Military Computer-Based Patient Record: Design, Development, Deployment With Clinical Focus

Healthcare Information and Management Systems Society

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Presenters

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Agenda -- Plan of Action

- **Background and Scope**  
  *(Dr. Robert Wah)*

- **Design and Development**  
  *(Dr. Bart Harmon)*

- **Training and Deployment**  
  *(Dr. Dan Zinder)*
The Military CPR: Background & Scope

Robert Wah, M.D., Commander, USN
Agenda

- Mission and Scope
- Where We Started
- Who We Are
- System Demonstration
Mission and Scope

Statistics

- Population -- 8.7 million eligible beneficiaries
  - Active duty military
  - Family members (spouses and children)
  - Retirees
  - Other eligible populations (such as NATO)

- 50 million outpatient visits/year

- 70 million prescriptions/year

- Peak days -- 4200 concurrent users projected for CPR system (source: Gartner Group Study)
Mission and Scope
Military Health System Levels of Care

- First Responder
- Theater Hospitalization
- Enroute Care
- Forward Resuscitative Surgery
- Care Outside Theater
- First Responder
Where We Started
Composite Health Care System I (CHCS I)

- Full computerized physician order entry (CPOE) and results retrieval
- Fully operational since 1993
- Current legacy system -- captures clinical data but is highly decentralized
- Paper records
- Command line interface (MUMPS-based program)
- 102 host systems serving over 500 hospitals and clinics
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Who We Are
Integrating the Health Record
**Who We Are**
Clinical Data Repository (CDR)

**Current**
- 4 MTFs (7+ Clinics) Testing

**Current (15 Nov 2002)**
- Patients – 879,975
- Completed Encounters – 102,898
- Lab Tests – 3,603,653
- Radiology Exams – 730,065
- Medical Orders – 5,242,305

**Current**
- Phase I Operational Test – Spring 2003
# Who We Are

## Military CPR & Institute of Medicine Recommendations

### Easiest to Implement
- Problem Lists
- Simultaneous User Views in the CPR
- Continuous Authorized User Access
- Access to Local & Remote Information
- Automated History & Physical
- Multiple Formulary Lists
- Point-of-Care Facility Input Mechanisms
- Icon-Generated Text

### Harder to Implement
- Ergonomic Presentation
- Multimedia/Image Data Storage
- Clinical Data Dictionary
- Health Status & Functional Level Measurements
- Multiple Controlled Vocabularies and Coding Structures

### Most Difficult to Implement
- Clinical Specialty Needs
- Confidentiality, Privacy, & Audit Trails
- Clinical Data Repository
- Links to Other Patient Records
- Direct Entry by Physicians

### Intelligent Support for Delivery of Care
- Clinical Problem Solving
- Clinical Reasoning & Rationale Documentation
- Longitudinal & Timely Linkages to Other Records
- Multiple PMS/EDI Financial Links
- Cost Measuring/Quality Assurance

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**NOTE:** Categories based on 1991 and 1997 IOM study and *Advance for Health Information Executives*, April 2002.
System Demonstration

- Highlights
  - Intuitive GUI
  - Support for clinical workflow
  - Structured data
  - Automated coding
The Military CPR: Design & Development

Bart Harmon, M.D., MPH
Lieutenant Colonel (P), USA
 Agenda

- Original Clinical Encounter Model
- Design
- Development
Original Clinical Encounter Model

Core Capabilities

Problem List

Core Documentation Tool (Structured)

Order Entry

UM/Mgd Care

Coding Encounter

Review Old Notes

Summary View of Patient Record

Lab/Radiology/Pharmacy

Allergies

Immunizations

Expert System/Alert Display

Consults (tracking not answering)

Security Infrastructure

Order Action

Core Capabilities

Corporate DBs

Scheduler (People, Equipment, Space)

Links to Other Systems

Alerts/Expert Systems
Design
Access Services for Medical Information

Presentation Services
- E-health Web Portal
- CHCS II Desktop

Security Services
- Role-Based
- Public Key Infrastructure
- Information Assurance

Application Services (Examples)
- Structured Documentation
- Problem List
- Appointing, Referrals
- Immunization Tracking
- Symptoms
- Reporting
- Consult Tracking
- Dental Charting
- Signs
- Clinical Practice Guidelines
- LAB-RAD-PHARM Order Entry, Results Retrieval
- Alerts & Wellness Reminders
- Assessments
- Plans
- Clinical Practice Guidelines
- LAB-RAD-PHARM Order Entry, Results Retrieval
- Alerts & Wellness Reminders

Data Services (Examples)
Clinical Data Repository
- ALLERGIES
- APPOINTMENT
- MEDICATIONS
- PROVIDER
- PATIENT DEMOGRAPHICS
- ALERTS
- DIAGNOSES
- PROCEDURES
- VITALS
- LAB REPORTS
Design
Process and Approach

- Top-down approval from leadership
  - Stress long-term project
  - Manage competing interests
  - Maintain organizational focus and drive
  - Align incentives and eliminate conflicts among competing interests

- Bottom-up requirements analysis
  - Clinicians and other subject-matter experts provide detailed requirements

- Clinical input to user interface design

- Multidisciplinary, evolutionary approach
Development

- Evolutionary, spiral development process
- Continuous user feedback
- Communication of changes
- Legacy integration
- Integrated solution
- Reporting
- Multidisciplinary solution
- Better at some times than at others
The Military CPR: Training & Deployment

Dan Zinder, M.D.
Commander, USN
Agenda

- Pre-Deployment Planning
- Marketing
- Business Process Reengineering (BPR)
- Training
- Roll-Out
- Go Live
- Support
Pre-Deployment Planning

- Plan ahead!
- Perform site surveys that include the following:
  - Technical -- End-user device placement, physical plant changes, network and infrastructure
  - Ergonomic -- End-user device type, physical workflow
- Identify early adopters
- Discuss impact to productivity now
Marketing

- Identify and use clinical champions early and throughout the buildup and roll-out
- Emphasize marketing -- Bad information travels fast
- Keep the masses informed and up to date
- Control rumors
- Discuss competing interests
Business Process Reengineering

- Implementation
  - Stage 1 -- Individual use
  - Stage 2 -- Identify and integrate handoffs
  - Stage 3 -- “Shakedown cruises”

- Optimization
  - Stage 4 -- Workload redistribution
  - Stage 5 -- Add telephone consults and ancillaries
  - Stage 6 -- Add wellness and reporting
Training

- Treat training like a development process
- Don’t underestimate the power of a strong training program for easing roll-out
- Consider a modular approach with multiple levels of training
- Evaluate team-based vs. role-based training
- Collect requirements, develop a plan, build curriculum, test the methodology, validate the process
- Start as soon as a fieldable version is ready because training is time consuming and laborious
**Roll-Out**

- Start slow and learn lessons before ramping up
  - Consider field tests to plan the roll-out

- Use clinical champions
  - Clinically-respected, early adopter (not the computer whiz)

- Keep information flowing
  - Technical and functional support available and visible on site
  - Frequent visits to the front lines to sense the atmosphere, assist users, and control rumors

- Consider incremental implementation but plan carefully
Go Live

- Maximum support (including emotional support) available on initial *go live*
- Expect the unexpected
- Rehearse to minimize bottlenecks
  - Be sure of handoffs and workflow on the new system
  - Walk through (not just talk through) complete process
- Understand the diffusion of technology curve and personalities involved
- On-site, implementation assistance for technical and functional
- “Leadership at the deckplates” -- Clinicians from Central Office should make on-site appearances on a regular basis
Support

- Plan for sustainment

- Continue training
  - New users
  - Advanced users
  - Super users

- Use buddy help to the maximum extent

- Make help readily available, especially in the first few months

- Make the providers’ ability to perform their jobs the top priority
Conclusion

- Understand the needs and demands of your medical population
  - CPR will support the military’s large and diverse population

- Look for ways to expand your existing capabilities
  - CPR is a quantum leap beyond the 10 year old MHS CPOE

- Work the project both top-down (executive buy-in) and bottom-up (support users) continuously

- Plan to accommodate growing knowledge as you progress (don’t expect to know everything when you start)

- Human factors are the highest priority

- Technology should support change, not drive it