Department of Veterans Affairs (VA)
Electronic Health Record:
Providing Information for Clinical Care and Data for
VA Health Research

National Institute of Health/National Library of Medicine:
Workshop on Long-term Preservation & Management of
Electronic Health Record
Bethesda, Maryland
April 5 – 6, 2011

John Quinn
Manager, National Data Systems
Office of Informatics and Analytics (OIA)
Veterans Health Administration (VHA)
United States Department of Veterans Affairs
Veteran Integrated Service Networks (VISN)

- Health care delivery managed by 21 VISNs
Department of Veterans Affairs (VA) At-a-Glance

- VA has more than 300,000 employees
- The Veterans Health Administration (VHA) has 243,000 of those employees

**Fiscal Year 2010 statistics**
- 8.34 million Veterans enrolled for VA care
- 6.0 million patients treated
- 75.6 million outpatient visits
- Over 679,000 admissions

Source: VHA Office of the Assistant Deputy Under Secretary for Health for Policy and Planning – 2010/Fiscal Year 2010 – Quarter 4
<table>
<thead>
<tr>
<th>VA Health Care Facilities</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>VA Hospitals</td>
<td>152</td>
</tr>
<tr>
<td>VA Community Living Centers</td>
<td>133</td>
</tr>
<tr>
<td>Domiciliary Residential Rehabilitation Treatment Programs</td>
<td>96</td>
</tr>
<tr>
<td>Outpatient Clinics Total</td>
<td>958</td>
</tr>
<tr>
<td>Hospital-based Outpatient Clinics</td>
<td>152</td>
</tr>
<tr>
<td>Independent Outpatient Clinics</td>
<td>6</td>
</tr>
<tr>
<td>Mobile Outpatient Clinics</td>
<td>9</td>
</tr>
<tr>
<td>Community Based Outpatient Clinics</td>
<td>791</td>
</tr>
<tr>
<td>Vet Centers</td>
<td>270</td>
</tr>
</tbody>
</table>

Source: VHA Office of the Assistant Deputy Under Secretary for Health for Policy and Planning – 2010/Fiscal Year 2010 – Quarter 4
VistA

- Single, integrated Computerized Patient Record System (CPRS) used throughout the Veterans Health Administration in all health care settings (inpatient, outpatient, long-term care)

- Delivers an integrated record covering all aspects of patient care and treatment
VistA includes many components to deliver high-quality health care to our Nation’s Veterans, including:

- Computerized Patient Record System (CPRS)
- VistA Imaging
- Bar Code Medication Administration
- Personal Health Record, My Health e Vet
VA’s Electronic Health Record Implementation: History

- More than 30 years experience developing medical IT solutions
- Veterans Health Information Systems and Technology Architecture (VistA)
  - “World class,” award-winning
    - Harvard University Innovations in American Government Award
    - “Top 100” CIO Award
    - Toward the Electronic Patient Record (TEPR), 1st Place Personal Health Record Award for My Health eVet – VA’s personal health record
    - Government Technology Leadership award for VA’s Bar Code Medication Administration program
- Built in partnership with clinicians, allied health and health information management professionals – key to successful development and adoption
- One contributor to VA’s success
Decentralized Hospital Computer Program (DHCP) is the precursor of today’s system
- Decentralized approach allowed site level control
- Centralized applications were made available and were enriched by locally developed software

VistA has evolved to over 150 tightly integrated applications
- Built by hundreds of developers over thousands of man hours
- Inconsistencies in coded data
VistA Implementation: Challenges

- Long-term preservation, storage of records
- Synchronization
  - Data standardization
  - Impact of continuing technology changes
  - Community and regional health exchanges/data sharing
  - Interoperability, semantic interoperability, and privacy/security issues
- User training
- Usability
- System maintenance and integration
  - Availability of trained/qualified technological support
Bar Code Medication Administration (BCMA)

Virtually eliminates errors at the point of administration
History of Bar Code Medication Administration (BCMA)

- **1994**
  - VA was one of the first health care organizations to develop BCMA technology to improve patient safety
  - Piloted by field staff at the Topeka Veterans Affairs Medical Center (VAMC)

- **1999**
  - Rolled out to all VAMCs (60,000 beds)

- **2003**
  - 100% of all VA wards documenting medication administration using BCMA

- **2010**
  - > 2.8 Million bar code scans observed since inception
  - ~678,000 medications scanned each day
Remote Physiological Monitoring

Flexible Sensor Connectivity

- Camera
- ECG
- Pulse O₂
- Thermometer
- Blood pressure
- Digital Scale
- Blood sugar
- Stethoscope
Radiology interpretation provided in real time to every point of care from expert centers
3-Tier Access Model:
- Visitors
- Registrants
- In-Person Authenticated (IPA) Users

August 2010:
- Over 43 million visits
- Over 1 million registered users
- Over 22,000 users have an IPA account
- Over 16.9 million VA prescription refills since August 2005
"Today I can announce that for the first time ever Veterans will be able to go to the VA website, click a simple “blue button,” and download or print your personal health records so you have them when you need them and can share them with your doctors. . . .” –President Obama

@Disabled American Veterans (DAV), Aug 2, 2010
Creating a New Way to Engage Veterans

“Blue Button” access to Personal Health Records

- Based on My Health eVet
- All the capabilities Veterans rely on
- All the security Veterans trust
- Simplifies basic exchange with other applications
- Improves record portability
VistA Benefits

- Improves patient safety and health care quality
- Reduces the frequency of medical errors
- Reduces costs
- Increases efficiencies through information management
- Advances the delivery of appropriate, evidence-based medicine
- Coordinates care among different providers
- Is available throughout VA’s health care network
### How VA Care Compares: Quality Measures

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast cancer screening</td>
<td>87%</td>
<td>87%</td>
<td>70%</td>
<td>68%</td>
<td>51%</td>
</tr>
<tr>
<td>Cervical cancer screening</td>
<td>92%</td>
<td>92%</td>
<td>80%</td>
<td>n/a</td>
<td>66%</td>
</tr>
<tr>
<td>Colorectal cancer screening</td>
<td>80%</td>
<td>79%</td>
<td>59%</td>
<td>53%</td>
<td>n/a</td>
</tr>
<tr>
<td>LDL Cholesterol &lt; 100 after AMI, PTCA, CABG</td>
<td>67%</td>
<td>66%</td>
<td>60%</td>
<td>57%</td>
<td>40%</td>
</tr>
<tr>
<td>Diabetes: DM control HbA1c &lt; 9.0%</td>
<td>98%</td>
<td>97%</td>
<td>89%</td>
<td>88%</td>
<td>81%</td>
</tr>
<tr>
<td>Diabetes: LDL-C&lt;100</td>
<td>69%</td>
<td>68%</td>
<td>46%</td>
<td>49%</td>
<td>34%</td>
</tr>
<tr>
<td>Diabetes: Eye Exam</td>
<td>88%</td>
<td>86%</td>
<td>57%</td>
<td>61%</td>
<td>53%</td>
</tr>
<tr>
<td>Diabetes: Renal Exam</td>
<td>95%</td>
<td>93%</td>
<td>82%</td>
<td>88%</td>
<td>77%</td>
</tr>
<tr>
<td>Diabetes: BP &lt; 140/90</td>
<td>80%</td>
<td>78%</td>
<td>66%</td>
<td>60%</td>
<td>57%</td>
</tr>
<tr>
<td>Smoking Cessation Counseling</td>
<td>96%</td>
<td>89%</td>
<td>77%</td>
<td>n/a</td>
<td>69%</td>
</tr>
<tr>
<td>Smoking: Medications offered</td>
<td>90%</td>
<td>84%</td>
<td>54%</td>
<td>n/a</td>
<td>41%</td>
</tr>
<tr>
<td>Smoking: Referral/strategies</td>
<td>96%</td>
<td>92%</td>
<td>50%</td>
<td>n/a</td>
<td>41%</td>
</tr>
<tr>
<td>Immunizations: Influenza</td>
<td>83%</td>
<td>84%</td>
<td>n/a</td>
<td>71%</td>
<td>n/a</td>
</tr>
<tr>
<td>Immunizations: Pneumococcal</td>
<td>95%</td>
<td>94%</td>
<td>n/a</td>
<td>67%</td>
<td>n/a</td>
</tr>
</tbody>
</table>
Cancer Screening, Selected Outpatient Quality Measures

VA and Private Sector, 2004 - 2007

Percent of Patients Screened

Cervical Cancer Screening

Colorectal Cancer Screening 50-80

Breast Cancer Screening in Women 40-69
The Value of an Electronic Health Record

- VA invested $4 billion in health IT and saved more than $7 billion from 1997 to 2007
  - Elimination of duplicated tests and reduction of medical errors accounted for 86% percent of savings

- Key findings
  - VA spends larger proportion of budget on health IT than other U.S. health care providers
  - VA has adopted health IT more widely than than other U.S. health care providers
  - At VA, improved performance measures in areas of preventative care and treatment of chronic conditions coincide with adoption of IT tools related to treatment

Study authors: The Center for IT Leadership

*Health Affairs, 29, no. 4 (2010): 629-638
http://content.healthaffairs.org/cgi/content/full/29/4/629#SEC2
Adoption of Selected Applications, VA and U.S. Private Sector

- Electronic Health Record (EHR)/Electronic Medical Record (EMR)
  - VA = 100% by 2002
  - Private Sector = 61% Inpatient by 2007
  - Private Sector = 12% Outpatient by 2007

- Computerized Provider Order Entry (CPOE)
  - VA = 100% by 2002
  - Private Sector = 16% Inpatient by 2007

- Bar Code Medication Administration
  - VA = 100% by 2002
  - Private Sector = 23% Inpatient by 2007
DoD/VA Health Information Sharing Partnership

One-way, enterprise exchange of text data

Bidirectional, real-time exchange of text data

Bidirectional, real-time, enterprise exchange of computable data

Federal Health Information Exchange – FHIE
Bidirectional Health Information Exchange – BHIE
Clinical Data Repository/Health Data Repository - CHDR
“By computerizing health records, we can avoid dangerous medical mistakes, reduce costs, and improve care.”

-- President George W. Bush, State of the Union Address, January 20, 2004

On April 9, 2009, President Obama directed the Department of Defense and the Department of Veterans Affairs to create the Virtual Lifetime Electronic Record that: “will ultimately contain administrative and medical information from the day an individual enters military service throughout their military career and after they leave the military.”

-- President Barack Obama
The Nationwide Health Information Network

A Variety of Devices (Web/Applications/User Interfaces)

- Battlefield
- Hospice
- Reg/Enroll
- Lab
- Sched
- Home Tele-Health

Common Application Framework

Common Applications

Mission Specific Applications

Nationwide Health Information Network

Common View Across Systems for VA/DoD
January 2010

- **Health Record Data:**
  - Healthcare Information Technology Standards (HITSP) C32 subset:
    - Allergy/Drug Sensitivity
    - Condition
    - Healthcare Provider
    - Information Source
    - Language Spoken
    - Medication
    - Person Information
    - Support

- **Partners:**
  - San Diego VA Medical Center
  - Naval Medical Center
  - Kaiser Permanente in San Diego

September 2010

- **Health Record Data:**
  - HITSP C32 subset (from San Diego)
  - Comment
  - Hematology Lab Result

- **Partners:**
  - Naval Medical Center Portsmouth
  - VA Medical Center Hampton
  - Med Virginia

March 2011

- **Health Record Data:**
  - HITSP C32 subset (from Tidewater)
  - Vital Sign
  - Chemistry Lab Result

- **Partners:**
  - 92nd Medical Group at Fairchild AFB
  - Spokane VA Medical Center
  - Inland Northwest Health System

September 2011

- **Health Record Data:**
  - HITSP C32 subset (from Spokane)
  - Advance Directive *
  - Encounter
  - Immunization *
  - Insurance Provider
  - Procedure
  - Unstructured Documents:
    - Consults/Referrals
    - Discharge Summaries
    - Results of Diagnostic Studies
    - Procedure Notes
    - History & Physicals

- **Partners:**
  - By September 2011 our goal is to have several additional pilot sites up and running with information sharing between various VA, DoD, and private sector partners

* will display but not send
Microsoft Office SharePoint Server Farm

- Performance Point Services
- Excel Services
- Reporting Services
- Analysis Services
- Collaboration Services
- Team Foundation Services
VA VISN, Regional, and National Data Warehousing

Source Systems

• Facility 1 VistA
• Facility 2 VistA
• Facility 3 VistA

Shadow/Journal Reader Process

• Regional VistA Shadow

Regional Feeder Data Warehouse

• Near Real Time
• Business key
• Time stamp
• OpCode (I/U/D)
• Indexes:
  - VistAEditDate
  - Business Key

Corporate Data Warehouse

• Daily
• SQL Server
• Business key
• Time stamp
• OpCode (I/U/D)

Regional Data Warehouse

• Daily
• SQL Server
• Business key
• Time stamp
• OpCode (I/U/D)

VISN Data Warehouse(s)

• Daily
• SQL Server
• Business key
• Time stamp
• OpCode (I/U/D)
Questions?

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