

Introduction to Free / Open Source VistA EHR

OSCon, 2010

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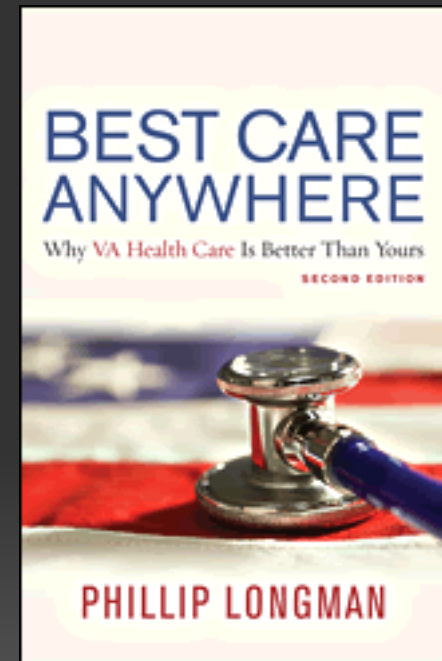
Agenda

- What is VistA?
- Clinical Transformation
- FOSS Technology Stack
- VistA FOSS Landscape
- Getting Involved
- Questions

What is VistA?

What is VistA

- Origins within the Department of Veterans Affairs
- Adoption by US Federal Government
 - Department of Defense (CHCS)
 - Indian Health Service (RPMS)
- Availability under FOIA



Outside US Federal Government

- Domestic
 - Secondary Care - e.g., Midland Memorial Hospital
 - Primary Care - e.g., Clinica Adelante
 - Other - e.g., Oklahoma State Veterans Homes
- International
 - Egypt
 - Mexico
 - Jordan
 - India

Clinical Transformation

Midland Memorial Hospital

Hospital Background

- Midland, Texas Population – 101,000
- 320 licensed beds, 2 sites
- Annual Inpatient Admissions – 11,000+/-
- Annual ER Visits – 50,000+

Key Project Milestone Dates

- Jun '03 - WorldVista Conference
- Dec '04 - Professional Services - Medsphere
- Q4 '05 ~ Q1 '07 - Phased Go-lives
- Jan '08 - Recognized as a HIMSS Stage6



Awards and Recognitions

EMR Adoption ModelSM

Stage	Cumulative Capabilities
Stage 7	Medical record fully electronic; HCO able to contribute CCD as byproduct of EMR; Data warehousing in use
Stage 6	Physician documentation (structured templates), full CDSS (variance & compliance), full R-PACS
Stage 5	Closed loop medication administration
Stage 4	CPOE, CDSS (clinical protocols)
Stage 3	Clinical documentation (flow sheets), CDSS (error checking), PACS available outside Radiology
Stage 2	Clinical Data Repository, Controlled Medical Vocabulary, Clinical Decision Support System, may have Document Imaging
Stage 1	Ancillaries – Lab, Rad, Pharmacy - All Installed
Stage 0	All Three Ancillaries Not Installed

- Jan 2008
 - Recognized by HIMSS Analytics as Stage 6 Hospital
- August 2008
 - Recognized as a “Top 25 Connected Healthcare Facility” by Health Image and IT
- November, 2008
 - Recognized as one of 100 finalists by Info World
- 2009 CIO 100 Award Winner
- 2009 American Business Awards (Stevie’s) Finalist in Information Team of the Year Category

Project Budget

VistA software license	\$ 0
Consulting (primarily Medsphere)	5,126,000
Hardware	801,000
Wireless infrastructure	226,000
Interfaces, etc.	140,000
Remodeling	100,000
Total	\$ 6,393,000

It's about the healthcare, stupid

Requirements

- Product Maturity
 - Proven Functionality
 - Adoption
 - Innovation
- Commercial support & maintenance
- Affordability

Addressing Organizational Concerns & Perceptions

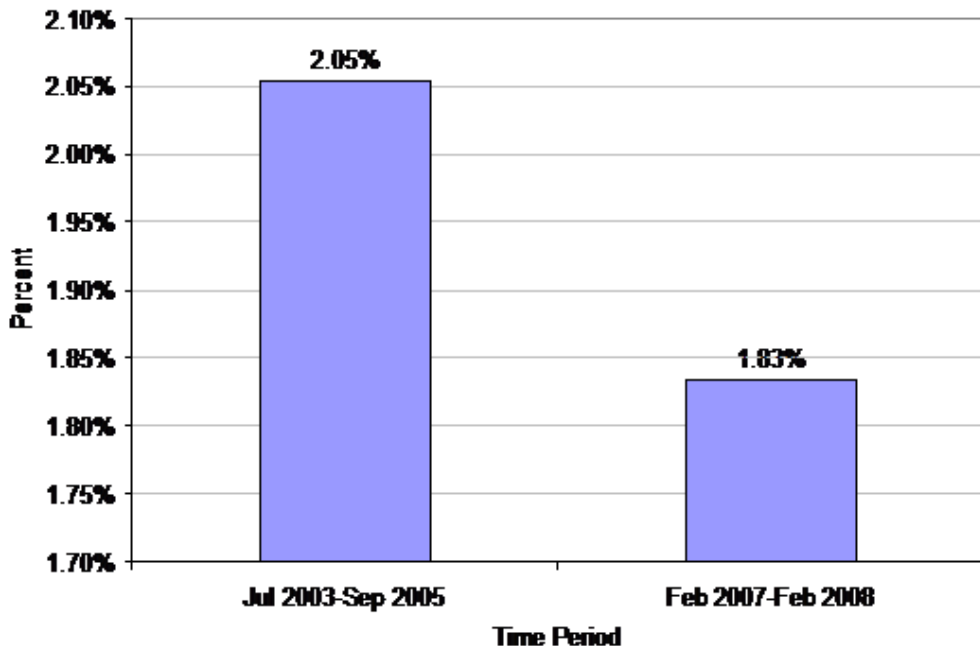
- Engagement of end-user (all providers, clinical staff, etc.)
- Educate, educate, educate...
- Internal marketing and sales

Perceived risks of open source (in healthcare)

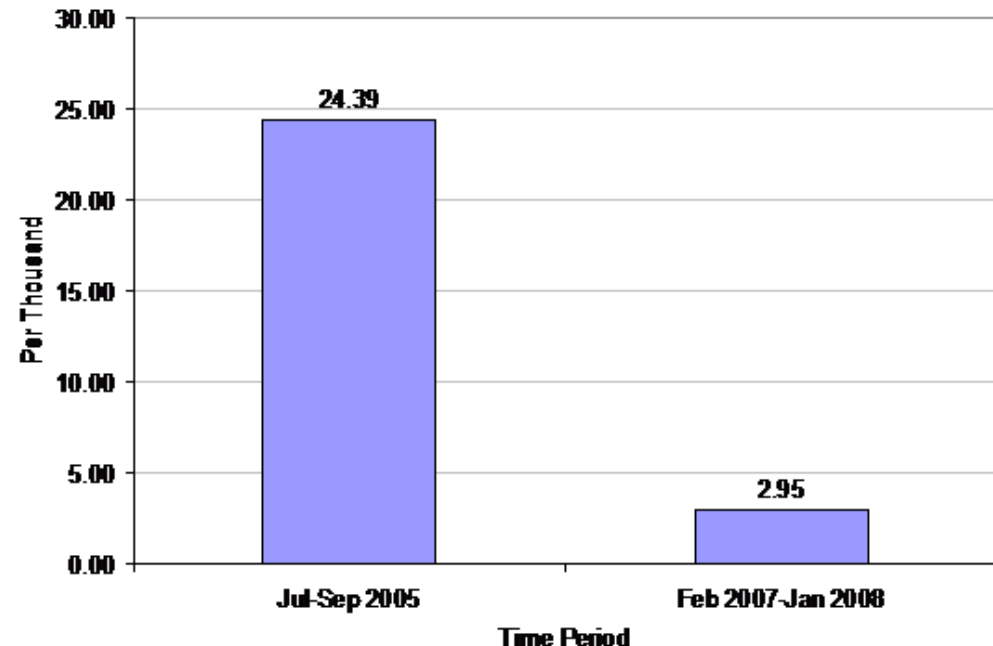
It's *actually* about the Patient

- Immediate care giver access to record
- Improved clinical processes
 - Order entry
 - Medication administration
 - Documentation
 - Results
- Improved clinical outcomes
 - Reduced Central Infection Rates
 - Reduced Medication Errors
 - Reduced Morbidity & Mortality
- Improved Patient satisfaction

Mortality Rates
~2 lives/month



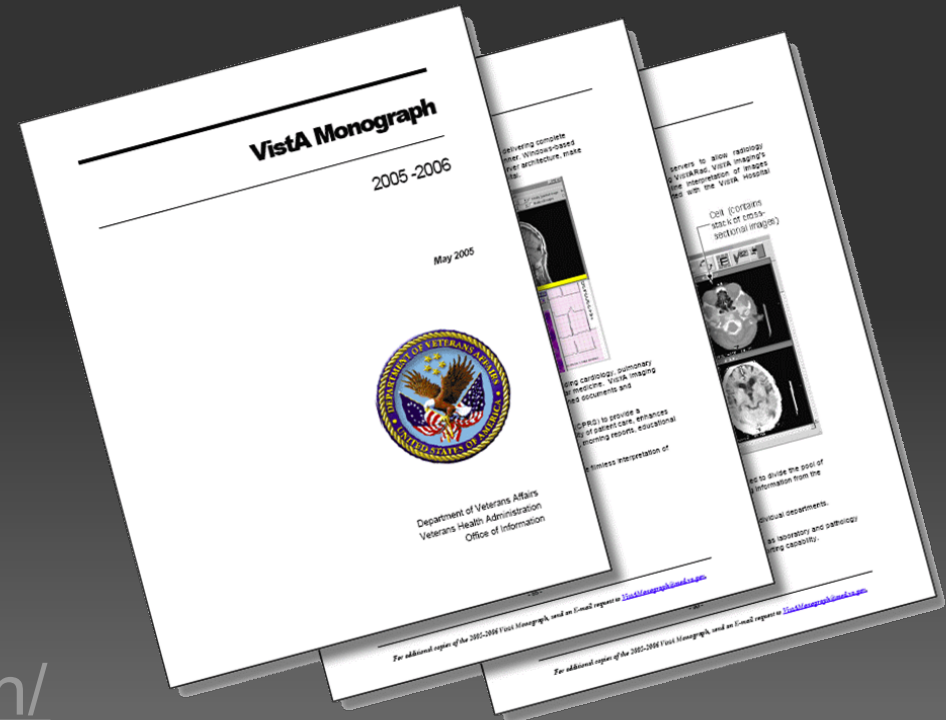
Central Line Infection Rate
88% decrease



FOSS Technology Stack

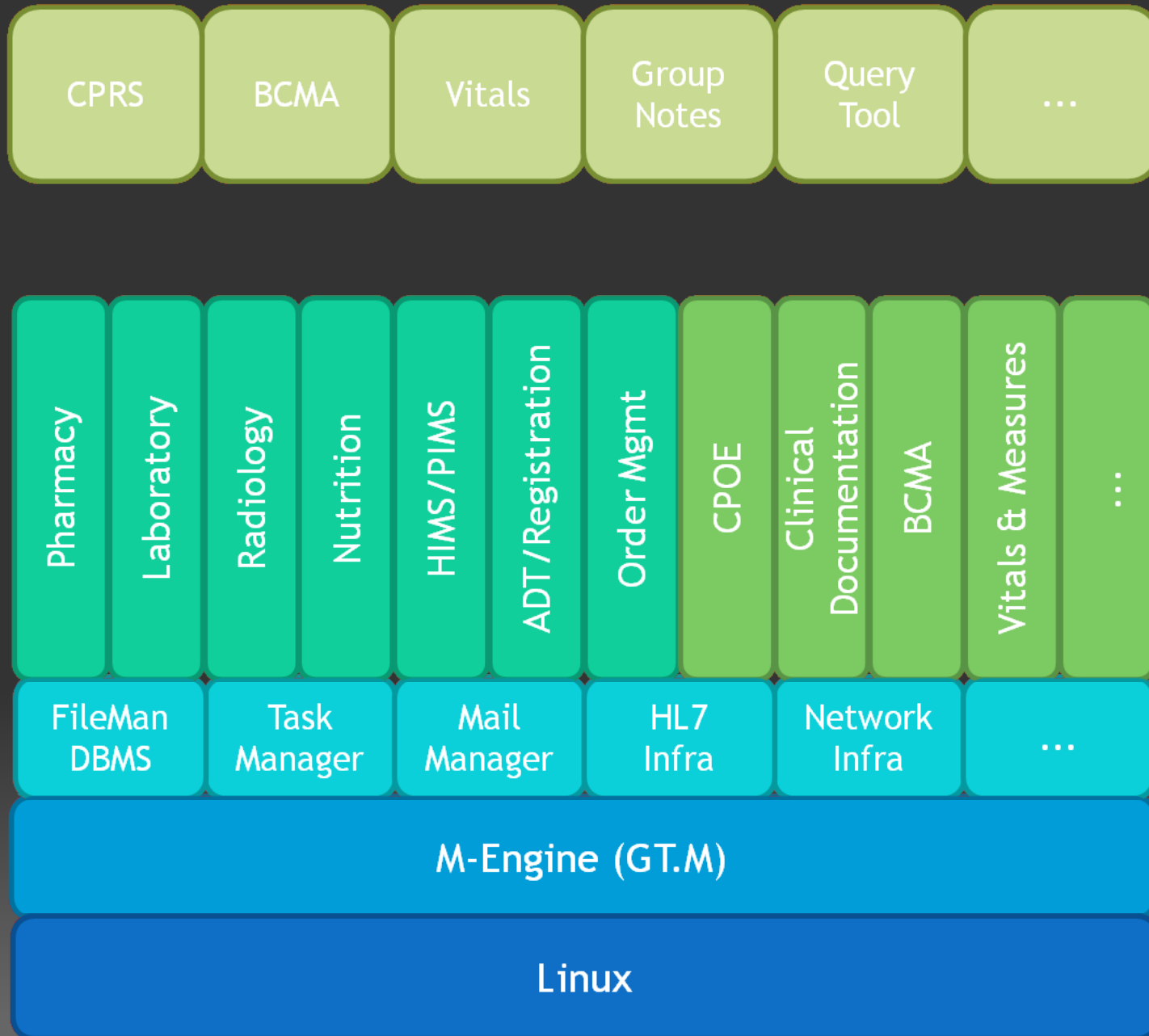
VistA: An application suite

- VistA is not an application
- The Monograph catalogs VistA's 100's of applications
- Application Categories:
 - Health Data
 - Registration, Enrollment & Eligibility
 - Health Provider
 - Management & Financial
 - Common Services



http://www.va.gov/vista_monograph/

Stack & Core Applications



M Engine & FileMan DBMS

Database & Application Server

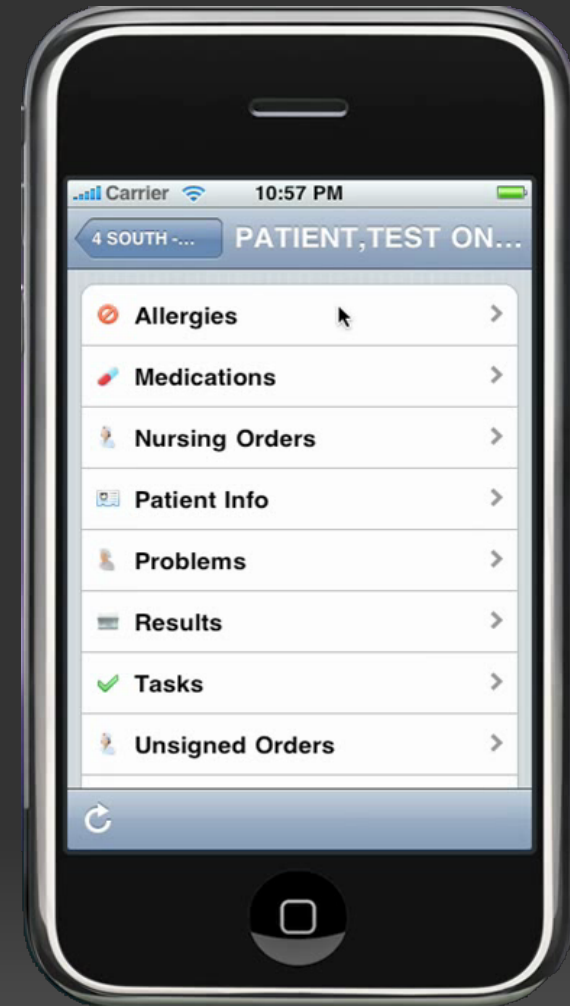
- NoSQL - data in B*-trees:
 - Compact
 - Sparse data
 - Fast
- Executes M code:
 - ISO standard
 - 3GL / Procedural
 - Database access is just an array reference

Database Management System

- Defines data structures, relationships, indices, triggers, etc.
- Benefits from underlying B*-tree structure, compactness, speed



Extending the Platform - OVID



- Can be used for Integration, Extension and Migration projects
- Java-based domain layer, access VistA data and logic from Java, SOAP or REST -- or access external data from within VistA.
- Being used to build integration modules, CCD/CCR interop, thick clients, web apps, mobile apps, etc.

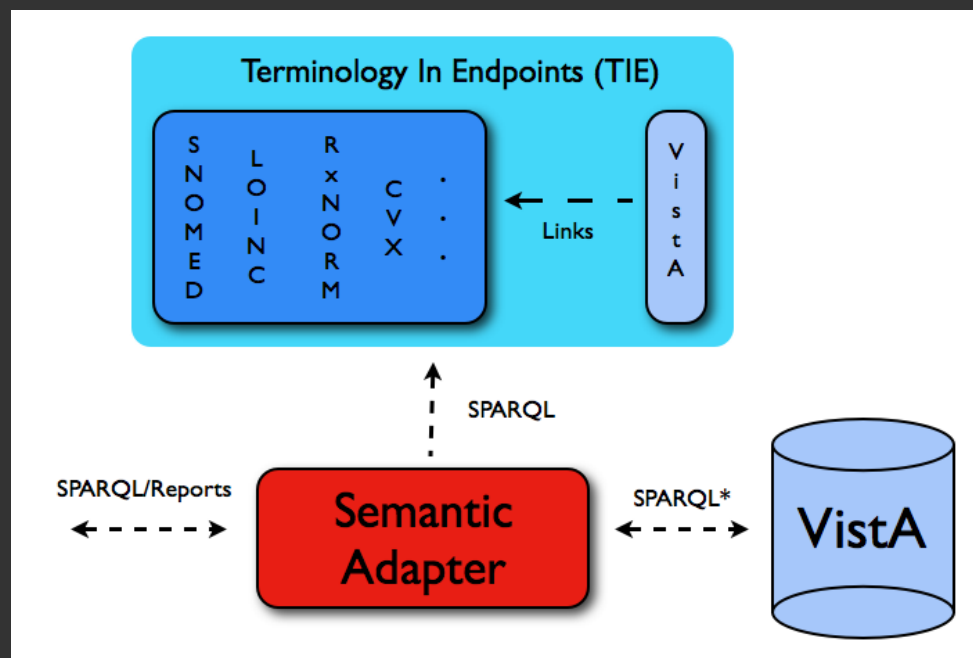
Project Home - <https://medsphere.org/community/project/ovid>

Presentation & Demo: <http://medsphere.blip.tv/file/3736408>

OVID Whitepaper - <http://medsphere.com/ovid-white-paper>

Extending the Platform - FMQL

- Wrap VistA in a SPARQL endpoint and the most popular EMR in America becomes a patient-knowledgeable member of the Semantic Web
- FileMan Query Language (FMQL) is a subset or profile of SPARQL suitable for this repository



Project Home - <http://www.caregraf.org/semanticvista>

Presentation - <http://www.caregraf.org/worldvistapres/wvpres.html#slide1>

"Vegan Vet" Demo - <http://www.caregraf.org/veganvet/demo>

Extending the Platform - EWD

- Advanced web application development technology and Ajax tagging library.
- Extend M-based applications onto the web in a modern, AJAX framework
- Technology used to rapidly develop web apps using an M back-end

Project Home - <http://www.mgateway.com/ewd.html>

Build an iPhone app - <http://www.youtube.com/watch?v=M04zyMPMnKU>

Case study - <http://tinyurl.com/6qrrx8>

Extending the Platform - FM Projection

- Projects VistA data structures into a relational database format using a MySQL data storage engine -- data is "projected" not "replicated"
- Users, applications, and dashboards can query against FM data structures using SQL and related tools

Project Home - <https://medsphere.org/community/project/fm-projection>

Presentation & Demo: <http://medsphere.blip.tv/file/3736408> (skip to 2nd half)

VistA FOSS landscape

VistA FOSS landscape - events

- VistA Community Meetings
- WorldVistA Education Seminars
- VeHU

VistA FOSS landscape - distributions

- FOIA VistA & FOIA RPMS
- WorldVistA EHR
- Medsphere OpenVista
- DSS vxVistA

VistA FOSS landscape - projects

- Interfaces
 - Practice Management System / Billing
 - Lab
 - e-Prescribing
- Continuity of Care Record / Document (CCR/CCD)
- Clinical user interfaces - TMG CPRS
- Clinical - pediatric growth charts
- Technical
 - "Megapatch" KIDS builds
 - Porting RPMS to GT.M; merging RPMS & VistA
- Meta-packaging - Astronaut

VistA FOSS landscape - organizations

- Non-profit
 - WorldVistA - <http://worldvista.org/>
 - VistA Expertise Network - <http://vistaexpertise.net/>
- Commercial
 - Medsphere - <http://medsphere.com>
 - DSS - <http://dssinc.com>
 - Dell Perot - <http://dell.com>
 - OHUM - <http://ohum.org>
 - Astronaut LLC - <http://astronautvista.com>
 - FIS (GT.M) - <http://fis-gtm.com>
 - Many consultants...

VistA FOSS landscape - lists

- Hardhats - technical
 - <http://groups.google.com/group/hardhats>
- WorldVistA services - business related
 - <http://groups.yahoo.com/group/worldvista-services>
- VistA - all else, including advocacy
 - <http://groups.google.com/group/vista>

VistA FOSS landscape - communities

- Hardhats - <http://hardhats.org>
- WorldVistA - <http://worldvista.org>
- Medsphere - <http://medsphere.org>
- VxVistA - <http://vxvista.org>

Getting Involved

Collaboration is welcome at any level of the "collaborative stack" -- clinicians, informaticists, developers, and more.

- Join a mailing list
- Find a project
- Engage the community

Communities

- <http://Hardhats.org>
- <http://WorldVistA.org>
- <http://vxVistA.org>
- <http://Medsphere.org>

Links & Resources

- [VistA @ Wikipedia](#)
- [VistA Community Projects & Discussion Lists](#)
- [Documentation, Training, & Educational Resources](#)
- [VistA Resources](#)
- [VistA-based Distributions](#)

Questions



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Addendum

Clinical Transformation

MMH - Anecdotal Improvements

Safety and Quality

- Non-compliance with documentation of date and time has been essentially eliminated.
- EDITH has eliminated the time spent clarifying orders and documentation due to handwritten legibility issues.
- Immediate access and availability has made it easier to conduct chart audits in support of regulatory and accreditation requirements.
- Bar-coded Medication Administration has helped reduce the rates of self-reported medication errors.

MMH - Anecdotal Improvements

Safety and Quality cont.

- Unapproved abbreviations have reduced significantly. During the recent Joint Commission survey, surveyors found two unapproved abbreviations and they were both handwritten on paper documents.
- Pharmacists are now more clinically focused; they are no longer just a dispensing pharmacy.
- Lost charts have been eliminated.
- Helps radiology staff identify isolation patients and “Do Not Resuscitate” status.

MMH - Anecdotal Improvements

Safety and Quality cont.

- There are fewer ordering errors made with direct entry.
- Use of topic-focused notes, e.g. documentation requirements for pressure ulcers, has helped improve capture of all documentation components since they are all together in one place in the record.
- Quality Management is now doing concurrent monitoring for compliance with core measures.
- Quality management reports that they “Would not have been able to do the nursing quality dashboard without EDITH.” The pressure ulcer rate was just over 20 percent and has dropped down to 3-5 percent.

MMH - Anecdotal Improvements

Safety and Quality cont.

- Quality Director reports, “With concurrent review it’s allowed us to set the stage for cultural change; quality is real time and it never used to be.”
- In the Emergency Department, requests for the paper chart would take anywhere from 20 minutes to the next day (if in the middle of the night and the House Supervisor was too busy). Now access is immediate.
- Timely administration of antibiotics on admission for patients with pneumonia has improved.

MMH - Anecdotal Improvements

Operational Efficiency

- Remote access has helped physicians decrease time spent doing rounds as they are able to come prepared with lab and procedure results ahead of time.
- Time spent reviewing records is now quicker, resulting in faster resolution of patient complaints.
- Delays in retrieving paper medical records have decreased. Pre-implementation it would take on average one week to retrieve the paper record for review. Record is now immediately accessible.

MMH - Anecdotal Improvements

Operational Efficiency cont.

- Chart availability helps everyone to fulfill their role and allows for simultaneous access to the same record by different roles.
- Medication verification can now be conducted more timely due to the ability to better allocate pharmacist coverage for this function.
- Information availability on outpatients and Emergency Department patients has helped radiology staff pre-plan interventions and improve continuity of care.
- Ability to cut and paste text saves time entering documentation.

MMH - Anecdotal Improvements

Operational Efficiency cont.

- Availability of electronic signature has helped reduce time spent authenticating records. One physician used to have to go to Medical Records to sign charts once per week or every three weeks. Now this can be done remotely. Now can do 50 charts in 20-30 minutes.
- Physician medical record deficiencies have reduced from 37-41% previously to 25% now.
- Charge nurses are rounding with computers on wheels to improve communication.

MMH - Anecdotal Improvements

Return on Investment

- Lab has eliminated the practice of printing lab reports and placing on the chart resulting in an approximate 99% reduction in lab paper costs.
- Lab has decreased the use of labels combining more tests to an accession number to print on one label; now using generic labels used by the Veterans Administration hospitals in lieu of more costly custom labels.
- Lab has decreased the count of terminals used in the department. They have removed 6-8 terminals due to work flow changes since technologists do not need as much interaction with the system.

MMH - Anecdotal Improvements

Return on Investment cont.

- EDITH has helped reduce record storage costs by reducing the needs for physical space for storage of medical records.
- The availability of McKesson Interqual and Milliman and Roberts criteria embedded in EDITH has helped with concurrent review.
- EDITH has greatly improved the time it takes to get charts coded due to improved access and availability. EDITH helped the organization catch up on a backlog of \$16.7 million of coding records and billing in 4 weeks (about 4500 records).

MMH - Anecdotal Improvements

Evidence-based Decision Making

- Use of physician order sets has reduced variability
- Physician specific discharge instructions in day surgery are being turned into order sets.