Organizational Description And History

- The U.S. Department of Veterans Affairs (VA)’s Veterans Health Administration (VHA) is a nationwide system of health care delivery for veterans with an annual medical-care budget of $47 billion in FY 2009 and 239,000 staff.
- The VHA comprises 1,400 facilities around the country in 21 Veterans Integrated Service Networks (VISNs).

Electronic Health Record (EHR) History

- Different types of decentralized VHA hospital-based computer systems developed in the 1980s evolved into a single EHR architecture, the Veterans Health Information Systems and Technology Architecture (VistA).
- In the late 1990’s, VHA developed and deployed Computerized Patient Record System (CPRS), a Delphi-based graphical user interface to VistA, which presented data on one patient in a paper-chart metaphor and allowed electronic management of nearly all patient data.
- System and data remain decentralized in 129 local VistAs, which are being migrated into 4 Regional Data Centers, for ease of maintenance and fail-over management.
- In mid 2010, VA started an open-source EHR modernization project based on modern architecture and web-based tools. VistA will become an open-source platform and remain the principal database for VA’s EHR.

Research Influence In EHR Design

- The VA’s EHR started with researchers leading the development in the mid-1980s and evolved into a record for direct patient care that eventually became VistA.
- Many leaders in VHA operations are also prominent researchers. Research projects have directly informed or have been transformed into modules in the VistA-CPRS system.

Data Management
There are currently multiple organizations in VHA that use a variety of processes to extract data from VistA and related clinical systems. Centralized databases have limited data elements and are at least one quarter old. VISN data warehouses have a wider variety of data but are idiosyncratic to each VISN.

There is a VA-wide movement for consolidation of databases and analytical activities.

The Corporate Data Warehouse (CDW) is the emergent flagship data warehouse for analytical activities. Its people are distributed across the country and its hardware is located in Austin, Texas.

Eventually, CDW will also draw patient data from other parts of the VA (Veterans Benefit Administration (VBA) and the National Cemetery Administration (NCA).

Under the direction of the Office of Research and Development, researchers are currently implementing (in stages starting in 2009) Veterans Informatics and Computing Infrastructure (VINCI) to (1) integrate data from multiple sources in VHA, (2) facilitate research in a secure, higher-performance computing environment accessible via Microsoft Remote Desktop Connection, and (3) develop custom application that allow researchers to work with text blobs (such as progress notes) and derive structured data more suited to statistical analysis and decision support.

VINCI is a partner with CDW in the creation of integrated databases that allow searches across databases to materialize views or datasets that allow analysis on a cohort and data elements of interest. VINCI is focusing on cleaning and integrating high-value legacy databases and data from non-VA organizations, while CDW focuses on creation of a new databased derived directly from VistAs.

Non-VA data that will be incorporated by VINCI include information from Centers for Medicaid and Medicare Services (CMS), Department of Defense (DoD), and state departments of health.

Data Available For Research

Prior to VINCI and CDW, researchers had access to multiple legacy databases that have many but not all data elements needed for analysis. Access to these data outside of VINCI is cumbersome.

There is no standardized or widely available process for extracting supplementary data elements. Therefore, much research is limited to a single VistA or VISN.

Data now available in CDW/VINCI are: Allergies, Radiology (Region 1 & 4), TIU (Region 1 & 4), Med-SAS (SAS and some SQL formats), DSS NDEs (SQL and SAS formats), Lab Chem, Outpatient Pharmacy, Vital Status (SQL and SAS formats), Encounters, Demographics, Health Factors

Data scheduled to be available by the end of fiscal year 2011 are: Microbiology, Orders, Inpatient Pharmacy, Mental Health, Non-VA meds

Data planned for or under negotiation for inclusion in CDW/VINCI are: HIV, National Surgical Quality Improvement Program (NSQIP) and the VA Cardiological Assessment Reporting and Tracking System for Cath Labs (CART-CL)
IT Support For Research

- Researchers largely depend on IT support from local medical centers.
- VA Information Resource Center (VIReC) in Hines, IL is responsible for helping VA researchers understand VA data. They maintain a variety of tools including a Listserv, web pages, an monographs to inform researchers about data content and quality issues.
- VINCI will provide a help desk and facilitate user groups for its data, environment, and applications.

Research Environment

How Research Is Organized

- General VA research program begun in 1925.
- VHA’s Office of Research and Development (ORD) comprises multiple research centers and programs with particular foci located at VA Medical Centers nationwide.
- Research programs and centers are grouped within four services: (1) biomedical laboratory R&D; (2) clinical science R&D; (3) health services R&D; and (4) rehabilitation R&D.
- Multi-center work is traditionally only done on a project-by-project basis; common architecture and data definitions/quality of VINCI will increase the potential for multi-center and national research.
- The VA’s current VA research workforce comprises 3,345 FTEs with all VA researchers being VA employees.
- The underlying ethos and mandate for all VA research is that it must be for the benefit of the care of Veterans.
- Data from VistAs and other VA data systems can be used to support clinical, health services, and some rehabilitative R&D projects.
- VINCI will increase the ability of researchers, analysts, and potentially clinicians to conduct fast, direct queries of the data.

Health Services Research

- Some HSR in early years—e.g. publication in 1932 of data showing that outcomes at VA clinics compared favorably to those at non-VA hospitals.
- The goals of HSR at the VA are:
  o To identify and evaluate innovative strategies that lead to accessible, high quality, cost-effective care for Veterans and the nation.
  o To fund intramural research by eligible VA clinician and non-clinician investigators to address VA health care priorities that ultimately help to improve health care for Veterans and the nation.
To support education and career development for VA clinician and non-clinician scientists through the VA ORD's Career Development Program, which includes post-doctoral awards that provide full salary support.

- HSR&D is one division of ORD comprised of 14 Centers of Excellence (COE), three Resource Centers, and 13 Research Enhancement Award Programs (REAPs).
- Each COE develops its own research agenda, is affiliated with a VA medical center, and collaborates with local universities.
- The resource centers receive core funding to support HSR&D by providing data, consultation and focused research on management, health economics and systems.
- REAPs are groups of investigators not associated with COEs that develop research projects and core investigators.

**Research Culture**

- Research units at local VA medical centers usually have collaborative agreements with local academic and other research and teaching institutions.
- Researchers publish in peer-reviewed literature.
- Publications and other forms of communication with the broader scientific community are considered in promotion and internal funding decisions of investigator-initiated work.
- Many HSR&D researchers also have academic faculty appointments.

**Research Funding**

- FY2010, total medical and prosthetic R&D budget of $581 million in direct appropriations plus $1.3 billion from NIH, DOD, CDC, private sources, and VA medical care support for a total budget of $1.9 billion.

**Data Stewardship**

- VINCI and CDW do not have authority to release data to researchers without authorizations from an institutional review board (IRB), VHA’s Privacy Office, and the data steward.
- Single-site studies are reviewed by the local IRB.
- Prior to CDW/VINCI most data stewards physically controlled national data extracts for which they are responsible. A new data stewardship program is being developed that allows data stewards to insert themselves into the research process to ensure that researchers are educated to properly use the data and can be informed of the results prior to publication. This is not a censorship program.
- Data Access Request Tool (DART) is the VHA-endorsed, web-based tool for processing research applications for authorization to use VHA data. It is likely to be adapted for general use and mandated for researchers’ data access to CDW/VINCI. It is part of an initiative to standardize data access policies and procedures.
• All patient-level data derived from VINCI will remain behind the VINCI firewall except in the case of approval from ORD senior management or patient-signed HIPAA release.
• A data-transfer tool allows other types of information to be transferred from VINCI. This tool logs transfers, of which VINCI staff will review a sample to ensure that no patient-level data (identified or de-identified) are transferred from VINCI without authorization.

**Organization of Quality-Related Functions at the VA**

• HSR&D’s Quality Enhancement Research Initiative (QUERI) works to improve quality of care by implementing research findings into routine clinical practice.
• The VHA’s LinKS Dashboard (Linking Knowledge & Systems) consolidates data from multiple quality programs within the VA and uses automation to identify significant issues that may require attention from VHA’s managers.
• The VHA’s In-Patient Evaluation Center (IPEC) in Cincinnati uses data from VistA to measure and report risk-adjusted outcomes for hospital patients.
• Other on-going VA quality initiatives include: (1) internal and external peer review programs; (2) the Evidence-based Synthesis Program (ESP), which conducts research reviews on important health care issues; (3) the Inpatient Evaluation Center in Cincinnati, which uses data from VistA to report risk-adjusted hospital patient outcomes; and (4) the National Surgical Quality Improvement Program (NSQIP) which produces analyses of postoperative outcomes.

**Scientific and Technical Talent**

• Implications of an increased commitment to research and other analytic uses of EHRs for the number of IT professionals needed and their skill sets.
• Challenges in recruiting scientific talent to conduct research at a health care delivery organization.
• Criteria for evaluating researchers’ job performance: the role of external scientific activities (publications, conference presentations, service to the research field, externally-funded investigator-initiated research projects, etc.) versus internal contributions to the organization.

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