continues to work closely with the Commonwealth's [Health Information Technology Standards Advisory Committee](#) (HITSAC). Members advise the Commonwealth's Information Technology Advisory Committee (ITAC) on the adoption of nationally recognized technical and data standards for health information technology systems or software pursuant to subdivision 6 of § [2.2-2458](#) in the *Code of Virginia*.

This group of public/private leaders in health IT has provided the Commonwealth with a technical architectural design and governance framework for the Health Information

Exchange (HIE), ensuring use of nationally recognized standards for communicating health data among providers, payers and Commonwealth agencies. VDH has assisted with development of and VVESTS complies with HITSAC's standards.

The initiative displays best practices through its alignment with NASCIO's 2010 Priority Strategies, including budget and cost control, consolidation, shared services, security, infrastructure and health information; and Priority Technologies, including networking, voice/data communications, content management, security enhancement, ERP, application modernization, business intelligence, identity and access management.

Benefit of the project

VVESTS enables cost reductions and avoidance while significantly improving data quality, functionality and data analysis over time and across programs. The success of the program in meeting its business requirements provides benefits to government, providers and citizens. Most importantly, the system has been designed with future growth in mind; the success of its initial applications indicates that the system design's value will continue to be leveraged and grown in the future.

Qualitative benefits

Software elements prevent problems, enhance standardization and detect, measure, and enhance effectiveness. Quality improvements enhance application operations. Programming ensures transmission of all statistical information to stakeholders in a more accurate, complete and timely manner. A variety of users can access and update person-centric data by associating vital events with an existing record. Convenient navigation, online help and automatic message generation assist users.

Birth records, mandated hearing screenings, birth defects registry data and a certifiable correspondence tracking system now are reported and recorded in a paperless environment. Data quality is improved. Maintenance and security are enabled. Robust reports easily are generated and audit is simplified and strengthened. Medical facilities may merge reporting roles. Parents receive birth certificates much more quickly and without office visits through process automation and data gathering at birth.

Multiple security layers produce stringent validations and ensure regulatory compliance including HIPAA, the National Center of Health Statistics, Center for Disease Control and Prevention (CDC) and the Social Security Administration (SSA).

State and federal agencies and divisions within VDH receive data in a more timely and accurate fashion. Data easily and regularly now is transmitted to the Division of Health Statistics, Department of Social Services (DSS), the SSA and the CDC. Data is verified

by DSS for appropriate management of citizen benefits. VVESTS also makes referrals to the Child Care Connection – System Users Network.

Quantitative benefits

VVESTS projects a 27.8% return on investment (ROI) within three years.

Achievements to date:

- Eliminated expense involved in supporting the 25% of birthing facilities which previously connected via an (800) number - \$48,000.00 per annum
- Eliminated expense of supporting the remaining 75% of facilities that connect via a PPP number - \$102,000.00 per annum
- Reduced by 50% the government resource cost required for data cleanup - \$52,342.50 per annum
- Reduced data entry cost for providers - at the rate of 5 minutes per birth record and an average of 107,231 births annually, participating Virginia hospitals save 8935 man hours per year
- Created ability for providers to combine roles and reallocate staff due to data linkage and single system production; among 597 VVESTS users, 61 (10.2%) have more than one role; of 324 birth registrars using VVESTS, 55 (17%) now also have roles to enter hearing and/or birth defects data
- Demonstrated sufficient benefits to achieve provider participation; in the first six months of operation (April – Oct. 2010), 51,121 unique infant records were created in VISITS, or 99.6% of in-state resident live births. By comparison, only 7,315 infant records (13.5% of all resident births) were created electronically during the same 6-month period of the preceding year
- Reduced time for parents to receive birth certificates, from weeks to days
- Reduced follow-up letters returned due to erroneous addresses, from 468 in 2008 to 198 in 2010
- Processed over half a million certificates
- Improved quality and reduced reporting time for hospital reports of hearing screening results, from an aggregate-only report to specific, unique records associated with birth certificates, and from 14 to 5 days
- During the first 6 months of operation, 99.7% (50,957/51,121) of all VISITS clients were originally created by and automatically linked to the EBC system.

The Virginia Department of Health's innovative and collaborative approach to health data governance, access and maintenance has attracted the attention of other states that are looking to VVESTS as a benchmark. The federal Center for Disease Control and Prevention recently used Virginia's VVESTS application to demonstrate best practice implementation to other states.