Hospitals and Health Systems: Case Studies on Implementation of Large-Scale Systems

HIT Summit
October 22, 2004

Robert M. Kolodner, M.D.
Acting Chief Health Informatics Officer, VHA &
Acting Deputy CIO
Department of Veterans Affairs
A Brief Agenda

• **Setting the Stage**
  – Veterans Health Administration context

• **VistA: VA’s Current Health Information System (HIS)**
  – CPRS: The clinician interface to the Electronic Health Records (EHR)

• **VA’s Large Scale Implementation Experience**
  – Processes honed and repeated over 20+ years
  – CPRS as an example – phased implementation
    • 4-step process
    • Critical ingredients
    • Clinician involvement – before, during, after deployment
    • Continued application evolution

• **Extent and Impact of Use Achieved**
  – Clinical Impact – the *Raison D'Etat* for Health IT

• **HealtheVet: VA’s Next Generation HIS & EHR**
2004: Who is “VA”? Veterans Health Administration

- **VHA is an Agency of the Department of Veterans Affairs**
- **Locations & Affiliations**
  - ~ 1,300 Sites-of-Care
    - Including 157 medical centers, ~ 850 clinics, long-term care, domiciliaries, home-care programs
  - **Affiliations with 107 Academic Health Systems**
    - Additional 25,000 affiliated MD’s
    - Almost 80,000 trainees each year
    - 60% (70% MDs) US health professionals have some training in VA
2004: Who is “VA”?  
Veterans Health Administration

• Budget, Staff, & Patients
  ~193,000 Employees (~15,000 Doctors, 56,000 Nurses, 33,000 AHP)
  • 6% decrease since 1995
    – 13,000 fewer employees than 1995
  ~ $27.4 Billion budget
  • 42% increase since 1995
    – Flat at ~ $19B from 1995 - 1999
  – 5.1 million patients, ~ 7.5 million enrollees
    • 104% increase in patients treated since 1995
      – From 2.5 million patients / enrollees in 1995
Who Are VA Patients?

• **Older**
  – 49% over age 65

• **Sicker**
  – Compared to Age-Matched Americans
    • 3 Additional Non-Mental Health Diagnoses
    • 1 Additional Mental Health Diagnosis

• **Poorer**
  ~ 70% with annual incomes < $26,000
  ~ 40% with annual incomes < 16,000

• **Changing Demographics**
  – 4.5% female overall
    • Females: 22.5% of outpatients less than 50 years of age
Safety is Not Enough

- Patients don’t seek care just to be safe, Safety is Fundamental
  - Goal: Avoid Getting It Wrong
- Safety & Effectiveness, To Close to Chasm
  - Expect effectiveness in maintaining & improving health, managing disease & distress
  - Goal: Getting It Right . . . Consistently
- Patient-Centered, Coordinated Care
  - Patient is locus of control
  - Seamless across environments
  - Integrates disease-specific, general health and social needs
  - Anticipates health trajectory and modifies risks, even before traditional risk factors manifest
  - Goal: Care that is safe, effective & predictive and delivered in the time, place & manner that the patient prefers

- Information Technologies & Care Coordination in Supporting These Goals
Success In Supporting Health Care Delivery For Millions Of Veterans

- **VistA is a success**
  - Built by “fire” of VHA collaboration
  - Publicly owned by VA; plan to remain so for the next generation system
  - Strong interest by public/private in using VistA

- **National software w/ local flexibility/innovation:**
  - Innovation developed locally & enterprise wide
  - Standard packages distributed enterprise wide, e.g. latest version of CPRS

- **Initial system (1983-1996) was built around “dumb terminals”**
  - “Decentralized Hospital Computer Program (DHCP)”
  - Steady deployment of packages and enhancements
  - Applications separated out by Hospital/Clinic “Service”
  - Simple “roll-and-scroll” screens
In 1996, VA launched the “Computerized Patient Record System” -- CPRS-- a comprehensive, integrated Electronic Health Record (EHR)
How it all Began......

- CPRS evolved from DHCP’s text-based Order Entry/Results Reporting
  - Initial design and subsequent enhancements guided by physicians and other direct health care providers
  - “Visually” organizes and presents all relevant data on a patient in a way that easily supports clinical decision making

- Phased implementation of CPRS
  - Placed in “production” at first VA site in July 1996
  - Began use at 3 more sites between August and December 1997
  - Installed in “lead” site in each of VA’s 22 regions by June 1998
  - Implementation completed at all VA Medical Centers (>170) in December 1999
“Try, fail. Try, fail. Try, succeed, deploy.”

William W. Stead, M.D.

Associate Vice Chancellor for Health Affairs & Professor of Medicine and Biomedical Informatics
Vanderbilt University
VA’s 4-step Process For Successful National Implementation

Using CPRS as an example…

• **Step 1: Software application planning and design**
  - Involved diverse group of providers to determine critical features and prioritize minimum set for Version 1
  - Iterative development with periodic reviews by these Subject Matter Experts
  - More recently made pre-release software available for testing/use/feedback by end users attending national VA IT meetings
  - Identify Implementation Manager for national roll-out
VA’s 4-step Process For Successful National Implementation

• Step 2: Install at 1st Site – Alpha site
  – Small number of users (early adopters) at a single site
    • Supported by relatively high number of national implementation staff and application developers as well as local support staff
    • Install and run in a “mirrored” test system on site, then move to “production”
    • Apply new configurations that tailor the new application to clinical needs and to improve response time
    • Rapid turn-around of minor software code changes
  – Expand the users and identify additional configurations necessary to support broader user base (new clinical settings and wider level of user expertise)
  – Goal of steady increase in basic use of the software
    • Log on and use of data retrieval capabilities
    • Entry of some simple, structured information
    • Some more demanding features (text entry) may be available but used only by a few clinicians
VA’s 4-step Process For Successful National Implementation

• **Step 3a: Implement at 2\textsuperscript{nd} site – 1\textsuperscript{st} Beta site**
  – Lower level of extra support than at alpha site
  - Code changes limited only to “bug” fixes and “show stoppers” identified at this 2\textsuperscript{nd} site
  – Confirm configurations and strategies
  – Identify differences (variations or additional configurations needed) from initial site
  – Test out training materials and methods
    - Refine based on results

• **Step 3b: Implement at 1-3 more Beta sites**
  – Progressively less extra support and more use of standard training methods
VA’s 4-step Process For Successful National Implementation

• **Step 4: Draw up and follow timetable for progressive national roll-out**

  – Several models used for different applications:
    
    • Establish a lead site in each “region” (VISN)
      
      – Train regional staff as “experts” in the application implementation & configuration
      
      – Launch separate, parallel installation activities in each region, using the lead site staff to support the newer sites in their region

    • Implement groups of sites across the country together in “waves”

    • Release software, training material with a target completion date and have every site implement on its own schedule
What Else is Needed For VA Implementations To Succeed

• The “Secret” Ingredients
  – Leverage VA model of “Super users” and Clinical Application Coordinators (CACs)
  – Initial implementation of major new applications often requires
    • Intense individual training
    • Round-the-clock, on site support at each local facility
  – Conduct national support calls involving the CACs, the National Implementation Manager, and, occasionally, the developers
  – Multi-tiered user support
    • Users to the facility Super Users and CACs
    • CACs to the local IT staff
    • Informal networking among CACs with their peers via email/messaging systems
    • Local IT staff and CACs to the national help desk
    • National help desk to the developers

• None of this can happen without management support and a show of solidarity during implementation.
“If you give me what I tell you I want, then I’ll tell you what I really want (and actually need).”

It’s NOT “scope creep;” it’s actually part of the process of refining what will work in a clinical setting.

Usability testing with a plan for iterative cycles of design need to be built into the plan.
VA Clinicians guided further rapid enhancements

1997

- Began “Camp CPRS” is an annual conference & training session
  - Designed to prepare VISN CPRS Key Site personnel for VistA CPRS
  - Five attendees from each CPRS Key Site.
    - 1 Key Site Project Manager
    - 1 Clinical Champion
    - 1 Clinical Application Coordinator
    - 1 IT Support Person
    - 1 Pharmacist

2000

- CPRS GUI Version 14 Graphical User Interface improved accessibility to online clinical information and results via integration with:
  - Enhanced online ordering capabilities
  - Display of related textual and graphical clinical images simultaneously
  - Provided access to clinical information from other VAMC sites through Health Summaries via Remote Data Views
The Evolution Continued....

2001
- VISTA Imaging V. 2.5 workstation software synchronizes with CPRS
- Images and scanned documents are captured and attached to progress notes (DICOM-standard)
- CPRS GUI Version 16 Released enhanced “Remote Data View” functionality for CPRS users to more easily view consolidated data from multiple VHA facilities across the country

2002
- Federal Health Information Exchange (FHIE) provides the first-ever interagency system with transfer of clinical data from DoD to VA on service members at the time of their separation

2004
- “Camp CPRS” renamed to VistA eHealth University – “VeHU”
  - Over 175 Sessions (60 Hands-On) on clinical software functionality
  - Over 1,450 physicians, nurses, pharmacists, clinical informatics support personnel and health information managers attended
Help at the Elbow

• Supporting the Clinical-Technical Interface
  – Role of 24/7 “Clinically Savvy” support
  – Tracking Tools to report errors and desired enhancements
  – Simplicity of using a closed system as a test bed
  – National work groups are mirrored locally and ensure clinical participation in future development
  – House staff become the critical mass to get everyone on board – keyboard/mouse is their primary method for data entry in all other parts of their lives
Where are we Now!!

Every VA Medical Center has Electronic Health Records!
100% VA Medical Centers have Electronic Health Record
CPOE is one of the Leapfrog Group’s “Top 3 Safety Strategies”

- Outside of VA, CPOE < 8% nationally
- ≤ 30% among Academic Medical Centers
- Nationally, 93% of all VA Rx’s by CPOE
- Ultimate Goal: 100%
- VA is the Benchmark for CPOE

All Medical Centers also have Desktop Imaging
And VistA Is Actively Used...
Some National VistA Statistics (Total / Daily)

• **Number of Documents**
  (Progress Notes, Discharge Summaries, Reports)
  – 533,000,000 / >510,000

• **Number of orders**
  – 1.14 Billion / >860,000

• **Number of Images**
  – 197,000,000 / ~340,000

• **Number of Medications Administered with BCMA**
  – 500,000,000 / >580,000
Chart Metaphor, Combining Text and Images
Clinical Reminders

Contemporary Expression of Practice Guidelines

- Time & Context Sensitive
- Reduce Negative Variation
- Create Standard Data
- Acquire health data beyond care delivered in VA

Links Reminder With the Action With Documentation
## Performance Measurement Setting the U.S. Benchmark for 18 Comparable Indicators

<table>
<thead>
<tr>
<th>Clinical Indicator</th>
<th>VA 2003</th>
<th>Medicare 03</th>
<th>Best Not VA or Medicare</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advised Tobacco Cessation (VA x3, others x1)</td>
<td>75</td>
<td>62</td>
<td>68 (NCQA 2002)</td>
</tr>
<tr>
<td>Beta Blocker after MI</td>
<td>98</td>
<td>93</td>
<td>94 (NCQA 2002)</td>
</tr>
<tr>
<td>Breast Cancer Screening</td>
<td>84</td>
<td>75</td>
<td>75 (NCQA 2002)</td>
</tr>
<tr>
<td>Cervical Cancer Screening</td>
<td>90</td>
<td>62</td>
<td>81 (NCQA 2002)</td>
</tr>
<tr>
<td>Cholesterol Screening (all pts)</td>
<td>91</td>
<td>NA</td>
<td>73 (BRFSS 2001)</td>
</tr>
<tr>
<td>Cholesterol Screening (post MI)</td>
<td>94</td>
<td>78</td>
<td>79 (NCQA 2002)</td>
</tr>
<tr>
<td>LDL Cholesterol &lt;130 post MI</td>
<td>78</td>
<td>62</td>
<td>61 (NCQA 2002)</td>
</tr>
<tr>
<td>Colorectal Cancer Screening</td>
<td>67</td>
<td>NA</td>
<td>49 (BRFSS 2002)</td>
</tr>
<tr>
<td>Diabetes Hgb A1c checked past year</td>
<td>94</td>
<td>85</td>
<td>83 (NCQA 2002)</td>
</tr>
<tr>
<td>Diabetes Hgb A1c &gt; 9.5 (lower is better)</td>
<td>15</td>
<td>NA</td>
<td>34 (NCQA 2002)</td>
</tr>
<tr>
<td>Diabetes LDL Measured</td>
<td>95</td>
<td>88</td>
<td>85 (NCQA 2002)</td>
</tr>
<tr>
<td>Diabetes LDL &lt; 130</td>
<td>77</td>
<td>63</td>
<td>55 (NCQA 2002)</td>
</tr>
<tr>
<td>Diabetes Eye Exam</td>
<td>75</td>
<td>68</td>
<td>52 (NCQA 2002)</td>
</tr>
<tr>
<td>Diabetes Kidney Function</td>
<td>70</td>
<td>57</td>
<td>52 (NCQA 2002)</td>
</tr>
<tr>
<td>Hypertension: BP &lt; 140/90</td>
<td>68</td>
<td>57</td>
<td>58 (NCQA 2002)</td>
</tr>
<tr>
<td>Influenza Immunization</td>
<td>76</td>
<td>P</td>
<td>68 (BRFSS 2002)</td>
</tr>
<tr>
<td>Pneumocooccal Immunization</td>
<td>90</td>
<td>P</td>
<td>63 (BRFSS 2002)</td>
</tr>
<tr>
<td>Mental Health F/U 30 D post D/C</td>
<td>77</td>
<td>61</td>
<td>74 (NCQA 2002)</td>
</tr>
</tbody>
</table>
Online Demo of CPRS

• Try a working copy of VA’s Computerized Patient Record System (CPRS) at

www.va.gov/cprsdemo
The Future.....
Next Generation VistA

• **Health_eVet-VistA** is a modernization effort that includes:
  – Systems Platform
  – Software Design
  – Development Methodology

• Based on state-of-the-art technology

• Business process re-engineering
HealtheVet – Strategy Overview

• **Moves from facility-centric to person/data-centric**
  – Uses national, person-focused health data repository for production & management/analysis/research

• **Builds on, enhances & utilizes VistA**
  – Moves from legacy VistA to HealtheVet-Vista

• **Uses best, appropriate modern technology**
  – Programming, software, hardware, networking

• **Standardizes the “core” applications**
  – Provides processes for local enhancements beyond the “core”

• **Standardizes data & communications**