Information Systems at VCU Health System

Alistair Erskine, MD
Chief Medical Information Officer
Overview - Glossary

- Cerner (EMR Vendor)
- Zynx (Content Provider)
- Patientkeeper (e-Charge Capture)
- Stentor (Radiology Online)
- Intranet (Portal to VCUHS)
- Lotus Notes (Messaging)
- Cisco VPN (Remote Access)
Current State of VCUHS EMR

Computer Physician Order Entry

Pathology

Clinical Decision Support

Clinical Data Repository

Common Medical Vocabulary

Pharmacy

Radiology/PACS

Office of Clinical Transformation
Industry Staging of EMRs

<table>
<thead>
<tr>
<th>Stage</th>
<th>Cumulative Capabilities</th>
<th>% of US Hospitals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 7</td>
<td>Medical record fully electronic; CDO able to contribute to EHR as byproduct of EMR</td>
<td>0.0%</td>
</tr>
<tr>
<td>Stage 6</td>
<td>Physician documentation (structured templates), full CDSS (variance &amp; compliance), full PACS</td>
<td>0.8%</td>
</tr>
<tr>
<td>Stage 5</td>
<td>Closed loop medication administration</td>
<td>1.4%</td>
</tr>
<tr>
<td>Stage 4</td>
<td>CPOE, CDSS (clinical protocols)</td>
<td>2.2%</td>
</tr>
<tr>
<td>Stage 3</td>
<td>Clinical documentation (flow sheets), CDSS (error checking), PACS available outside Radiology</td>
<td>25.1%</td>
</tr>
<tr>
<td>Stage 2</td>
<td>Clinical Data Repository, Controlled Medical Vocabulary, Clinical Decision Support System (CDSS) Capability</td>
<td>37.2%</td>
</tr>
<tr>
<td>Stage 1</td>
<td>Ancillaries – Lab, Rad, Pharmacy</td>
<td>14.0%</td>
</tr>
<tr>
<td>Stage 0</td>
<td>All three Ancillaries not installed</td>
<td>19.3%</td>
</tr>
</tbody>
</table>

Source: HIMSS Analytics™ Database (derived from the Dorenfest IHS Database™). N = 5,073

Slide 4

VCU Medical Center
Every Day, A New Discovery.

Office of Clinical Transformation
Office of Clinical Transformation

- Improving the quality of patient care, enhancing service, and reducing costs through effective alignment of people, process and technology
### Patient Care

<table>
<thead>
<tr>
<th>PowerChart 107</th>
<th>PathNet NA*</th>
<th>DissemRules</th>
<th>Innovian 2</th>
<th>FPD 2</th>
<th>RALS 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inpatient System</td>
<td>Pathology System</td>
<td>Clinical Rules Tool</td>
<td>Anaesthesia</td>
<td>Provider Database</td>
<td>Blood Glucose Capture</td>
</tr>
<tr>
<td>Overall Inpatient Nursing Clinical Application. Includes Order Entry, Document Management, Charting and Charge Entry functions.</td>
<td>Primary applications for expert role and alerts.</td>
<td>Drugs, Used in OR, PACU &amp; Pre-Op area.</td>
<td>In-Hosptial, ED of MDs and other providers including community MDs.</td>
<td>Manages bedside capture of Wood glucose and upload of results to server.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PowerChart Office</th>
<th>FirstNet</th>
<th>RadNet</th>
<th>ORMIS 10</th>
<th>VARSIS</th>
<th>CAPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambulatory Clinic System</td>
<td>Emergency Department System</td>
<td>Radiology System</td>
<td>OR Scheduling &amp; Work Flow</td>
<td>Radiation Oncology</td>
<td>Outpatient Pharmacy</td>
</tr>
<tr>
<td>Main applications used outside of inpatient nursing. Includes order entry, documentation, charting and charge entry.</td>
<td>Main applications for Emergency Department areas. Includes patient tracking, documentation &amp; order entry.</td>
<td>Radiology workflow system</td>
<td>GE, Used for edemal scans, nursing desk &amp; chargers (includes webLink)</td>
<td>Varian - System manages the records of Radiation Oncology patients through their series of treatments.</td>
<td>PCDD, Handles outpatient prescriptions and renewals.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cappote</th>
<th>PowerNet</th>
<th>ProView</th>
<th>MIDAS 2</th>
<th>RobBot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pharmacy Management</td>
<td>Inpatient Pharmacy System</td>
<td>Pharmacy Documentation</td>
<td>Endoscopy</td>
<td>Pharmacy Robot</td>
</tr>
<tr>
<td>Application that tracks patient transfers and discharges along with EDX down-time and ED charges registations.</td>
<td>Pharmacy system for tracking and approving inpatient drug orders. Tied with Drug Alerts.</td>
<td>Structured documentation for physicians.</td>
<td>Departmental system for tracking service schedule and developing results - tied with equipment.</td>
<td>System supports referral functions - such as utilization management and support for social work areas.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Discern</th>
<th>Blood Bank</th>
<th>PharmNet</th>
<th>Teletracking</th>
<th>PYVIS</th>
<th>PharmaDispy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Custom Reports</td>
<td>Blood Bank System</td>
<td>Ambulatory Pharmacy</td>
<td>Patient Transport</td>
<td>Drug Dispersing Cabinets</td>
<td>Ambulatory dispensing</td>
</tr>
<tr>
<td>Primary application used for data extraction and report design.</td>
<td>Core modules for managing the blood bank operation.</td>
<td>Purchased - Approved for Install - WIP</td>
<td>Application tracks patient transport calls and routes requests to transport while tracking time.</td>
<td>Cabinets loaded with patient med orders and allow access to pull med and supplies.</td>
<td>Counts pills, prints labels and captures receipt signatures</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PowerVision</th>
<th>ePathLink</th>
<th>P2 Sentinel</th>
<th>Telemtracking</th>
<th>Escanect</th>
<th>Cardology - Echo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Report Writing Tool</td>
<td>External MD viewing of lab</td>
<td>Audit Trail</td>
<td>Teletracking</td>
<td>Escanect</td>
<td>Cardology - Echo</td>
</tr>
<tr>
<td>Secondary report writing and query tool - Unlimited use.</td>
<td>Independent system for tracking the names and actions of individuals using the CIS System.</td>
<td>Applications provides live view of patient bed status to assist with Bed Mgmt.</td>
<td>Departmental system for tracking Echo tests and linking with equipment - not interfaced to CIS</td>
<td>Departmental system for tracking Echo tests and linking with equipment - not interfaced to CIS</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OpenEngine</th>
<th>CIS Interface Engine</th>
<th>ProFile</th>
<th>CEPOD</th>
<th>MUSE</th>
<th>PACS 11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core Engine engine used for ADT, Orders, Results and Charges.</td>
<td>Pathology - Cytogenetics and Molecular Diagnostics</td>
<td>Medical Records</td>
<td>Dietary - Means</td>
<td>Cardiology - EKG</td>
<td>Radiology Image Storage</td>
</tr>
<tr>
<td>Purchased - System for Medical Records functions: coding/link, report tracking, etc.</td>
<td>Purchased - System for Medical Records functions: coding/link, report tracking, etc.</td>
<td>Collects Patient Menu choices, values held device and prints tray labels.</td>
<td>Departmental system for tracking Echo tests and linking with equipment - not interfaced to CIS</td>
<td>Departmental system for tracking Echo tests and linking with equipment - not interfaced to CIS</td>
<td>MDC/ICN system being implemented to replace IAD current system.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Core Admin, Core Mobile</th>
<th>ICU Tracking System</th>
<th>Purchased</th>
<th>Transcriptions</th>
<th>Cardiology - Cardiac Cath Lab</th>
<th>Radiology Image Viewing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biodex / Medcure Admin</td>
<td>ICU Tracking System</td>
<td>Purchased</td>
<td>Transcriptions</td>
<td>Siemens - Dept. System for CATS Lab linked with equipment.</td>
<td>Web based application for viewing of images</td>
</tr>
</tbody>
</table>
Reduced sign-on Initiative

- Balance Security and Access needs
  - Too many passwords to systems
    - eID for VCU Library and resources
    - Workstation access (aka Windows login)
    - Cerner, Stentor, etc. login access

- Short-term
  - Windows Login – pass-through authentication

- Long-term
  - Biometrics, Sentillon, RFID
Clinical Information - Online

- Anatomic Pathology and Genomics
- Pharmacy (eMAR)
- Radiology (in and outside Radiology Dept)
  - CT, MRI, Ultrasound
- Echocardiograms/Cardiac Cath/EKG
- Endoscopy reports

- Rounding Reports, EMR Summary
Virtual paper documentation

**Efficiency**
- Use of preventive care
- Documentation quality
- Information availability
- Staff satisfaction
- Regulatory compliance
- Performance payments
- E-Consult and e-Signature

**Effectiveness**
- Cost of paper forms
- Transcription costs
- HIM workload, staff reductions
- Costs of data collection
- Process variation
- Cost of record storage

**Safety**
- Reduced ADE incidence
- Patient chart legibility
- Malpractice expense
- Automate Quality Tracking

*Multiple data entry methods*
Major EMR initiative during FY2009

- Online Physician Documentation (Jan 09)
  - Dictation/Transcription – Medquist
  - Text-blobs – Cerner Clinical Notes
  - Structured templates – PowerNotes
  - Voice Recognition – Nuance/Dragon

- Online Nursing Documentation (Oct 09)
  - Admission Assessment
  - On-going Assessments
  - ICU documentation
Placing orders for future visits

Efficiency
- Clinical outcomes
- Use of preventive care
- Regulatory compliance
- Direct patient care time

Effectiveness
- Redundant testing
- Order turnaround time
- Process variation
- DRG associated LOS

Safety
- ADE incidence
- Med error incidence
- Complications of care
- Patient chart legibility
Placing Orders: e-Prescribing (FY09)

- Reduce reliance on paper/printers
- Electronic write prescriptions
- Electronic transmit prescriptions
- Catalog of local pharmacies to select
- Improve communication between providers and pharmacy staff (internal/external)
- Decision support with EMR (ie – allergies)
- Simply process for patients
- Dose Calculator for prescription orders

Interaction

Efficiency
- Clinical outcomes
- Documentation quality
- Information availability

Effectiveness
- DRG associated LOS
- Process variation
- Costs of data collection
- Drug use and costs
- Script turnaround time
- Redundant testing
- Cost of paper forms

Safety
- Patient script legibility
- ADE incidence
- Complications of care
- Med error incidence

Office of Clinical Transformation
Evidence-Based Content Provider

- 3rd party content provider –
  - Reduced orderset development time to production
  - Quarterly updates on content
  - Tracking of Regulatory mandates
  - Best-practice Plans of Care
  - Evidence Links within Cerner ordersets
  - Zynx Forecaster models to anticipate effects of planned interventions
  - Includes Rules/Alerts and developing Documentation Templates
Adventist Health Results with Zynx

Pathway: 2002 = 4,662 Patients  
2003 = 4,974 Patients  
2004 = 4,955 Patients

Non-Pathway: 2002 = 7,105 Patients  
2003 = 7,331 Patients  
2004 = 5,278 Patients

Reduced readmission, mortality and cost

Cost Data from Trendstar/Outcomes Advisor
For years 2002, 2003 and 2004
Assistance with Charge Capture

Office of Clinical Transformation
**Patientkeeper**
Converged Mobile Device

- Look-up medical reference
- Check lab, rad, notes, problem list
- Capture physician professional fee
- Look-up colleague contact for a clinical consult

Visit of Patient

Office of Clinical Transformation
Converged Mobile Device

Handoff Patient Care

- Check medication list
- Look-up recent email
  - Email patient signout
- Create discharge summaries
- Follow-up patient with pending labs/radiology/consult notes
VCUHS Workstation Desktop
VCUHS Intranet

http://vcuhsweb.mcvh-vcu.edu
Paging System (AMCOM)

http://amcomwbm.vcuhs.mcvh-vcu.edu
Current Status: 2  IN HOSPITAL ON PAGE  Org:
Current Exception:
---------------- You do not have a current exception ----------------

Status Update

1 AVAILABLE AT
2 IN HOSPITAL ON PAGE
3 IN HOSPITAL PAGE EMERGENCY ONLY
4 IN HOSPITAL NOT AVAILABLE
5 OUT OF HOSPITAL ON PAGE
6 OUT OF HOSPITAL PAGE EMERGENCY ONLY
7 OUT OF HOSPITAL NOT AVAILABLE
8 IN MEETING
9 AT THE VA

Update
Employee Self-Serve (ESS)

http://vcuhshr.vcuhs.mcvh-vcu.edu/
Helpful Tools And Links

- VCUHS Outpatient Medication Profiles
  - Requires Log In
- Formulary OneSource
- FIRST Consult
- Zynx Health
- Virginia Commonwealth University
  - Daniel W. Reynolds Partnership in Geriatric Education
- McKesson
  - Va Premier CareLink
- PubMed
- VCU Libraries

[Ambulatory Clinics] [Directories] [Dose Range Checking] [Newsletters & Online Communities]
[Professional Associations] [Research] [Resource Centers] [Technology Links] [VCU Specific Links]

Ambulatory Clinics:
- Oral & Maxillofacial Surgery Clinic

Directories:
- Hospital Directory (www.hospital.com -- Not internal)
VCU Library
http://www.library.vcu.edu
Lotus Notes

iNotes (Web)
Lotus Notes
Desktop Client
Cerner FirstNet
<table>
<thead>
<tr>
<th>Location</th>
<th>Name</th>
<th>MRN</th>
<th>Attending Physician</th>
<th>Medical Service</th>
<th>Admitted</th>
</tr>
</thead>
<tbody>
<tr>
<td>11E 338 A</td>
<td>4370043</td>
<td>HULL MD, JASON R</td>
<td>IP-Ortho Surgery</td>
<td>9/19/2008 5:42</td>
<td></td>
</tr>
<tr>
<td>11E 349 B</td>
<td>6410136</td>
<td>ZUELZER JR MD, WILHELM A</td>
<td>IP-Ortho Surgery</td>
<td>9/22/2008 17:10</td>
<td></td>
</tr>
<tr>
<td>11W 420 A</td>
<td>6193641</td>
<td>WARD MD, JOHN D</td>
<td>IP-Neurosurgery</td>
<td>9/16/2008 19:43</td>
<td></td>
</tr>
<tr>
<td>11W 444 A</td>
<td>1257676</td>
<td>GRAHAM MD, ROBERT S</td>
<td>IP-Neurosurgery</td>
<td>9/24/2008 5:45</td>
<td></td>
</tr>
<tr>
<td>H4 016 A</td>
<td>5284327</td>
<td>GRAY MD, RASHIDA N</td>
<td>IP-Psychiatry</td>
<td>9/23/2008 15:27</td>
<td></td>
</tr>
</tbody>
</table>
Cerner PowerChart
Keeping with VCUHS mission

- **Education/Knowledge management**
  - Patient education
  - Staff continuing training (evidence at point of care)
  - Housestaff training (link to medical education)
    - Simulation Center

- **Research**
  - Real-time automated enrollment
    - Clinical Trial eligibility and management
  - Digitalized data is easier to mine, analyze and report
    - Natural language processing and data extraction
Keeping up with changes

- Training
  - Online, competency-based modules
  - Ad-hoc “no reservation needed” classroom sessions
  - 1:1 at-the-elbow support as needed
- “Clinical Transformation Specialist” role
  - Review Lights-On Network data
  - Market system changes to clinicians
  - Provide feedback to design/development teams
It's 11:44AM and you just dispensed 4mg of dexamethasone to your patient. Where would you click to begin to chart the med?

Image description: A screenshot of a medical charting software showing a medication entry with a message indicating that it is not correct. The correct action is to select the red box to the right of dexamethasone that says "4mg" under the 11:44AM column to begin charting the med. Click anywhere to continue.

Question 1 of 10
Radiology Online

PACS - McKesson
Remote Access - Stentor
Welcome
Can't find old studies? Call radiology fleroom at 8-3543, 8-3559 or 8-3573.

User name: aorskins
Password: ********
Log on to:
iSite
Workstation location:
Main Location

iSite® Enterprise Log-In

Version 3.2.2 Release (Build 20) FCS
Protected by U.S. Patents 6,553,141; Additional patents pending.
Remote Access

VPN Client
Remote Access

http://vcuhsra.mcvh-vcu.edu
**What do OCT councils do?**
The VCUHS Office of Clinical Transformation (OCT) includes the five councils listed below. Each of these councils has a specific focus as it relates to the Electronic Medical Record (EMR).

Below each council’s heading is a list of the top issues the council is working on. Click on the council names to read council charters and membership structures.

<table>
<thead>
<tr>
<th>Communication Council</th>
<th>Orders &amp; Caresets Council</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cerner Message Center</td>
<td>E-Consults</td>
</tr>
<tr>
<td>Provider Notification</td>
<td>Medication Reconciliation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Data Retrieval &amp; Interface Council</th>
<th>Rules &amp; Alerts Council</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cerner Remote Hosting Option (RHO)</td>
<td>Core Measure Compliance Improvements</td>
</tr>
<tr>
<td>Clinical Data Abstraction</td>
<td></td>
</tr>
</tbody>
</table>

**Documentation Council**
Mandatory Physician Online Documentation

*Note: This is a dynamic list that may change depending on the issues & projects each council is working on.*

Click [here](#) to contact the Office of Clinical Transformation if you have questions about proposed, current, or future EMR projects.