The U.S. Department of Defense’s EHR Journey and Way Forward

Improving Quality Health Care in the Post Electronic Health Record World

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MEDINFO 2013
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- Masters in Management
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- Board Member AMIA
- Chairman NATO MED CIS EP
- Member U.S. Health IT Policy Committee
- Deputy PM Defense Health Information Management Systems
- CMO Defense Health Information Management Systems
- Graduate of the US Naval Academy
Purpose: To provide history and update on the US DoD’s Electronic Health Record (EHR) journey

Agenda

• Where We Came From
• Where We Are
• Where We Are Going
Medical in the Department of Defense (DoD)

Department of Defense

Army

Navy

Air Force

Marines

TRICARE

Military Health System

JMIS

OCIO

Defense Health Information Management System

Defense Health Support System

Tri-Service Infrastructure Management Program Office
DHIMS Information Management/Information Technology (IM/IT) Areas of Responsibility

- Ancillaries
  - Laboratory, Radiology, Pharmacy
- Blood Management
- Case Management
- Clinical Decision Support
- Consults/Referral Management
- Dental
- DoD/VA Data Sharing
- Health Surveillance
- Imaging
- Inpatient
- Longitudinal Health Record
- Medical Command and Control
- Medical Planning
- Medical Readiness
- MEDLOG Support
- Order Entry/Results Retrieval
- Outpatient
- Patient Administration
- Patient Tracking
- Personal Health Record
- Population Health
- Preventive Health
- Spectacle Requisition
- Tele-Health
- Theater Occupational/Environmental/Radiological Health
- Trauma Registry Documentation
- Traumatic Brain Injury/Behavioral Health (TBI/BH)
- Utilization Management
- **Veterinary Medicine**
- Workload Accounting
The DoD EHR is an Enterprise-wide Medical and Dental Information Management System

**WHO WE SERVE**
- Service Members
- Retirees
- Their Families
- Other Beneficiaries
- Operational Commanders
- Military Health System Community
- Other Stakeholders

**WHAT WE DO**
- Right Information
- Right Community
- Right Time
- Right Place

**WHY WE DO IT**
- Enhanced Access to Quality of Care
- Enhanced Patient Safety
- Enhanced Health Outcomes
- Better Health Resource Management
- Health Community Satisfaction
Service Member Health Care Continuum
From Recruitment to Transition to Veteran Care

- Recruitment
- Accession/Training
- Routine Care
- Readiness/Pre-Deployment
- Post-deployment
- Care in Transit
- Deployed/Theater Care

Electronic Health Record

Personal Health Management

Transition & Benefits Assessment
Sustaining Base EHR Footprint Today

- **AHLTA – Worldwide**
  - Covers 24 time zones
  - Averages 148,000+ additional encounters per day
  - 9.8 million beneficiary
  - Over 110,000 EUDs
  - US Capitol
  - White House

- **MHS Inpatient Solution**
  - 21 Sites (12 MHS)
  - AHLTA Worldwide

<table>
<thead>
<tr>
<th>Military Treatment Facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>70 Hospitals</td>
</tr>
<tr>
<td>410 Medical Clinics</td>
</tr>
<tr>
<td>362 Dental Clinics</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Workload Each Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.8M Outpatient Encounters</td>
</tr>
<tr>
<td>2.1M Prescriptions</td>
</tr>
<tr>
<td>103,000 Dental Procedures</td>
</tr>
<tr>
<td>18,200 Inpatient Admissions</td>
</tr>
<tr>
<td>2,200 Births</td>
</tr>
</tbody>
</table>

Supporting transient patient populations and transient healthcare teams
A day in the Life of the US DoD EHR…….

1 Day
3 million Structured terms
3 million Structured terms
171,000 Abnormal symptoms
One of the largest, fully deployed EHRs in the world

- The volumes are enormous
  - **148,000 Patient encounters/day**
  - **85+ Terabytes** (mostly non-image)
  - **9.8 Million Patients with clinical data**
  - **70,000 Providers**
  - **100+ million signed outpatient encounter notes entered into AHLTA to date**
  - **1.8 million HL7 messages per day**
Evolution of the US DoD’s Electronic Health Record

From first concept development of facility-centric capability to worldwide deployment of patient-centric system at all DoD military treatment facilities (MTFs).

1981
- Deployment of standalone medical information systems TRIPHARM, TRILAB, TRIRAD, TRIPAS and AQCESS (Quality of Care Evaluation) in 19 MTFs

1986
- Interim Tri-Service Micro Pharmacy System: Automated support for in- and out-patient pharmacy services in 240 facilities by 1989

1988
- CHCS development begins; deliver CPOE and MTF-centric EHR. Integrates outpatient ancillary services - laboratory, radiology, and pharmacy – providing MHS’ first online MTF hospital-centric clinical support system

1988
- Limited early inpatient documentation (CIS)

1996
- CHCS - providing CPOE - completed worldwide. Concept exploration for clinically-oriented graphical user interface underway

1998
- CHCS II initial concept development (patient-centric system)

2000
- CHCS II initial deployment

2000–03
- Further concept development: application / infrastructure refinements

2003
- Initial TMIP-J deployment to Theater

2004
- Worldwide implementation of global system begins

2005
- Initial EHR in 77 MTFs and 11 time zones

2006
- AHLTA Block 1 worldwide deployment completed to all MTFs

2007
- Began initial implementation of updated inpatient EHR (Essentris)

2008
- Began TMIP Block 2 deployment (EHR first time on ships)

2009
- Strategic Planning for EHR Way Ahead

2013
- Next Generation EHR

2013
- From first concept development of facility-centric capability to worldwide deployment of patient-centric system at all DoD military treatment facilities (MTFs).
Virtual Lifetime Electronic Record

“... the Department of Defense and the Department of Veterans Affairs have taken a first step towards creating one unified lifetime electronic health record for members of our armed services that will contain their administrative and medical information -- from the day they first enlist to the day that they are laid to rest.”
Ensure Full Interoperability by Way of IT Standards and Data Sharing Across all US Government Organizations

COMMON SERVICES
• Common Terminology Service
• Identity Management Services
• Joint Active Directory
• Global Force Management
• Virtual Lifetime Electronic Record (VLER)
• James A. Lovell Federal Health Care Center
• Included in all WIPT Teams

• National Health Information Network
• Health Information Technology Standards Panel
  Health Information Technology Standards Panel
Conclusion

“The very low levels of adoption of electronic health records in U.S. hospitals suggest that policymakers face substantial obstacles to the achievement of health care performance goals that depend on health information technology. A policy strategy focused on financial support, interoperability, and training of technical support staff may be necessary to spur adoption of electronic-records systems in U.S. hospitals.”
‘Meaningful Use’ is Impacting the EHR


- Cash incentives up to $44,000 starting in 2011 for practices to adopt EHR
- $54 billion: Total money incentives under act

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**THE NEW ENGLAND JOURNAL OF MEDICINE / July 13, 2010**

“The meaningful use rule *strikes a balance between acknowledging the urgency of adopting EHRs to improve our health care system and recognizing the challenges that adoption will pose* to health care providers. The regulation must be both ambitious and achievable… But the speed of ascent must be calibrated to reflect both the capacities of providers who face a multitude of real-world challenges and the maturity of the technology itself.”

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**GARTNER / January 7, 2010**

“The incentive payments can cover a substantial portion of the total costs of implementing an EHR. *However, the criteria for getting the funds require meaningful use of some of the important features of EHRs such as physician order entry and quality measurement.* That level of implementation requires substantial change management within the hospital or practice. The benefits of doing an EHR well far outweigh the incentive funds and so does the cost of a poor implementation.”

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The US DoD Acquisition Process
What has the US DoD accomplished so far?

• The DoD has one of the largest, fully deployed EHR’s in the world: **AHLTA**

• An integrated Medical and Dental EHR

• The DoD, with AHLTA, is currently capturing more detailed computable clinical data in the outpatient setting than any other organization in the world

• The DoD and VA are sharing more non-billing EHR data than any other two healthcare provider organizations in the world
AHLTA is...

AHLTA
Clinics & Hospital

AHLTA-Theater
AHLTA-Theater is...

Documenting at Point of Injury

Documenting in Theater

Documenting Onboard Ships

Documenting In-Transit & In-Air
Documenting at Point of Injury
Onboard USS Ronald Reagan and USS John C. Stennis
Documenting in Transit
Documenting in Theater
In Hospitals
Lesson Learned: Form factor options
AHLTA Theater Application Worldwide Footprint

- White House Medical Unit (WHMU)
- OIF/OEF
  - TC2: 5,881,386 Total Workload
  - AHLTA-Theater: 2,455,768 Total Encounters
- Iraq: 9 Theater Hospitals / 150+ Forward Resuscitative sites
- U.S. Embassy Clinic in Baghdad, IRAQ
- Qatar: 1 Theater Hospital
- Kuwait: 1 Theater Hospital / 8 Forward Resuscitative sites
- Afghanistan: 2 Theater Hospitals / 50+ Forward Resuscitative sites
- Djibouti: 1 Theater Hospital equivalent
- USS Ronald Reagan (CVN 76)
- USS John C. Stennis (CVN 74)

As of 01/31/09
Medical Data Integration: Today

THEATER

Clinics and Hospitals

- GCSS
- JMeWS
- TMIP CHCS Caché (TC2)
- TRAC2ES
- JPTA Web Entry
- AHLTA Mobile
- AHLTA-Theater

- VA
- BVIE
- JTTR
- CDR
- CDM

- Essentris
- Composite Health Care System (CHCS)
- Defense Blood Standard System (DBSS)
- AHLTA

*JPTA functionality merged into TMDS March 2008
T = Means Patient has AHLTA-Theater Notes

Kuwait
<table>
<thead>
<tr>
<th>Date</th>
<th>Status</th>
<th>Appl Class</th>
<th>Appl Type</th>
<th>Primary Diagnosis</th>
<th>Clinic Location</th>
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<tbody>
<tr>
<td>27 Apr 2009 13:11</td>
<td>Complete</td>
<td>Inpatient</td>
<td>SPEC</td>
<td>SUBCONJUNCTIVAL HEMORRHAGE - RI</td>
<td>LSL Ophthalmology</td>
</tr>
<tr>
<td>27 Apr 2009 13:05</td>
<td>Complete</td>
<td>Inpatient</td>
<td>SPEC</td>
<td>visit for screening exam</td>
<td>LSL Ophthalmology</td>
</tr>
<tr>
<td>24 Apr 2009 0:00</td>
<td></td>
<td>Outpatient</td>
<td>ACUTE</td>
<td>ACUTE EPIDURAL HEMORRHAGE</td>
<td>Theater Clinic</td>
</tr>
<tr>
<td>03 Mar 2009 11:00</td>
<td>Complete</td>
<td>Outpatient</td>
<td>ROUTN</td>
<td>CIRCADIAN RHYTHM SLEEP DISORDER JET LAT TYPE</td>
<td>Theater Clinic</td>
</tr>
</tbody>
</table>

Signed Encounter Documents: 29 Apr 2009 04:34 signed by

**Landstuhl Regional Medical Center**
<table>
<thead>
<tr>
<th>Note Title: Discharge Summary</th>
<th>Provider: [Redacted]</th>
</tr>
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<tbody>
<tr>
<td>Note Date: 27 Apr 09</td>
<td>Location Name: 332ND EXPEDITIONARY MED GROUP</td>
</tr>
<tr>
<td>Note Type: Progress Note</td>
<td></td>
</tr>
<tr>
<td>Complete Note:</td>
<td></td>
</tr>
<tr>
<td>332nd AFTH TRANSFER/ DISCHARGE SUMMARY</td>
<td></td>
</tr>
<tr>
<td>FULL NAME/RANK: [Redacted] / Captain, USA</td>
<td></td>
</tr>
<tr>
<td>SSN/HIN#: [Redacted]</td>
<td></td>
</tr>
<tr>
<td>DATE OF ADMISSION: 24 APR 2009</td>
<td></td>
</tr>
<tr>
<td>DATE OF DISCHARGE: 27 APR 2009</td>
<td></td>
</tr>
<tr>
<td>ADMISSION DIAGNOSIS:</td>
<td></td>
</tr>
<tr>
<td>Temporal bone basilar skull fracture</td>
<td></td>
</tr>
<tr>
<td>Epidural hematoma</td>
<td></td>
</tr>
<tr>
<td>Brain Contusion</td>
<td></td>
</tr>
<tr>
<td>Aspiration pneumonitis/pneumonia</td>
<td></td>
</tr>
<tr>
<td>DISCHARGE DIAGNOSIS:</td>
<td></td>
</tr>
<tr>
<td>Same</td>
<td></td>
</tr>
<tr>
<td>BRIEF EPI:</td>
<td></td>
</tr>
<tr>
<td>40 y/o USA [Redacted] who either fell or jumped from a moving vehicle at low speed. Per EMS and vehicle driver, pt struck the back of his head. Presenting GCS was 14, but pt reportedly intubated for combativeness. CT scan revealed R occipital epidural hematoma, R temporal bone fracture, and shift of structures to the left and effacement of basilar cisterns. Decision was made to transfer pt to Balad for neurosurgical consultation. Transfer was delayed because of weather. Pt received 2 doses of mannitol and was loaded with phenoxybenzamine outside facilities. In route to Balad, pt remained normotensive. Active treatment began on admission.</td>
<td></td>
</tr>
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Note Title: NEUROPSYCH ASSESSMENT FINAL 12701
Note Date: 19Jun09
Note Type: 999-9
Location Name: PALO ALTO HCS

Complete Note:
Palo Alto HCS: 640
14517097
06/19/2009 13:20
NEUROPSYCH ASSESSMENT FINAL 12701

LOCAL TITLE: NEUROPSYCH ASSESSMENT FINAL 12701
STANDARD TITLE: NEUROPSYCHOLOGY NOTE
DATE OF NCE: JUN 19, 2009@18:20 ENTRY DATE: JUN 24, 2009@18:21:14

AUTHOR: [Redacted] EXP COSIGNER: [Redacted]
URGENCY: [Redacted] STATUS: COMPLETED

IDENTIFYING INFORMATION
Patient Name: [Redacted]
Age (DOB): 40 (02/14/1969)
Ethnicity: Asian-American
Gender: Male
Marital Status: married
Education: 19 years
Handedness: Right
Military Branch: [Redacted]
Rank: Captain

REASON FOR REFERRAL
[Redacted] was referred for a neuropsychological evaluation to assess general cognitive and emotional functioning to inform treatment recommendations.

HISTORY OF PRESENTING PROBLEM
[Redacted] is a 40-year-old, Army Captain who was serving in Kuwait when he fell off a slow moving vehicle and struck the back of his head per witnesses on 4/23/09. He sustained a right temporal bone fracture, epidermal hematoma (EDH), subdural hematoma (SDH), right hemispheric contusion of...
Patient’s Allergy List shown from DoD and VA origins

<table>
<thead>
<tr>
<th>Allergen</th>
<th>Reaction</th>
<th>Onset Date</th>
<th>Info Source</th>
<th>Entered By</th>
<th>Origin</th>
<th>Facility/CHCS Host</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penicillins</td>
<td>Rash</td>
<td>26 May 1967</td>
<td>Patient</td>
<td></td>
<td>DOD</td>
<td>Tripler AMC, HI</td>
</tr>
<tr>
<td>POLLENS (POLLEN EXTRACTS)</td>
<td>EYE ITCHING</td>
<td>10 Feb 1959</td>
<td>Patient</td>
<td></td>
<td>VA</td>
<td>Portsmouth CBGC</td>
</tr>
</tbody>
</table>
Medication Origin from DoD, VA and Civilian Pharmacies

<table>
<thead>
<tr>
<th>Origin</th>
<th>Medication Name</th>
<th>Sig</th>
<th>Refills Status</th>
<th>OTC</th>
<th>Last Filled Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>DoD</td>
<td>Triamcinolone Acetate 0.1%, Ointment, Topical</td>
<td>APPLY TO AFFECTED AREA(S) SPARINGLY 3ID</td>
<td>1 of 1 Active</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VA</td>
<td>HYDROXYZINE HCL, 25MG, TABLET, ORAL</td>
<td>T1 T9 ORS PRN ITCHING</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DoD</td>
<td>Lorazepam 2mg/mL, Solution, Injection</td>
<td>1MG IV Q 6 H PRN FOR AGITATION</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DoD</td>
<td>Omeprazole 40mg/mL, Suspension, Oral</td>
<td>20MG VIA DOBHOFF Q 24 H</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DoD</td>
<td>ACETAMINOPHEN, 160MG/5ML, ELDERLY, OR</td>
<td>320MG VIA DOBHOFF Q 6 H PRN PAIN #2 RF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DoD</td>
<td>Risperidone 2mg Tablets, Oral</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DoD</td>
<td>Levalbuterol 4mg Vial, Inhaler</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DoD</td>
<td>Enoxaparin 1mg Vial, Injection</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VA</td>
<td>ATENOLOL, 50MG, TABLET, ORAL</td>
<td>T1 T8 PO QD #10 RFQ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DoD</td>
<td>Pentobarbital Sodium 50mg/mL, Solution, Injection</td>
<td>DRIP CONC 1250MG/250ML IV DRIP FOR ICPR CONTROL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VA</td>
<td>Insulin Regular, Human Recombinant 100U/mL</td>
<td>DRIP CONC 1 UNIT ML ADJUST FOR PROTOCOL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DoD</td>
<td>ACETAMINOPHEN, 160MG/5ML, ELDERLY, OR</td>
<td>200MG IV Q 12HRS #6 RF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DoD</td>
<td>Phenylalanine 50mg/mL, Solution, Injection</td>
<td>650MG PC/PG/PFT Q 4HRS PRN #1 RF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DoD</td>
<td>Cefadroxil 500mg, Oral Suspension</td>
<td>INFUSE 900MG IV Q 8H #1 RF</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>DoD</td>
<td>Phenylpropanolamine 30mg/mL, Solution, Injection</td>
<td>200MG IV Q 12HRS #6 RF</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>DoD</td>
<td>Albuthol Sulfate 90mg, Aerosol powder, Inh</td>
<td>INH 4 PUFFS Q6H #1 RF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DoD</td>
<td>Mannitol 25%, Solution, Injection</td>
<td>4 VIALS FOR AIR EVAC ICP MANAGMENT #4 RF</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>DoD</td>
<td>Sodium Chloride 3%, Solution, Injection</td>
<td>3% SALINE SOLUTION GGT AT 40ML/HR #3 RF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DoD</td>
<td>Fentanyl Citrate 0.05mg/mL + Pt, Solution, Injection</td>
<td>FENTANYL GGT #3 RF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DoD</td>
<td>Pantoprazole Sodium 40mg, Reconstituted sol</td>
<td>40MG IV Q2HRS #1 RF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DoD</td>
<td>Basvacin 1000U/g, Ointment, Ophthalmic</td>
<td>APPLY TO AFFECTED EYE QID #1 RF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DoD</td>
<td>Propofol 1mg/mL, Emulsion, Injection</td>
<td>PROPOFOL GGT (100ML/VIALS) #10 RF</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>DoD</td>
<td>Levofloxacin 5mg/mL + Dextrose 5% + Water, Solution, Injection</td>
<td>750MG IV Q2HRS #1 RF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DoD</td>
<td>Indacaterol Hydrochloride 2mg/mL, Solution, Injection</td>
<td>4MG IV Q6 PFN NAUSEA #4 RF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DoD</td>
<td>Levofloxacin 5mg/mL + Dextrose 5% + Water, Solution, Injection</td>
<td>750MG IV Q2HRS #1 RF</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>DoD</td>
<td>NAPROXEN, 250MG, TABLET, ORAL</td>
<td>T1 T2 TAB BID W/CWM #12 RF</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>DoD</td>
<td>Guanfacine 600mg + Pseudoephedrine Hydrochloride</td>
<td>TAKE 2 TABLETS PO EVERY 12 HOURS WITH PLE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DoD</td>
<td>MOMETASONE FURATEO, 50MG, SPRAY, NASAL</td>
<td>SPRAY ONCE INTO EACH NOSTRIL DAILY #3 RF</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Other</td>
<td>EVOCIN CLINDAMYCIN PHOSPHATE 1% FOAM</td>
<td>EVD 100ML T3 TFD FOR ALLERGIES</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DoD</td>
<td>Pimecolimus 1%, Cream, Topical</td>
<td>APPLY BID TO AFFECTED AREAS #3 RF</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

OTC is an over-the-counter medication.
Beyond the Military Hospitals and Clinics…

NEXT STEPS

>50% of Healthcare Care delivered outside of the DoD Healthcare network

Civilian Providers
Lessons Learned from the U.S. Military Health System

• Clinically Led Governance
  • *IT IS A HEALTHCARE PROJECT*
• Work Flow Training
• Blend of Structured Data and Unstructured Data
• *More Work Flow Training*

★ • Normalize the Data: 3M Health Data Dictionary
   http://www.hddaccess.com/

• Open Source AHLTA: http://openahlta.org/
• Open Source VistA: http://www.osehra.org/content/va-enterprise-vista-standard
What Is HDD Access

NEW!

The July 2013 HDD Access software and content release are now available. This release is an interim release that contains performance enhancements and bug fixes to the software, but no new features. The content has been reviewed and updated. The clinical content for reproductive and genital disorders has been added.

Welcome To HDD Access

3M, the U.S. Department of Defense (DoD) and the U.S. Department of Veterans Affairs (VA) jointly present HDD Access, the public version of the 3M™ Healthcare Data Dictionary (HDD). Deployed since 1996, the HDD is helping 3M customers manage terminologies used in healthcare and can be integrated with other applications in a seamless manner.

HDD Access will help healthcare providers to accelerate implementation of electronic health records and help manage clinical guidelines and protocols.
HDD Access can help you to:

1. Integrate medical terminology standards into your applications

2. Make the data from all your systems semantically interoperable for exchange, analytics, decision support, alerts and reminders

3. Minimize terminology development and maintenance costs

4. Be more efficient and effective in every aspect of your operations where actionable data is needed
5 phases of the Gartner Hype Cycle

1. "Technology Trigger"
The first phase of a Hype Cycle is the "technology trigger" or breakthrough, product launch or other event that generates significant press and interest.

2. "Peak of Inflated Expectations"
In the next phase, a frenzy of publicity typically generates over-enthusiasm and unrealistic expectations. There may be some successful applications of a technology, but there are typically more failures.

3. "Trough of Disillusionment"
Technologies enter the "trough of disillusionment" because they fail to meet expectations and quickly become unfashionable. Consequently, the press usually abandons the topic and the technology.

4. "Slope of Enlightenment"
Although the press may have stopped covering the technology, some businesses continue through the "slope of enlightenment" and experiment to understand the benefits and practical application of the technology.

5. "Plateau of Productivity"
A technology reaches the "plateau of productivity" as the benefits of it become widely demonstrated and accepted. The technology becomes increasingly stable and evolves in second and third generations. The final height of the plateau varies according to whether the technology is broadly applicable or benefits only a niche market.
Trajectory to Healthcare Transformation
Achieving Real Care Coordination and Outcome Measurement

HIT Infrastructure: EHRs and Connectivity

Primary Care Capacity: Patient Centered Medical Home

Operational Care Coordination: Embedded RN Coordinator and Health Plan Care Coordination

Value/Outcome Measurement:
Reporting of Quality, Utilization and Patient Satisfaction Measures
Social & Community Measurements

Value-Based Reimbursement Tied to Performance on Value (quality, appropriate utilization and patient satisfaction)

Digital Hospital

Source: Hudson Valley Initiative
The State of Healthcare
Every day for next 20 years – 10,000 Baby Boomers reach age 65
The number of people with Chronic Conditions will increase by 37% between 2000 and 2030.

Number of People With Chronic Conditions (in millions)

- 1995: 118
- 2000: 125
- 2005: 133
- 2010: 141
- 2015: 149
- 2020: 157
- 2025: 164
- 2030: 171

Rising health care costs have been squeezing employers and employees for years.

Cumulative Increase in **national** Health Care Premiums, Wages and Inflation (1999 base)

- **Health Care Premiums**
- **Workers’ Earnings**
- **Inflation**
State of Care

Average Medicare spending during the last two years of life for chronically ill patients.

Source: Dartmouth Atlas of Health Care
If unchanged, Health Care spending will consume 1/5th of US economy by 2020

National Health Expenditures as a Percent of the Gross Domestic Product

Source: Centers for Medicare and Medicaid Services
**Mortality Amenable to Health Care, 2002–03**

Deaths per 100,000 population*

- France: 65
- Japan: 71
- Australia: 71
- Spain: 74
- Italy: 74
- Canada: 77
- Norway: 80
- Netherlands: 82
- Sweden: 82
- Greece: 84
- Austria: 84
- Germany: 90
- Finland: 93
- New Zealand: 96
- Denmark: 101
- United Kingdom: 103
- Ireland: 103
- Portugal: 104
- United States: 110

*Deaths per 100,000 population are based on specific causes of death, such as diabetes, asthma, and injuries.
<table>
<thead>
<tr>
<th>Country</th>
<th>Infant mortality rate (&lt;1 yr)</th>
<th>Child mortality rate (&lt;5 yr)</th>
<th>Maternal deaths/100,000 births</th>
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<td>5.6</td>
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<tr>
<td>USA</td>
<td>6.9</td>
<td>8.5</td>
<td>17</td>
</tr>
<tr>
<td>Country</td>
<td>Life expectancy at birth</td>
<td>Life expectancy at age 60</td>
<td>Healthy years remaining at age 60</td>
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<td>83.3</td>
<td>17.6</td>
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<td>82.4</td>
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<tr>
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<td>77.1</td>
<td>81.6</td>
<td>15.8</td>
</tr>
</tbody>
</table>
Patient Centered Medical Home
“We do the best heart surgeries.”
Away from Episode of Care to Management of Population

The System Integrator

- Creates a partnership across the medical neighborhood
- Drives PCMH primary care redesign
- Offers a utility for population health and financial management
Practice transformation away from episode of care

“Master Builder”

Preventive Medicine  Chronic Disease Monitoring  Medication Refills  Acute Care  Test Results

Case Manager  Behavioral Health  Medical Assistants  Nursing

Source: Southcentral Foundation, Anchorage AK
PCMH Parallel Team Flow Design

The glue is **real data** not a doctors Brain

Chronic Disease Monitoring

Medication Refills

Test Results

Acute Care

Preventive Medicine

Point of Care Testing

Acute Mental Health Complaint

Chronic Disease Compliance Barriers

Healthcare Support Team

Case Manager

Clinician

Medical Assistants

Behavioral Health

Source: Southcentral Foundation, Anchorage AK
Smarter Healthcare

36.3%  Drop in hospital days
32.2%  Drop in ER use
12.8%  Increase Chronic Medication use
-15.6% Total cost
10.5%  Drop Inpatient specialty care costs
18.9%  Ancillary costs down
15.0%  Outpatient specialty down

A 1999 study found that patients receive only 51.7% percent of the care experts advise.

- At Best 70% Lancet BMJ NEJM

In Kaiser Permenente PCMH Clinic 87%

- 1/3 less cardiac intervention needed
- 60% less complication Diabetes
- 60% decreases death sepsis
WellPoint (large US Health Care Insurer)
PCMH Preliminary Year 2 Highlights

Sept Issue Health Affairs 2012

- 18% decrease in acute InPatient admissions/1000, compared to 18% increase in control group

- 15% decrease in total ER visits/1000, compared to 4% increase in control group

- Specialty visits/1000 remained around flat compared to 10% increase in control group

- Overall Return on Investment estimates ranged between 2.5:1 and 4.5:1
Blue Plan Care Delivery Innovations

PCMH Level Care in market or in development in 49 states, District of Columbia and Puerto Rico

United HC, Humana, Aetna, CIGNA, Kaiser Martins Point, CDPHP, Priority,
Patient Centered Medical Homes (PCMH) within the Federal Employees Health Benefits (FEHB) Program

- A growing body of evidence supports investment in PCMH – SO we are!
- **there must be a plan for all US Federal Employees lives** enrolled in the practice to be included in a reasonable timeframe.
Why to Build your own PCMH

Per Employee Per Month Health Costs Post Implementation

Midwest Hospital with 12,135 employees 1 year self-funded for group health

12 month rolling PEPM averages

Copyright 2011 by IBM
Cumulative Percent Change in Cost

<table>
<thead>
<tr>
<th>Year</th>
<th>VHA Cost Per Patient</th>
<th>Average Medicare Payment/Enrollee</th>
<th>Consumer Price Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>-0.4%</td>
<td>8.3%</td>
<td>3.00%</td>
</tr>
<tr>
<td>1996</td>
<td>-0.9%</td>
<td>11.4%</td>
<td>5.37%</td>
</tr>
<tr>
<td>1997</td>
<td>-7.9%</td>
<td>9.7%</td>
<td>7.05%</td>
</tr>
<tr>
<td>1998</td>
<td>-9.3%</td>
<td>10.8%</td>
<td>9.41%</td>
</tr>
<tr>
<td>1999</td>
<td>-8.9%</td>
<td>15.4%</td>
<td>13.13%</td>
</tr>
<tr>
<td>2000</td>
<td>-9.5%</td>
<td>25.9%</td>
<td>16.30%</td>
</tr>
<tr>
<td>2001</td>
<td>-10.9%</td>
<td>33.5%</td>
<td>18.16%</td>
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<tr>
<td>2002</td>
<td>-5.9%</td>
<td>40.0%</td>
<td>20.88%</td>
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<tr>
<td>2003</td>
<td>-0.1%</td>
<td>51.7%</td>
<td>24.14%</td>
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<tr>
<td>2004</td>
<td>2.1%</td>
<td>62.9%</td>
<td>28.36%</td>
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<tr>
<td>2005</td>
<td>4.4%</td>
<td>89.6%</td>
<td>32.47%</td>
</tr>
<tr>
<td>2006</td>
<td>15.6%</td>
<td>99.2%</td>
<td>36.18%</td>
</tr>
<tr>
<td>2007</td>
<td>24.1%</td>
<td>111.9%</td>
<td>41.35%</td>
</tr>
<tr>
<td>2008</td>
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</tr>
</tbody>
</table>
• **Australia** recognizes evidence in support of Patient-Centered Medical Homes is in, and it’s compelling.
  - Improved access to care;
  - Improved clinical outcomes;
  - Better management of chronic and complex disease;
  - Decreased use of inappropriate medications;
  - Decreased hospital admissions and readmissions; and
  - Improved palliative care services.

*Therefore, the Australian government will adopt Patient-Centered Medical Home as standard of care.*
A journey to higher quality lower cost
quality as well as efficiency
Survey Of 5 European Countries Suggests Patient-Centered Medical Homes Would Improve Family Medicine Primary Care

2013/03/19

http://content.healthaffairs.org/content/early/2013/03/19/hlthaff.2012.0184.full.html
PCMH as the Foundation of Care Delivery and Coordination for Military Health

The right care foundation
The right time
The right price
Why the Medical Home Works: A Framework

www.pcpccc.net

<table>
<thead>
<tr>
<th>Feature</th>
<th>Definition</th>
<th>Sample Strategies</th>
<th>Potential Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient-Centered</td>
<td>Supports patients in learning to manage and organize their own care at the level they choose, and ensures that patients and families are fully informed partners in health system transformation at the practice, community, and policy levels.</td>
<td>• Additional staff positions to help patients navigate the system and fulfill care plans (e.g., care coordinators, patient navigators, social workers) • Compassionate and culturally sensitive care • Strong, trusting relationships with physicians and care team, and open communication about decisions and health status</td>
<td>Patients are more likely to seek the right care, in the right place, and at the right time.</td>
</tr>
<tr>
<td>Comprehensive</td>
<td>A team of care providers is wholly accountable for a patient’s physical and mental health care needs, including prevention and wellness, acute care, and chronic care.</td>
<td>• Care team focuses on ‘whole person’ and population health • Primary care is co-located with oral, vision, OB/GYN, pharmacy and other services • Special attention paid to chronic disease and complex patients</td>
<td>Patients are less likely to seek care from the emergency room or hospital, and delay or leave conditions untreated</td>
</tr>
<tr>
<td>Coordinated</td>
<td>Ensures that care is organized across all elements of the broader health care system, including specialty care, hospitals, home health care, and community services and supports.</td>
<td>• Care is documented and communicated effectively across providers and institutions, including patients, primary care, specialists, hospitals, home health, etc. • Communication and connectedness is enhanced by health information technology</td>
<td>Providers are less likely to order duplicate tests, labs, or procedures</td>
</tr>
<tr>
<td>Accessible</td>
<td>Delivers consumer-friendly services with shorter wait-times, extended hours, 24/7 electronic or telephone access, and strong communication through health IT innovations.</td>
<td>• Implement more efficient appointment systems that offer same-day or 24/7 access to care team • Use of e-communications and telemedicine to provide alternatives for face-to-face visits and allow for after hours care.</td>
<td>Better management of chronic diseases and other illness improves health outcomes</td>
</tr>
<tr>
<td>Committed to quality and safety</td>
<td>Demonstrates commitment to quality improvement through the use of health IT and other tools to ensure that patients and families make informed decisions about their health.</td>
<td>• Use electronic health records and clinical decision support to improve medication management, treatment, and diagnosis. • Establish quality improvement goals to maximize data and reporting about patient populations and monitor outcomes</td>
<td>Focus on wellness and prevention reduces incidence / severity of chronic disease and illness</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Health care dollars saved from reductions in use of ER, hospital, test, procedure, &amp; prescriptions.</td>
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</tr>
</tbody>
</table>
Healthcare will Transform

• Data Driven
• Every patient has a plan
• Team based
• Managing a Population Down to the Person
Defining the Care

- Superb Access to Care
- Patient Engagement in Care
- Clinical Information Systems, Registry
- Care Coordination

Centered on Patient

- Team Care
- Communication Patient Feedback
- Mobile easy to use and Available Information
MobileFirst Patient Consumer
MobileFirst Remote Sensing
Will build upon the Data Available to provide the Best Quality Care to our Patients

Mobile Sensing emotion for mental health status -- analyzes facial expressions
Mobile Sensing position for asthma -- integrates GPS into inhalers
Mobile Sensing motion for Alzheimer’s -- monitoring gait
Mobile Sensing ingestion of medications. activated by stomach fluid

Mobile Sensing for sleep disorders -- tracks breath, heart rate, motion
Mobile Sensing for diabetes. continuous monitoring iPhone non invasive sensor.
Mobile Sensing for readmission prevention -- BP, weight, pulse, ekg
Mobile Sensing for exercise wellness -- benefit design feedback
Benefit Redesign - Patient Engagement
Different Strategies for Different Healthcare Segments

- Those with severe, acute illness or injuries
- Those with chronic illness
- Those who are well or think they are well

% Total Healthcare Spend

% of Members
PCMH in Action

Community Care Team
- Nurse Coordinator
- Social Workers
- Dieticians
- Community Health Workers
- Care Coordinators

Public Health Prevention

A Coordinated Health System
- Health IT Framework
- Global Information Framework
- Evaluation Framework
- Operations
U.S. PCMH Growth
Features of the Medical Home

• The medical home is an approach to the delivery of primary care that is:
  
  • Patient-centered: A partnership among practitioners, patients, and their families ensures that decisions respect patients’ wants, needs, and preferences, and that patients have the education and support they need to make decisions and participate in their own care.
  
  • Comprehensive: A team of care providers is wholly accountable for a patient’s physical and mental health care needs, including prevention and wellness, acute care, and chronic care.
  
  • Coordinated: Care is organized across all elements of the broader health care system, including specialty care, hospitals, home health care, community services and supports.
  
  • Accessible: Patients are able to access services with shorter waiting times, "after hours" care, 24/7 electronic or telephone access, and strong communication through health IT innovations.
  
  • Committed to quality and safety: Clinicians and staff enhance quality improvement through the use of health IT and other tools to ensure that patients and families make informed decisions about their health.
PCMH    To Do Now

When you get back:
• Understand your patient Population
• [www.pcpcc.net](http://www.pcpcc.net)
• Secure messaging
• Registry

Next Month:
• Pick your top 3 disease states you want to help address/support
  • DM
  • Asthma
  • HTN

Next Quarter:
• Put staff in place to support your top patients
  • Nurses, Coaches, Techs
• Start Daily Scrum Meetings
• Begin to measure where you are with your top 3 diseases (HgbA1C, BP)

6 months:
• Reporting Metrics
• Continue Process Improvement
The U.S. Department of Defense’s EHR Journey and Way Forward

3 Decade EHR Journey

- Lessons Learned
  - Clinically Led Governance
  - Work Flow Training
  - Blend of Structured Data and Unstructured Data
  - More Work Flow Training
  - Normalize the Data: 3M Health Data Dictionary
    http://www.hddaccess.com/

PCMH Journey

- Scope your population
- Secure Messaging
- Team Approach
- Begin your Analytics Journey
Thank you!

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mweiner@email.gwu.edu