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

HIT Summit

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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'Etre* 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

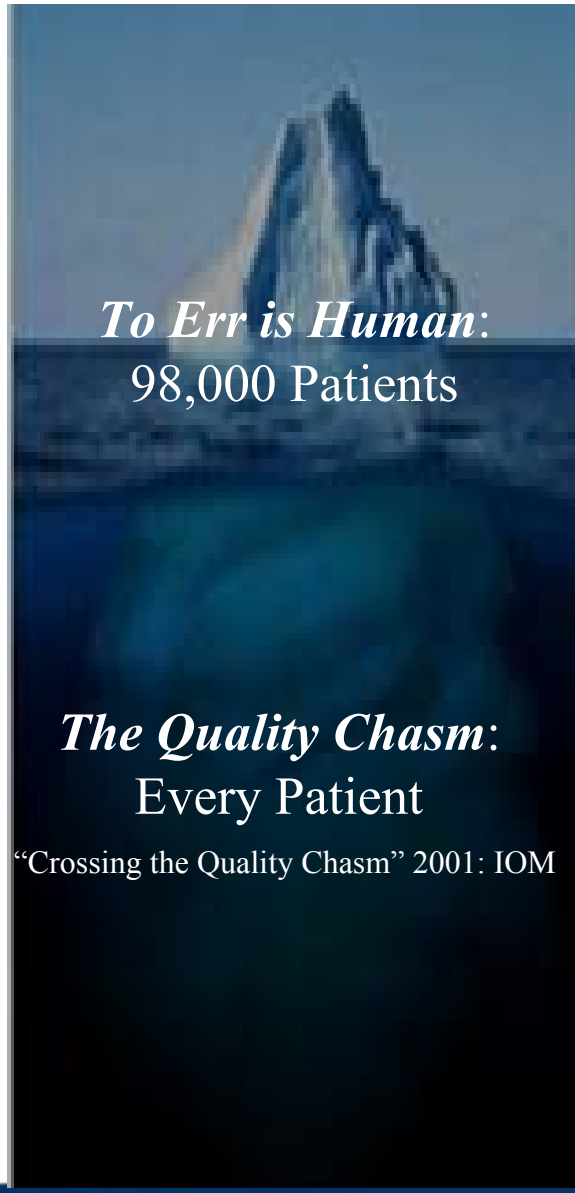
Who Are VA Patients ?

- **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**

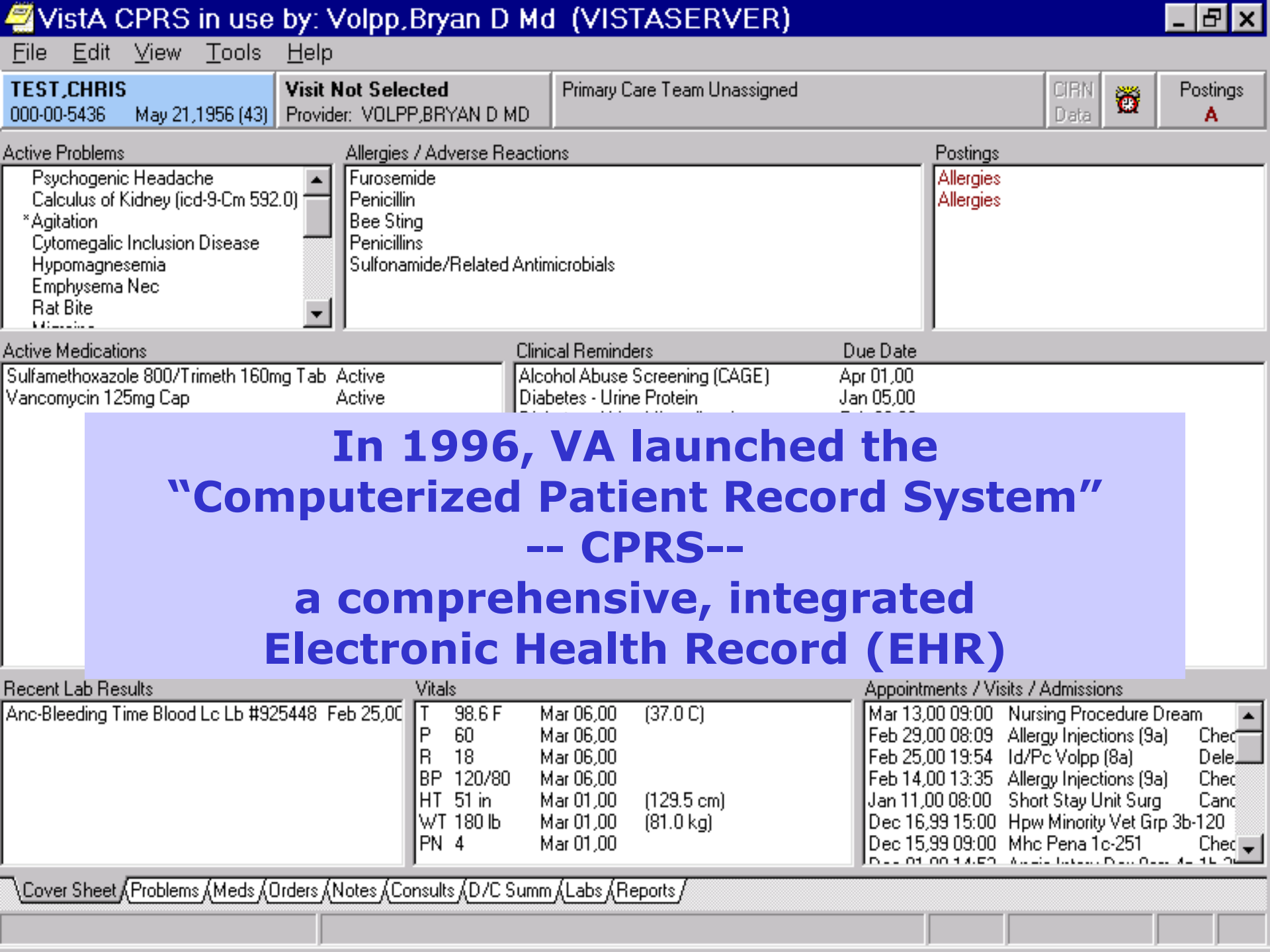


VistA

Success In Supporting Health Care Delivery For Millions Of Veterans

VistA

- **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


VistA CPRS in use by: Volpp,Bryan D Md (VISTASERVER)
File Edit View Tools Help
TEST,CHRIS
000-00-5436 May 21,1956 (43)
Visit Not Selected
Provider: VOLPP,BRYAN D MD
Primary Care Team Unassigned
CIRN Data
Postings
A
Active Problems
Psychogenic Headache
Calculus of Kidney (icd-9-Cm 592.0)
*Agitation
Cytomegalic Inclusion Disease
Hypomagnesemia
Emphysema Nec
Rat Bite
Allergies / Adverse Reactions
Furosemide
Penicillin
Bee Sting
Penicillins
Sulfonamide/Related Antimicrobials
Postings
Allergies
Allergies
Active Medications
Sulfamethoxazole 800/Trimeth 160mg Tab Active
Vancomycin 125mg Cap Active
Clinical Reminders
Due Date
Alcohol Abuse Screening (CAGE) Apr 01,00
Diabetes - Urine Protein Jan 05,00
In 1996, VA launched the
"Computerized Patient Record System"
-- CPRS--
a comprehensive, integrated
Electronic Health Record (EHR)
Recent Lab Results
Anc-Bleeding Time Blood Lc Lb #925448 Feb 25,0C
Vitals
T 98.6 F Mar 06,00 (37.0 C)
P 60 Mar 06,00
R 18 Mar 06,00
BP 120/80 Mar 06,00
HT 51 in Mar 01,00 (129.5 cm)
WT 180 lb Mar 01,00 (81.0 kg)
PN 4 Mar 01,00
Appointments / Visits / Admissions
Mar 13,00 09:00 Nursing Procedure Dream
Feb 29,00 08:09 Allergy Injections (9a) Chec
Feb 25,00 19:54 Id/Pc Volpp (8a) Dele
Feb 14,00 13:35 Allergy Injections (9a) Chec
Jan 11,00 08:00 Short Stay Unit Surg Canc
Dec 16,99 15:00 Hpw Minority Vet Grp 3b-120
Dec 15,99 09:00 Mhc Pena 1c-251 Chec
Cover Sheet
Problems
Meds
Orders
Notes
Consults
D/C Summ
Labs
Reports

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

Insight on Successful Software Development

VistA

"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

VistA

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

VistA

- **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

VistA

- **Step 3a: Implement at 2nd site – 1st Beta site**
  - Lower level of extra support than at alpha site
    - Code changes limited only to "bug" fixes and "show stoppers" identified at this 2nd 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

VistA

- **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

VistA

- **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.**

Guidance for IT Development Staff Who Work With Clinicians

VistA

"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.

The CPRS Evolution Continued….

VistA

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…., VistA

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

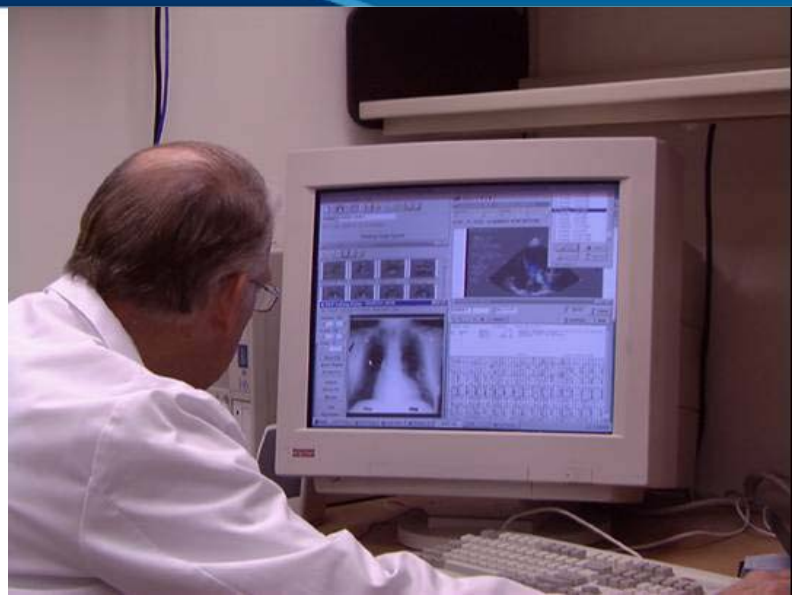
Help at the Elbow

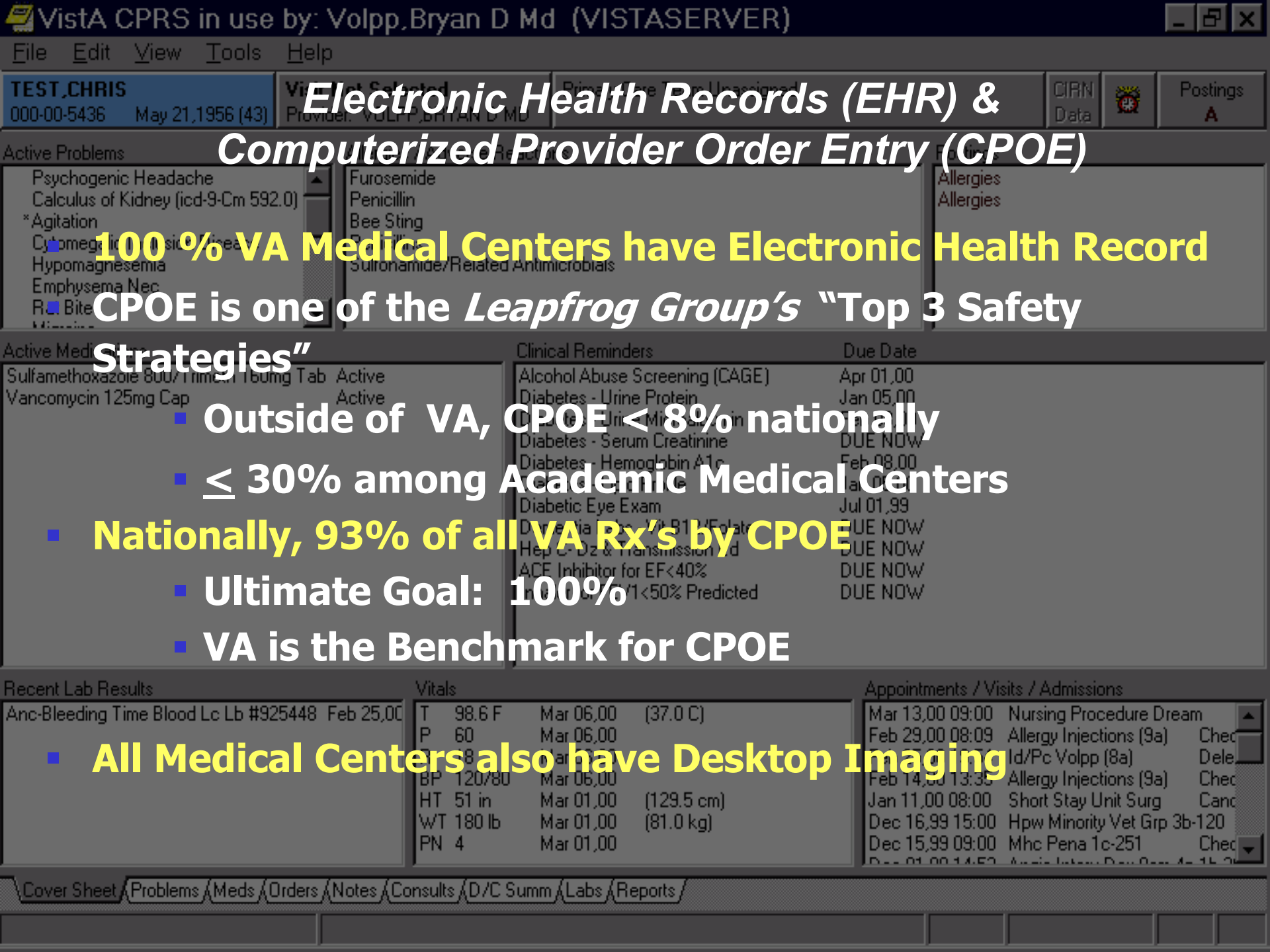
- **Supporting the Clinical-Technical Interface**
  - Role of 24/7 “Clinically Savvy” support
  - Tracking Tools to report errors and desired enhancements
  - Simplicity of using a closed system as a test bed
  - National work groups are mirrored locally and ensure clinical participation in future development
  - 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!!

VistA

Every VA Medical Center has Electronic Health Records !





Electronic Health Records (EHR) & Computerized Provider Order Entry (CPOE)

- **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**

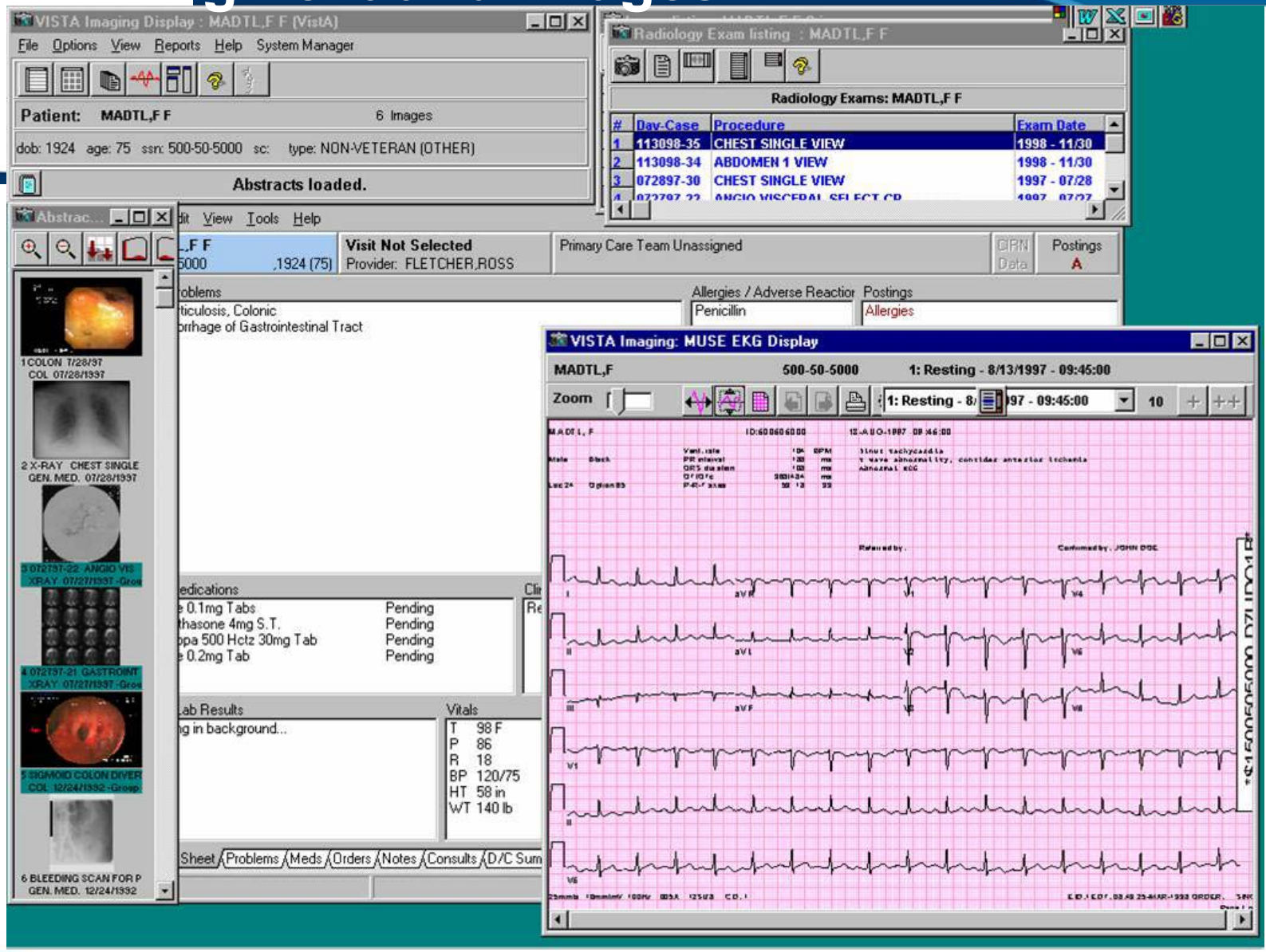
And VistA Is Actively Used...
Some National VistA Statistics (Total / Daily)

VistA

- **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,
g Text and Images

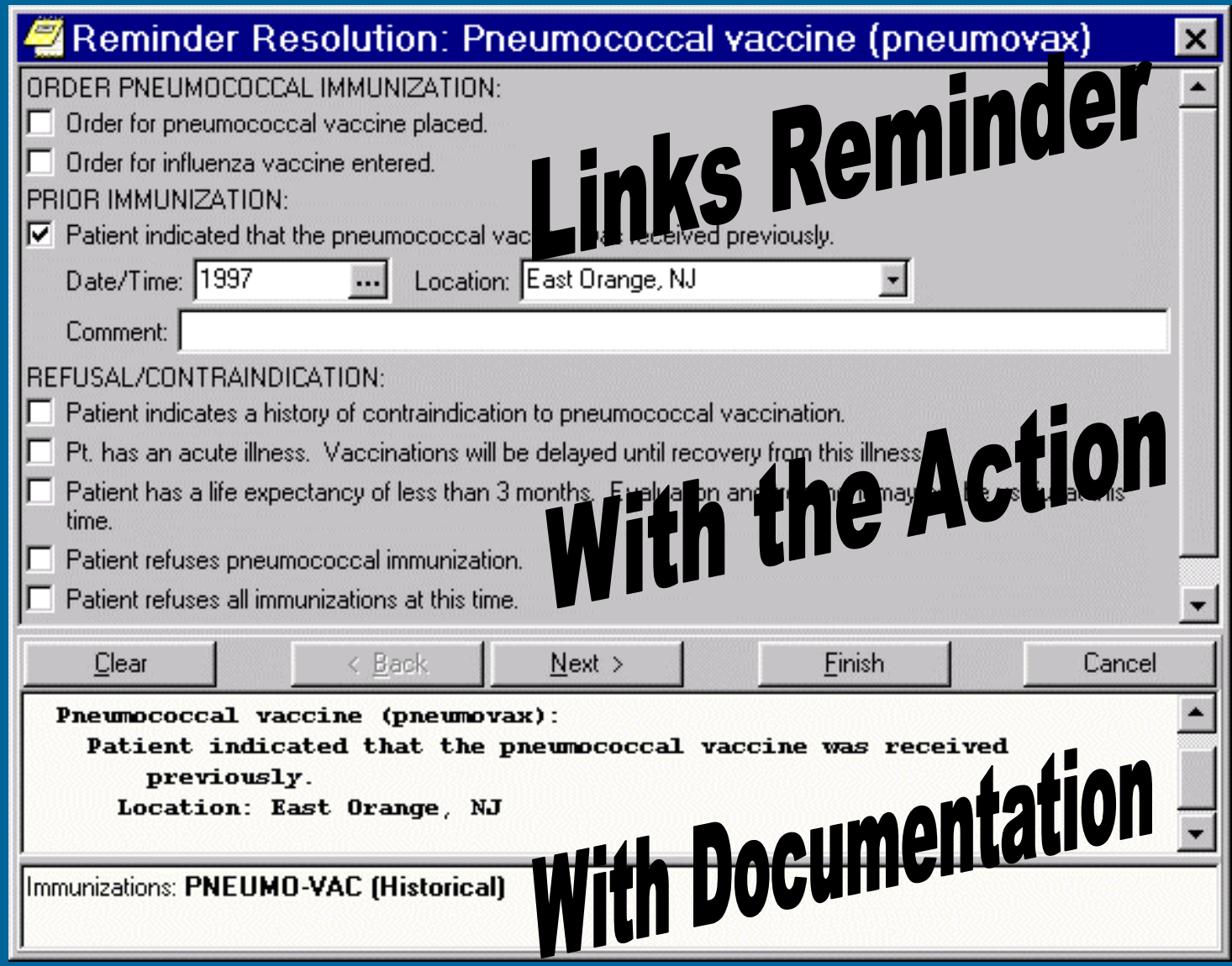
VistA



Clinical Reminders

Contemporary Expression of Practice Guidelines

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



Performance Measurement Setting the U.S. Benchmark for 18 Comparable Indicators

VistA

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

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

HealtheVet

- **HealtheVet-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**