A Catalog of Capabilities

Patient related data sources across the health system and the resources that support them

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VP & CIO
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Major IT Strategic Axis (Why These Systems?)

• **Cerner Electronic Medical Record**
  – Fully integrated and comprehensive application avoids the serious compromises when all clinical data cannot be shared among systems
  – Partnered with a vendor whose encompassing vision for the future of patient care aligned with ours

• **GE/IDX Hospital Billing (HPA)**
  – Leverages the advantages of integration with their registration/scheduling system
  – Aligns with vision of a Centralized Business Office
  – A common technical platform that is easier to support

• **Lawson Enterprise Resource Planning**
  – The most successful resources management system for hospitals
  – Ability to support consolidated financial reporting and common chart of accounts
  – A modular approach that let us start with General Ledger/Accounts Payable/Material Management and grow into Human Resources/Payroll and Business Intelligence
Current Cerner Status

- Most ancillaries such as lab, pharmacy and radiology are fully part of the EMR
- IP and OP areas with med history and e-prescribing
- 100% Online Physician Documentation, primarily through PowerNotes (partially structured), clinical notes or uploaded dictation
- Actively implementing PowerInsight EDW for robust clinical analytics
- Collecting discrete genomic data via Helix since August 2008
- Peri-operative areas being implemented for fall 2012 (incl Anesthesia)
- Integration of scanned documents and photos
- Integration of PACS images from radiology, EKGs and Echo images
- Use of PowerTrials for clinical trials screening
Current State of VCUHS EMR

- Computer Provider Order Entry
- Clinical Decision Support
- Clinical Data Repository
- Common Medical Vocabulary
- Pathology
- Laboratory
- Radiology/PACS

CTSA Clinical & Translational Science Awards

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Evolution of the VCU Health System EHR

- Biomedical Device Interface
- Bar-Code Administration
- Scanning
- Patient Portal
- Physician Documentation
- Nursing Documentation
- Analytics Business Intelligence

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EMR Current Status

Remaining to do

- Interdisciplinary Plan of Care (IPOC)
- Point of Care bar coded meds administration
- Patient Portal
- Physician Portal

- HIM Coding/Abstracting
- Helix Cytogenetics
- Smartroom (iAware)
- eVisits
- SurgiNet/Anesthesia
Current State of Analytics at the Health System
Current distribution of “data marts:”

- DSS Cognos8
- Virginia Premier Health Plan
- Core Transaction Systems GE/Lawson/Cerner/etc
- CTSA DW RedCap I2B2
- IDX Globalworks Cognos8
- Cerner PI Business Objects
- GE/Lawson/Cerner/etc
VCUHS Decision Support  
(Jeremy Utz)

**Organization**  
Reporting to both the CMO and CIO allows Decision Support to stay close to the business while leveraging hospital information technology teams and infrastructure.

**Core Mission**  
Decision Support will use all available technology and data sources to put timely, actionable data in the hands of key decision makers.

**Strength**  
Ability to combine billing, clinical and operational data in creative ways to answer questions and solve problems.

**Examples of Current Projects**  
• Meaningful Use Physician Dashboard for Core CMS Statistics  
• Clinical Guideline Redesign for Reducing Variation (CABG and Stroke)  
• Monitoring of Real Time Hospital Occupancy  
• Primary Resident Scorecards for Chronic Disease Patient Panel  
• Financial and Clinical Analysis for the Development of a VCUHS Stroke Center
Decision Support Core Reporting Capabilities

Bed Tracking
- Information Regarding Inpatient Transfers, Patients Waiting to Move and/or Discharge and Bed Clean Times

Clinical
- ICD9 Diagnosis/Procedure Codes on all positions
- MS DRG on all Inpatient Encounters, CMI Calculations
- MD Relationships (Department, Service, Attending, Admitting)
- Cerner Order Information

Census
- Inpatient and 24 Hour Observation Patient Locations (Tracked Every 2 Hours)
- Inpatient and Observation Days

Finance and Operations
- Hospital Charges, Costs and Modeled Reimbursement Tracked on Every Patient Encounter
- Profit and Loss by Payer and Payer Grouping
- Admits, Discharges, Accounts Receivable and Balance By Account
- Hospital Charge and Transaction Detail
- Patient Demographics
- ED Measure Tracking

OR
- Case and Procedure Information from all Operating Rooms

Pharmacy
- VCUHS Outpatient Pharmacy Transactions with Patient and Prescription Information

Transfer Center
- Patient Transfers to VCUHS Tracked from Other Healthcare Facilities

Virginia Coordinated Care
- Claim Tracking and Analysis for the VCC HMO
NOTE:  DS unable to access detailed employee/payroll data from Ulti system.

    DS unable to access Cerner patient clinical data either thru millennium or power insight other than highly labor intensive unique data extracts (only orders flowing in to DSS)
PowerInsight EDW
(Abdoul Sosseh)

- **Leverages BusinessObjects™**
  - Reporting and analysis tool that allows users to access data
  - Uses familiar business terms instead of technical database terms
  - Offers the ability to ‘drag and drop’ predefined objects to create queries and reports
  - Data can be presented in reports with simple tables or dynamic documents with drillable charts

Award number UL1RR031990
PowerInsight EDW

Content Areas

- Medications
- Orders
- Allergies
- Problem Lists
- Diagnosis
- Labs
- Vitals
- Procedures
- Demographics
- Events
- Alerts
- Maternity

- Documentation(PowerForms)
- Pathways
- Surgery (once Surginet goes live)
- ED(Firstnet)
- PowerNote
- Patient Accounting
- General Ledger
- Patient Satisfaction
- Timekeeping
PowerInsight EDW

Project Status
- Officially kicked off in June 2011
- Hardware purchased and setup
- Business Object Certification environment setup and validated
- Training scheduled for mid January 2012

Next Steps
- IT staff ETL training – 01/2012
- Production domain certification – 04/2012
- Production go-live – 05/2012 (Tentative)
- Retrospective Data load – ongoing after go-live.
| Protocol Full Title (protocol_full_title) | Protacol Board Name (protocol_board_name) | PI Last Name (pi_last) | PI First Name (pi_first) | PI Middle Initial (pi_mi) | PI's E-mail address (protocol_pi_email) | PI's Phone (protocol_pi_phone) | Associated Department (protocol_pi_associated_department) | Review Category (protocol_review_category) | Protocol Status (protocol_status) | Number of Users (est_number_of_users) | Database Type (database_type) | Server Type (server_type) | Server Location (server_location) |
|----------------------------------------|---------------------------------|-------------------|-------------------|----------------------|------------------------|-------------------------|-------------------------------|---------------------------------|-------------------------------|-----------------------------|-------------------------------|------------------------|------------------------|--------------------------|
| MATTh (Mid-Atlantic Twin Registry)     |       | 6         | Silberg           | Judy L               | jsilberg@vcu.edu       | (804) 828-8153        | Human Genetics             | Expedited                      | Approved                      | 12                          | MB SQL Server                | Physical Windows          | VCU/EC                 |                          |
| National Hemochromatosis Transplant Registry | D    | Silberg            | Judy L             | jsilberg@vcu.edu     | (804) 828-8153        | Human Genetics         | Expedited                      | Closed                          |                              |                             | Physical Windows          | VCU/EC                 |                          |
| The Crohn’s Therapy Resource Evaluation and Assessment Tool (TREAT) Registry (990474) | WIRB | Silberg           | Judy L             | jsilberg@vcu.edu     | (804) 828-8153        | GI - Internal Medicine   | Full                          | Approved                       | 2                            | Unknown                     | VMWare (Windows, Linux, etc.) | VCU/EC                 |                          |
| Transplant Registry (PATs)            |       | C            | Fisher            | Richard K            | rksterli@vcu.edu      | (804) 828-4080        | Internal Medicine          | Expedited                      | Closed                         | 0                           | MB SQL Server                | Physical Windows          | VCU/EC                 |                          |
| Participation in the Cystic Fibrosis Patient Registry | VCUW | Silberg         | Judy L             | jsilberg@vcu.edu     | (804) 828-8153        | Pediatrics             | Expedited                      | Approved                       | 2                            | Unknown                     | VMWare (Windows, Linux, etc.) | VCU/EC                 |                          |
| Advancements in ESD Therapy (ACT) Registry | VCUW | West             | Mark A            | 7670                 | Internal Medicine     | Expedited                      | Approved                       | 2                              | Unknown                     | Unknown                     | Unknown                     | VCU/EC                 |                          |
| The Cystic Fibrosis Patient Registry  | WIRB  | Silberg           | Judy L             | jsilberg@vcu.edu     | (804) 828-8153        | Internal Medicine       | Expedited                      | Approved                       | 2                            | Unknown                     | VMWare (Windows, Linux, etc.) | VCU/EC                 |                          |
| Gene Environment Interplay in Early Development: The Puerto Rican Infant Twin Registry | WIRB | Silberg           | Judy L             | jsilberg@vcu.edu     | (804) 828-8153        | Internal Medicine       | Expedited                      | Approved                       | 2                            | Unknown                     | VMWare (Windows, Linux, etc.) | VCU/EC                 |                          |
| Treatment-Resistant Depression Registry | WIRB | Panter           | Andrew K          | panter@vcu.edu       | (804) 828-8153        | Psychiatry              | Full                          | Approved                       | Unknown                      | Unknown                     | Unknown                     | VCU/EC                 |                          |
| National Oncologic PET Registry       | WIRB  | Millner           | Bruce E            | millner@vcu.edu      | (804) 828-8153        | General Medicine and Cancer | Expedited                      | Approved                       | Unknown                      | Unknown                     | Unknown                     | VCU/EC                 |                          |
| Integrated Systems Biology Analysis of Clinical Genome and Inquiry | VCUW | West             | Kevin              | west@vcu.edu         | (804) 828-8153        | Emergency Medicine       | Full                          | Approved                       | 7                            | Unknown                     | Physical Windows          | VCU/EC                 |                          |
| Geriatracs and Prosthetics Markets for Primary Prevention E2D Patients: An E2D Registry | VCUW | Edwards          | Keren A            | edwards@vcu.edu       | (804) 828-8153        | Cardiology - Internal Medicine | Full                          | Approved                       | 2                            | Unknown                     | Unknown                     | VCU/EC                 |                          |
| Registries Database (Tim Aro and Chris Suleske) | Center for Clinical and Translational Research | Virginia Commonwealth University | CTSA | Clinical and Translational Science Awards | Award number UL1RR031990 |
Registries Issues

• No comprehensive dictionary of what already exists and is being collected – leading to potential for duplicative efforts

• Some local registries not following IT best practice for both security and backup (Data Center, on a server, with appropriate security/virus protection, backed up daily). Potential loss or compromise of years of data.
Proposed Clinical and Translational Data Environment (CTDE) for SOM
Future Direction of Analytics at the Health System
Becoming an Information-Powered Enterprise

VCUHS today
- Ad Hoc Reporting
- Provisional Analytics
- Poor data quality
- Limited data integration
- Reliance on analysts to run reports
- Development of data marts

VCUHS future
- Data-Driven Performance Management
- Data mining at the bedside
- Master data stored, managed centrally
- BI functionality embedded in transactional systems
- Information-Powered Insight
- Metrics roll up to enterprise view
- Deployment of interactive dashboards
- Establishment of data governance
- Deployment of user-friendly reporting tools
- Standardization of critical data elements
- Appointment of data stewards
- Isolated analytics projects
- Development of data stewards

Value Created by IT

Award number UL1RR031990
Strategically Target Key Opportunities

Business Intelligence fills the gap between the available information and the needs of the business.
Challenges in the Current State?

**Overall Data Governance Readiness:**
- There is no concept yet of data stewardship and formal accountability for maintaining data access and integrity; and
- Formalized methods to manage data have not been developed across the enterprise and exist in isolation within the functional areas; and
- There are some elements of an informal structure for DG that has materialized such as an occasional ad-hoc task force, but not a fully formed DG structure to address enterprise data concerns.

**People Readiness:**
- The current level of skill set is not likely to fully support the new direction of VCUHS; however with the appropriate tools, training, and exposure, most needs could be met with a mix of current and new resources. Including changes to positions and descriptions of roles; This applies to both functional and technical resources.

**Technology Readiness:**
- Major systems are centralized like Cerner, Lawson and GE/IDX, but the much of the specialty areas like transplant and endoscopy and cardiology still maintain data in non-integrated systems that are departmentally focused; and
- There is, as yet, no Metadata dictionary to guide analytics efforts and minimal data standards to guide development of vendor supported or home grown systems; and
- Duplication of data sets or modified versions of data sets exist in different departments or functions.
Principle 1: Data is an Enterprise Asset:

Data is a VCUHS asset that is defined, managed, and leveraged throughout the Health System.

Principle 2: The BI environment development will be Priority-Driven and Iterative:

The BI initiative development is an on-going incremental process that is driven by strategic and tactical clinical and business priorities. The BI environment must be responsive to changes in the VCUHS’s environment.

Principle 3: The BI Environment is the Enterprise Repository of Truth:

The proposed BI environment will be recognized as the shared source of timely and accurate decision support information. Data quality is guaranteed by policies, processes, and DG program management.
Addressing Multiple Constituencies

Common Data Governance and Shared Metadata

VCUHS EDW

Financial

Operations

Clinical Care

SOM Research EDW-CTSA

Award number UL1RR031990
Enhanced Analysis and Planning Functions

Quality Indicators

Program Evaluation

Grant Seeking and Reporting

Patient Worklists

Outcomes Research

Award number UL1RR031990
VCUHS Business Intelligence and Data Governance
Future State?
Questions?