BRIEFING
FROM THE BELTWAY

The Value of the Healthcare Data Dictionary (HDD) Open Source to the Healthcare Industry

May 16, 2013

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Reminder

This call is being recorded.

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Reminder

Please press mute when not speaking

(6 to mute, *7 to unmute)*

Agenda

4:00 – 4:10 PM Welcome and Introductions

4:10 – 4:45 PM DaCosta Barrow, Public Market Program Director of 3M Health Information Systems, Inc.

Dr. Hon Pak, President and CEO of Diversinet Corp

4:45 – 5:00 PM Discussion and Announcements

5:00 PM Adjourn

Dacosta Barrow

Director, 3M Health Information Systems, Inc.

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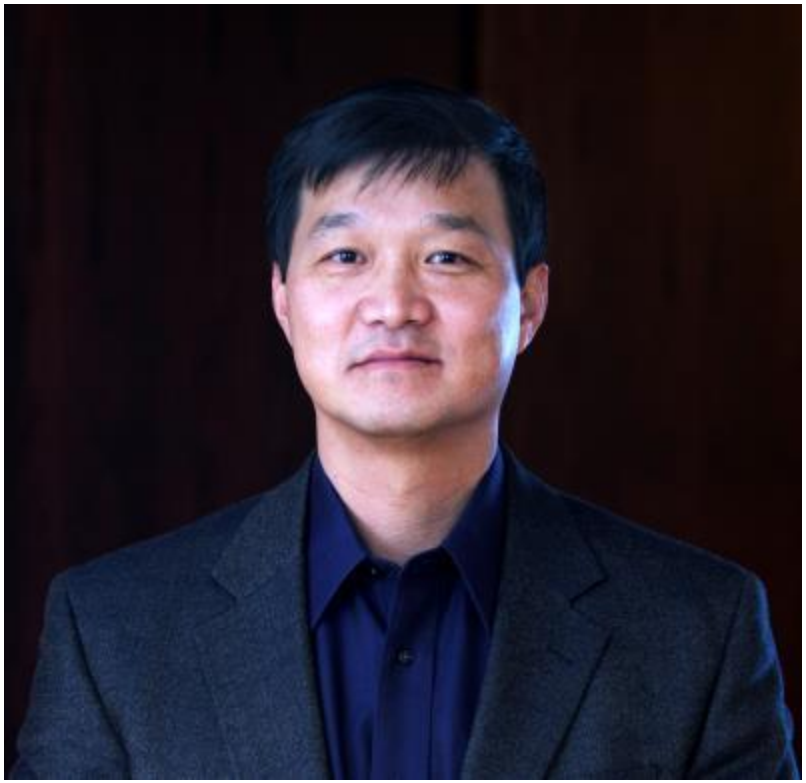
Dr. Hon Pak



CEO Diversinet

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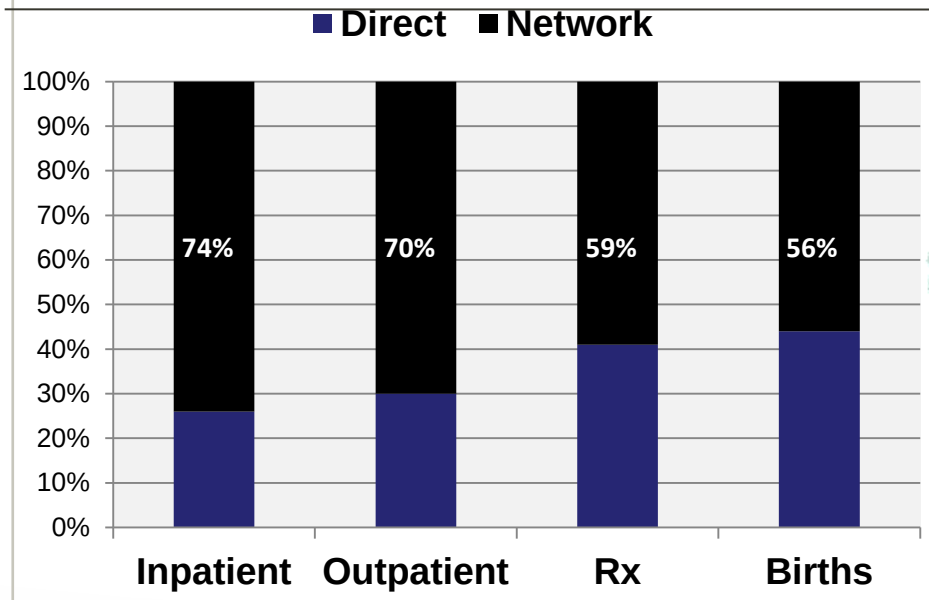
Agenda

- DoD's EHR Journey
  - Background
  - Transition from CPOE (CHCS) to EHR (AHLTA)
  - Role of HDD
- VA and DoD' convergence
  - iEHR
  - VLER
- HDD Access
- Opportunities

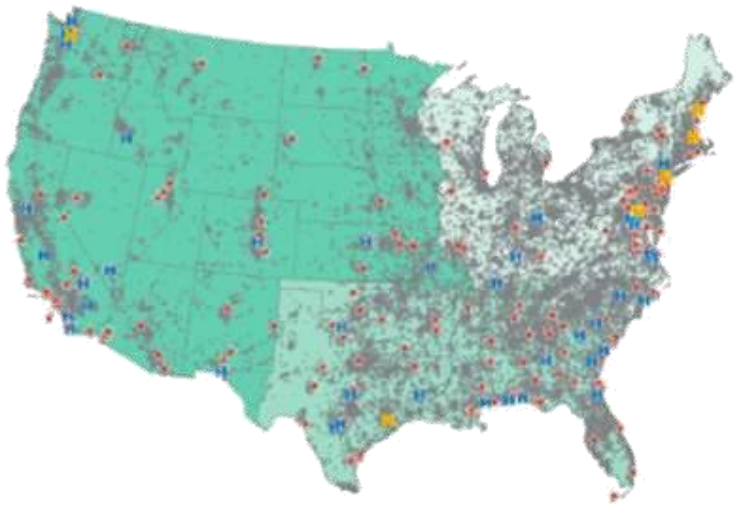
Military Health System (MHS)

Military Beneficiaries: 9.4 million			
Military Bases in US: 202			
Military hospitals	63	Medical/Dental Clinics	826
Encounters/month	9.5 million	Average outpatient visits/year/patient	4

1:4 military families move in a given year
<50% of network consults make it back to the PCM



MHS Beneficiary Distribution



DoD and VA

DoD Health Statistics*
Provides a broad range of health services
to 9.7 million beneficiaries across the globe

Key areas of focus include:

- Military Treatment Facilities and Health Care Practitioners
  - 59 Hospitals
  - 364 Medical clinics
  - 282 Dental clinics
  - 325,000 Heath care providers in the U.S.

- Healthcare - 2011 totals
  - 1,169,003 Inpatient admissions
  - 129,152,879 Outpatient visits
  - 124,729 Births
  - 142,126,856 Prescriptions

VA Health Statistics**
Provide comprehensive care to more than
8.3 million Veterans each year

Key areas of focus include:

- Number of VA Facilities and Health Care Practitioners
  - 152 Hospitals
  - 807 Medical clinics
  - 200 plus Dental clinics***
  - 115,300 Heath care providers in the U.S.

- Healthcare - 2010 totals
  - 682,000 Inpatient admissions
  - 80,200,000 Outpatient visits

** Reference: 2011 MHS Stakeholder Report*
*** Reference: National Center for Veterans Analysis and Statistics*
**** Reference: http://www.va.gov/dental/*

DoD/VA Data Sharing

BHIE provides access to the following clinical information in real time:

Data Type	DoD Access	VA Access
Outpatient Medications	✓	✓
Laboratory Results	✓	✓
Radiology Reports	✓	✓
Outpatient Clinical notes	✓	
Encounters	✓	✓
Problem lists	✓	
Procedures/Diagnoses	✓	✓
Allergies	✓	✓
Vital signs	✓	✓
Theater level clinical data from TMDS	✓	✓
Inpatient documentation	✓	✓
Family histories/social histories/other histories		✓
Questionnaires		✓
Periodic Health Assessments		✓

DoD's Health Information Systems

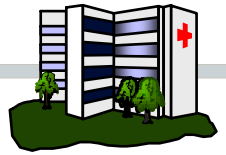
"Need: Comprehensive longitudinal health record anywhere in the world in real time."

Accession

AHLTA
…

Training

AHLTA
DINPACS
CDA
…



Sustaining Base

AHLTA
Essentris
DINPACS
CDA
…

Deployment

AHLTA
DINPACS
CDA
PPDHRA
…

First Responder

BMIST

Forward Resuscitative Surgery

AHLTA-T
TC2
MC4
JMEWS
TMDS/JPTA
TRACES2
JTTR…

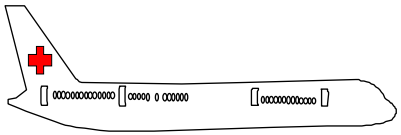
CDR

TMDS

VA CDR

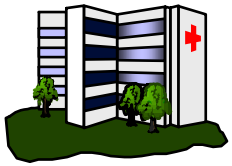
Theater Hospitalization

AHLTA-T
MC4
JMEWS
TMDS/JPTA
TRACES2
JTTR…



Enroute Care

TMDS/JPTA
TRACES2
…



DoD

AHLTA
Essentris
DINPACS
CDA
…

VA Care

VISTA
DINPACS
…

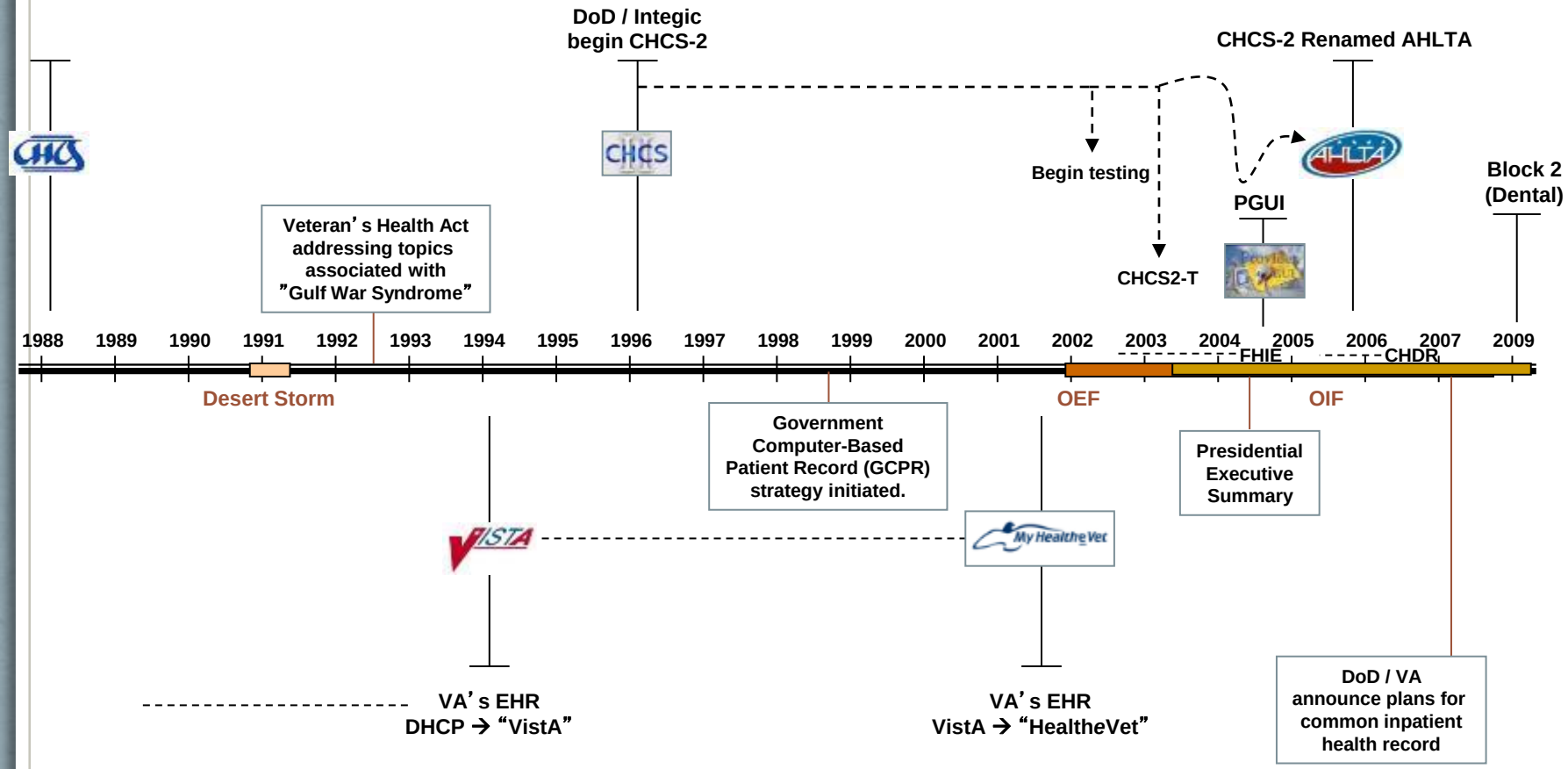
Private Sector Care

Cerner
McKesson
Epic, etc.
Paper
…

VA

VISTA
DINPACS
Inpatient
…

DoD-VA The Electronic Health Record Timeline

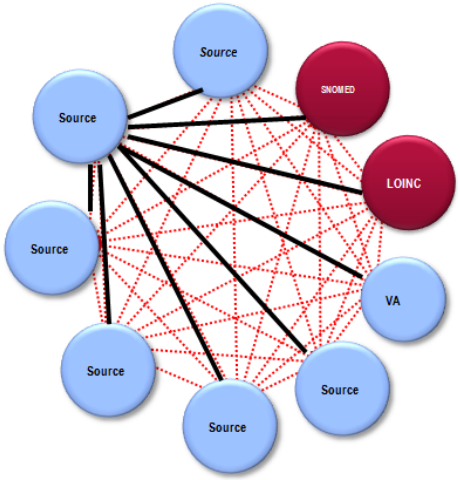


Transition from CPOE to EHR

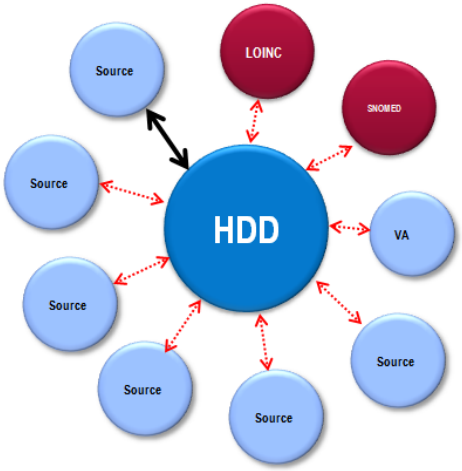
- CHCS (CPOE) has same lineage as VA's CPRS (CPOE)
- CHCS servers deployed to over 100 DoD locations
- Multiple legacy systems in entire continuum of care
- Differences in processes, local autonomy, lack of governance allowed variations to occur in data management (e.g. naming convention) across all hosts
- As a central data repository for AHLTA was being established, it became clear that we had to standardize and normalize the CHCS data

Challenges of CPOE-EHR Journey

- DoD's HIT environment consisted of disparate, best-of-breed systems.
- Interoperability challenge across systems with "point to point" mapping.



VS.



Point-to-point mapping is difficult to maintain: 102 sites – 5151 "fixes"

Centralized mapping is simple to maintain: 1 "fix"

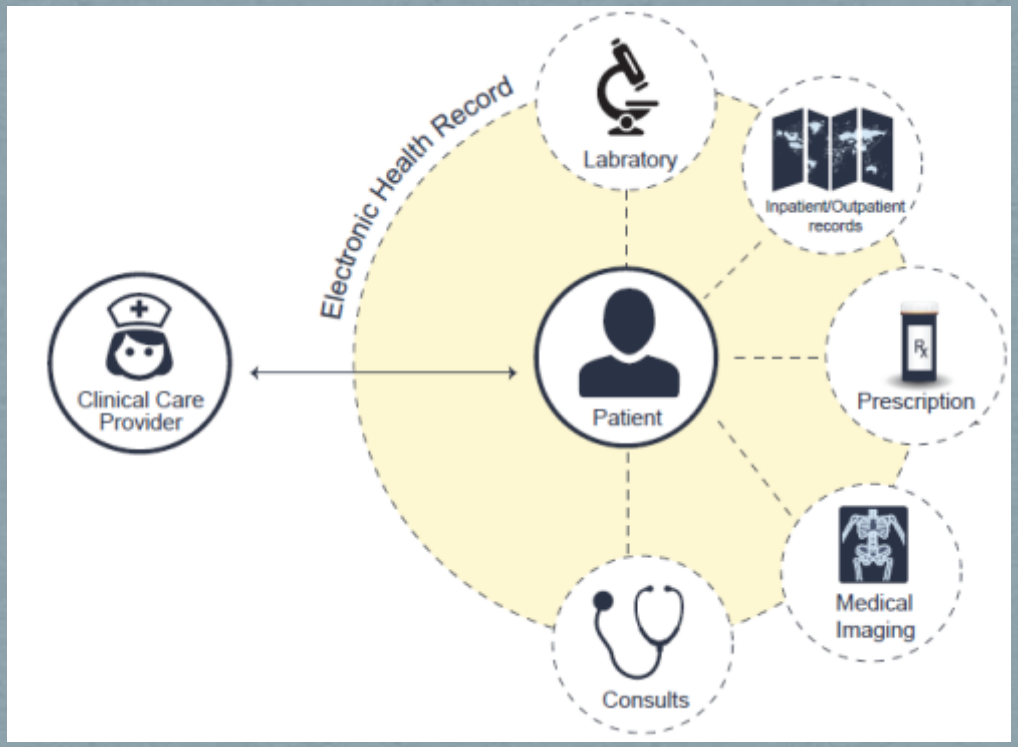
Challenges Implementing Standard Terminologies

- Multiple standard terminologies
- Heterogeneous terminology management processes
  - Different terminology formats and models
  - Ability to keep up with requests for adds/changes (updates)
  - Different release schedules
- Backward compatibility
  - Historical/current patient data already coded as legacy or application codes/terms
  - Independent, uncoordinated terminology changes in legacy systems
- Implementation expertise

Impact of HDD in AHLTA/CHCS

- Centralized mapping to a single terminology solution and achieved semantic level interoperability across the enterprise.
- Normalized medication and lab data across source systems in inpatient and outpatient settings
- Managed ongoing updates from standard terminologies as well as local additions and changes from source systems
- Allows for the creation of DoD specific hierarchies/concept relationships
- DoD able to meet MU reporting across enterprise
- Research/Analytics Ready
  - TBI
  - PTSD
  - Others

iEHR Vision and Mission



VISION

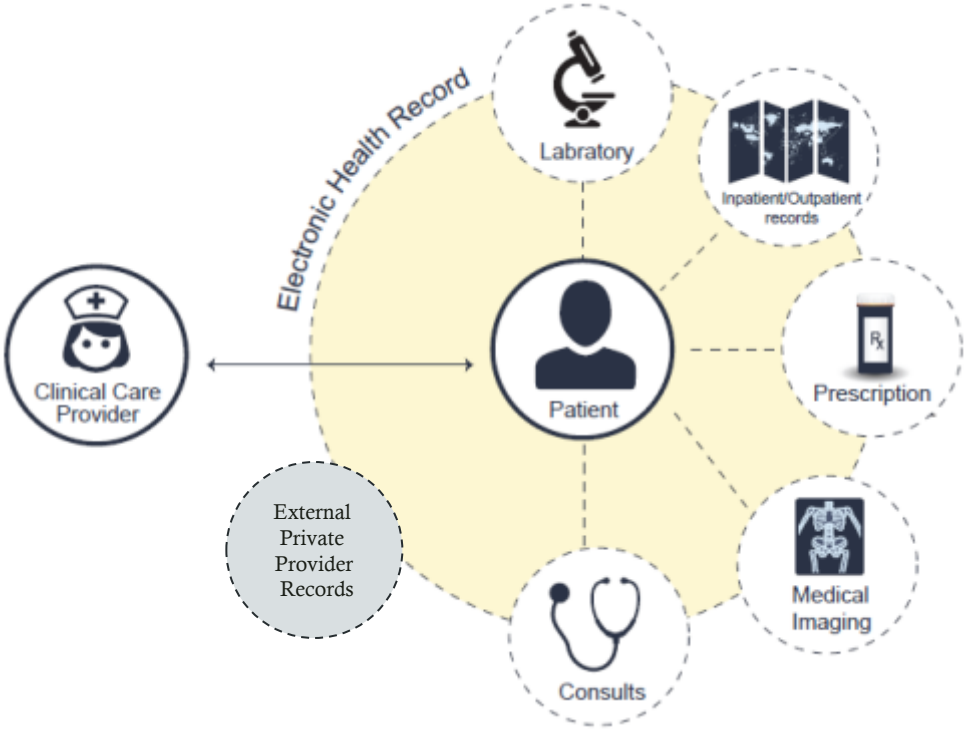
"… full and seamless electronic exchange and record portability of healthcare information in a secure and private format…to ensure … effective delivery of healthcare services."

DEPSECDEF, DEPSECVA and VCJCS Update on February 12, 2011

MISSION

Deliver affordable, interoperable and time-critical integrated electronic healthcare capability across DoD and VA

VLER Health Objectives



- The capability for both Departments to share health information from their legacy systems (AHLTA and VISTA) with external providers
- The capability for both Departments to present health information from the private sector seamlessly to clinicians for treatment
- <u>The capability to share and consume health information from the integrated Electronic Health Record (iEHR) with the private sector and other federal and state agencies</u>

3M Opens Access to the 3M Healthcare Data Dictionary under Agreement with U.S. Departments of Defense and Veterans Affairs

- The 3M Healthcare Data Dictionary will provide the core technology to enable semantic interoperability for the joint DoD/VA integrated Electronic Health Record (iEHR), making it possible to share medical knowledge and secure patient data between care providers at U.S. military treatment facilities located around the world and VA Medical Centers.
- 3M Health Information Systems opened access to the 3M Healthcare Data Dictionary under an agreement with the U.S. Department of Defense (DoD) and Department of Veterans Affairs (VA) given:
  - Increasing amount of healthcare delivered by civilian network
  - Healthcare organizations have a growing need to maintain an ever-increasing amount of structured data to comply with meaningful use requirements and achieve accurate and consistent terminology use

3M Opens Access to the 3M Healthcare Data Dictionary under Agreement with U.S. Departments of Defense and Veterans Affairs

- Healthcare industry stakeholders could also benefit, as the agreement makes the 3M Healthcare Data Dictionary (3M HDD) software and terminology content openly available to hospitals, health systems, physician practices, payers, vendors, and public health agencies worldwide.

Impact of HDD Access

- "Every healthcare organization's technology investment is enhanced by this agreement. With an open source medical terminology server, we'll see tremendous benefit for public health reporting, quality surveillance, IT protocols, and real-time reminders."
- *-- Stan Huff MD, CMIO, Intermountain Healthcare*

Today's Healthcare Environment

- Payment shifts are driving new organizational models of care
  - *Accountable Care Organizations (ACO)*
  - *Analytics: Ability to measure, learn and evolve will be critical*
- The era of electronic health records (HITECH)
  - *Legislation driving the electronic capture of clinical data (Meaningful Use)*
- Clinical Decision Support will require standard terminologies
- Disparate systems must become interoperable (HIE)
  - *Multiple stakeholders with varying systems have increasing requirements to exchange information*

HCOs Must Leverage its Data to Meet Strategic Objectives

- Strategic Objectives:
  - Positively impact efficiencies of patient care
  - Reduce costs in providing patient care
  - Improve clinical outcomes
  - Expand clinical research capabilities
- Data Source
  - Consolidation of Hospitals/Healthcare Systems mean multiple health systems
  - Most HCOs have many health information systems including legacy data with dependencies from many vendors
  - Integration/mapping are left to vendors in many settings and lead to point-to-interfaces that lead to high cost

Challenge: Managing local or proprietary codes

- Today most EHR systems use local, vendor-specific, and proprietary internal codes or free text to collect and store patient data. These local terminologies consist of widely variable codes that have not been mapped to standard terminologies, and they also lack the framework for integrating with other health information systems.

- Another layer of complexity arises when an organization begins to implement standard terminologies and then must determine how to maintain backward compatibility with data stored using a local terminology.

Meaningful Use

- Currently, no one terminology or classification system contains everything that is needed for the EHR. Consequently, encoding patient data for MU requires multiple standards.

- Compliance with the MU standards requirement is a challenge for many organizations. The challenges arise from characteristics and complexities of the coding systems as well as the lack of a recommended implementation strategy that is comprehensive for an organization.

- For example, most EHR systems use local/proprietary internal codes or free text for the collection and storage of patient data. These local terminologies are widely variable, "home-grown" terminologies that supply the codes and displays used within many health information systems. In order to be compliant with MU they will need to map (or link) their local codes to the codes within the standard terminologies.

Use of ONC Standard Terminologies in MU

Data	2011 Edition	2014 proposal
Immunizations	CVX – July 30, 2009	CVX – Aug 15, 2011
Problems	ICD-9 -CM/SNOMED CT – July 2009	SNOMED CT – Jan 2012
Procedures	ICD-9 -CM/ CPT-4	ICD-10-PCS/HCPCS & CPT-4
Lab Tests	LOINC 2.27	LOINC 2.38
Medications and Medication Allergies	Any source vocabulary in RxNorm	RxNorm – Feb 6, 2012
Race & Ethnicity	OMB standards	OMB standards
Preferred Language	N/A	ISO 639-1:2002
Preliminary Determination of Cause of Death	N/A	ICD-10-CM
Smoking Status	N/A	Current every day; current some day; former; never; smoker, current status unknown; and unknown if ever smoked
Encounter Diagnoses	N/A	ICD-10-CM

Data Challenges to widespread ACO adoption

- Data Silos in individual IT systems create inefficiencies and underutilized assets
- Volume of data points and quality measures, in widely dispersed locations
- Missing or competing data standards, limited interoperability
- Resource constraints and difficulty managing increasing complexity/change
- Limited use of analytics among providers

ACOs require far more than EHRs

Requirements

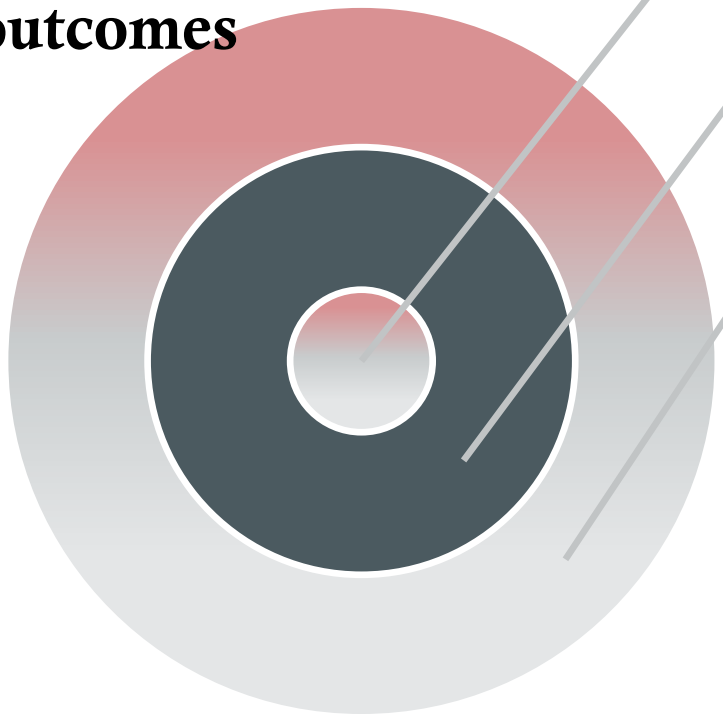
- Predictive modeling
- Registries
- EHR interfaces
- Reminder systems
- Claims and clinical data warehouses
- Episode of care analysis systems
- Specifications for integrated claims and clinical databases
- Patient portal options
- Health information exchanges

Data Sources for Mining

- Medical records
- Clinical outcomes data
- Patient billing systems
- Payer data
- Quality measures abstracts
- Charge master
- Physician, payer, service line utilization data
- Infection surveillance data
- Labor, productivity and throughput records
- Adverse drug events

ACO: Success Requires BI

Improving triple aim™ population outcomes



Experience of Care

Metrics:
- Patient satisfaction
- PAM Scores (Patient Activation Measures)

Per Capita Costs

Metrics:
- Total medical PMPM
- Total Medical Trend
- Total Rx PMPM
- Admissions/1000
- Readmission rate

Population Health

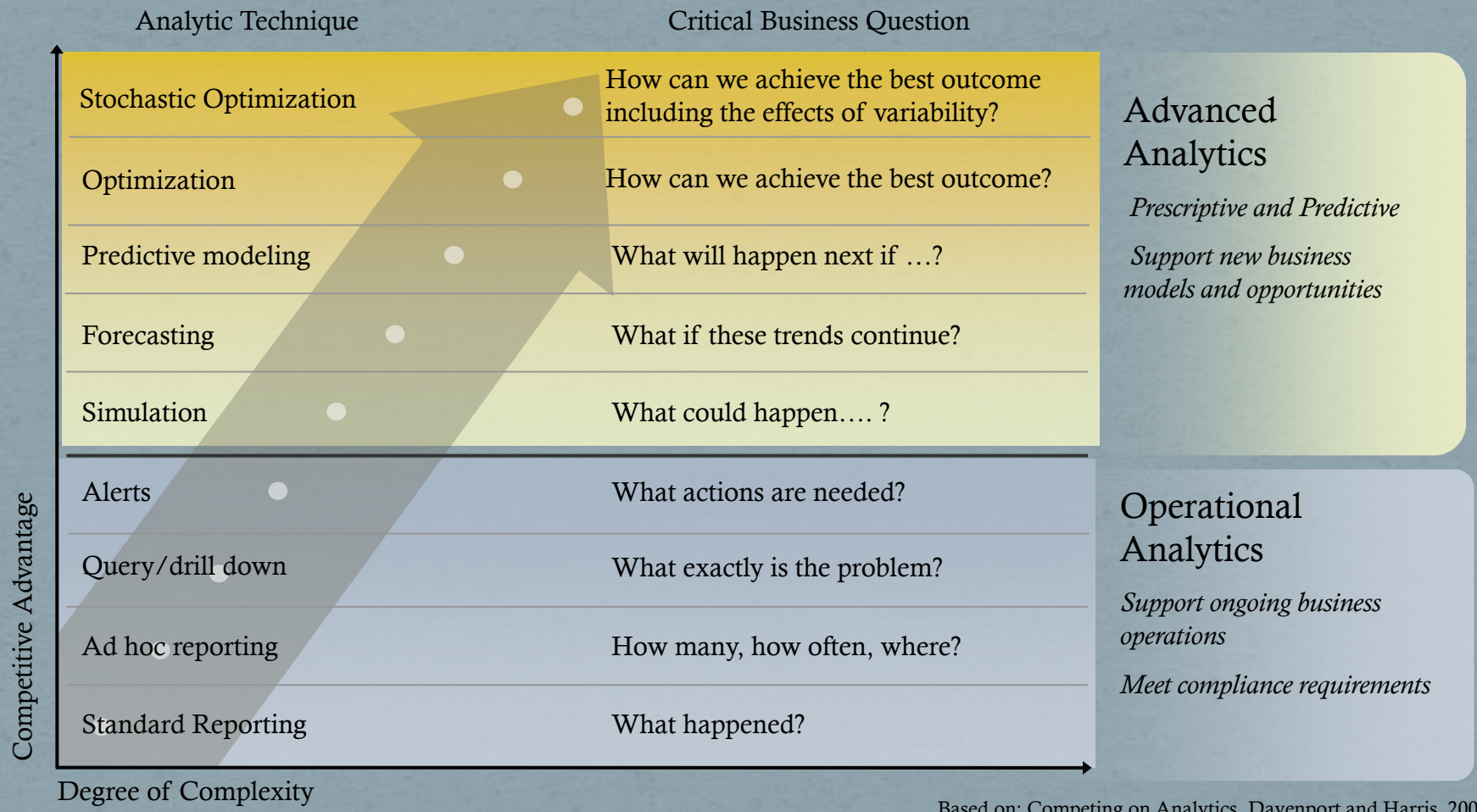
Metrics:
- QUEST outcomes
- Select HEDIS metrics
- Health status – SF12
- Mortality rates

Healthcare Business Intelligence will be the key to success in managing to these metrics

* The term triple aim is a trademark of the Institute for Healthcare Improvement

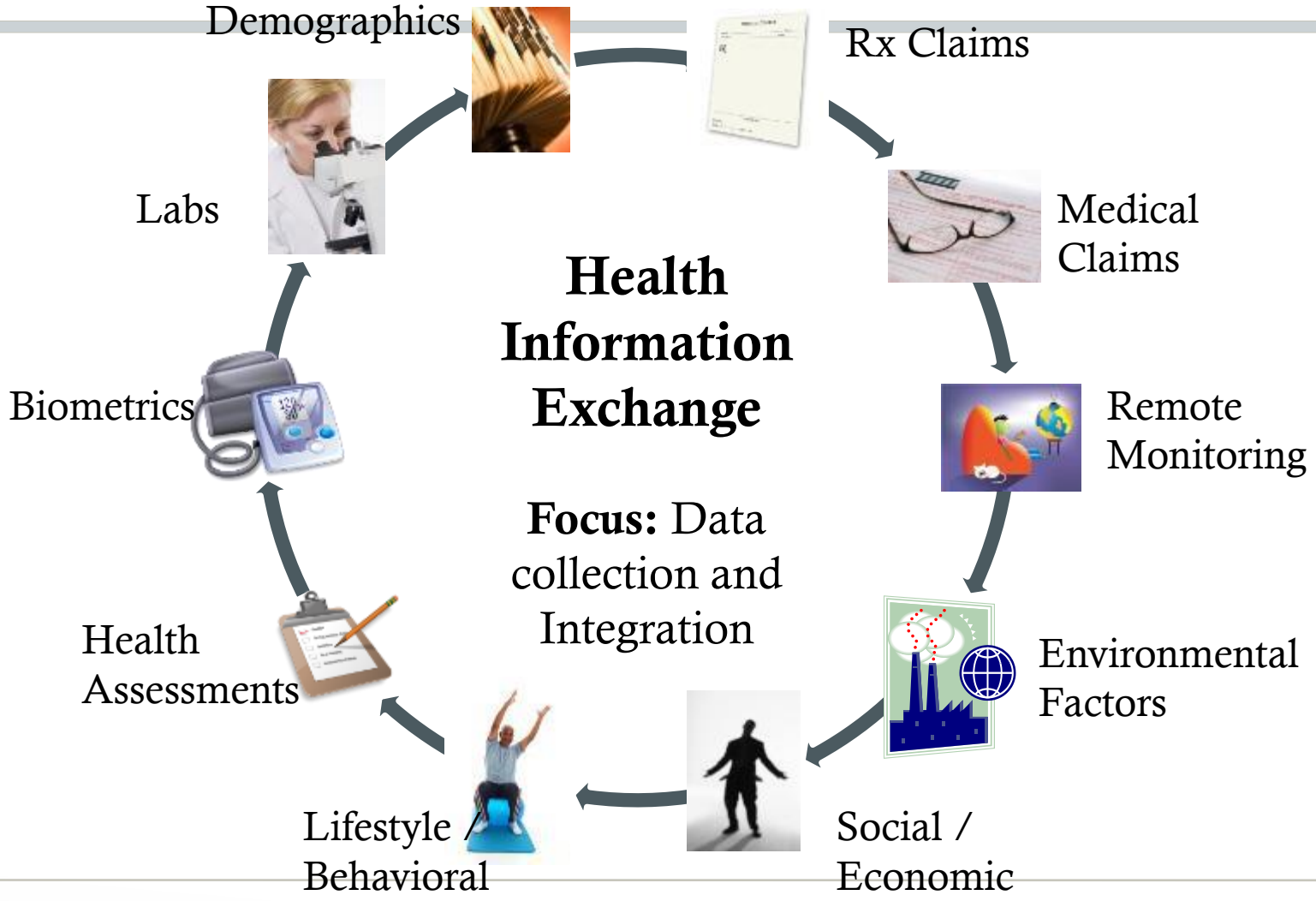
Moving beyond Operational Analytics

Healthcare increasingly will use advanced analytics to drive clinical and operational improvements to meet business challenges



Based on: Competing on Analytics, Davenport and Harris, 2007

HIE: Current View



HIE: Emerging ACO View

AMIA Clinical Decision Support Town Hall Meeting Summary Report November 10, 2008 Washington, DC

CDS adoption challenges. CDS designers, implementers, and users face challenges as outlined below.

- **Lack of a common understanding of CDS and varied CDS-related terminology**. A clear and common understanding as to the overall purpose, benefits, and challenges of CDS is lacking…. Some of this confusion arises because of the disconnect between how various stakeholders perceive CDS: practicing clinicians are not typically involved in creating systems developed by vendors or in-house informaticians. This confusion is reflected in the varying definitions and interpretations used by stakeholders for key CDS terms (guidelines, standards, reminders, tools, and rules). More consistent definitions and application of terminology could go a long way to reducing the confusion.
- **Variability and lack of adaptability of CDS systems.** CDS applications and functions vary across vendors and systems. The depth and breadth of the specific CDS tools, functions, and clinical areas is not necessarily consistent. Participants reported that it is difficult to compare or share CDS rules between systems or across provider organizations, and collaboration on CDS rules is challenging. Further, it is not easy to adapt existing CDS systems for use in specific environments such as specialty providers, rural hospitals, or pediatric practices.
- **Challenges in expressing medical knowledge in CDS systems**. Participants noted that CDS is only as good as the data on which it is based, and it is a challenge to organize data in a standardized manner for use with CDS applications. Knowledge needs to be translated into a form usable for routine practice. Agreement is lacking on the best ways to express medical knowledge contained in CDS.

HDD Access

HDD Access will help healthcare providers to accelerate implementation of electronic health records and help healthcare organizations achieve interoperability between disparate systems. HDD Access enables clinical data capture, queries and analytics, and organizes healthcare data to support requirements under meaningful use. It provides the foundation for enhancing healthcare analytics, decision support, and business intelligence.

- HDD Access Is Now Available To You For Free!

- HDD Access can help you to:
  - Concept-based terminology (medical vocabulary + knowledge base)
  - Information models
  - Integrates multiple standard and local terminologies
  - Enables various applications such as Electronic Health record (EHR), interface engines, data interoperability, healthcare information exchange (HIE) and Meaningful Use (MU)
  - Local extensions are supported

HDD Access Terminology Content- April 2013

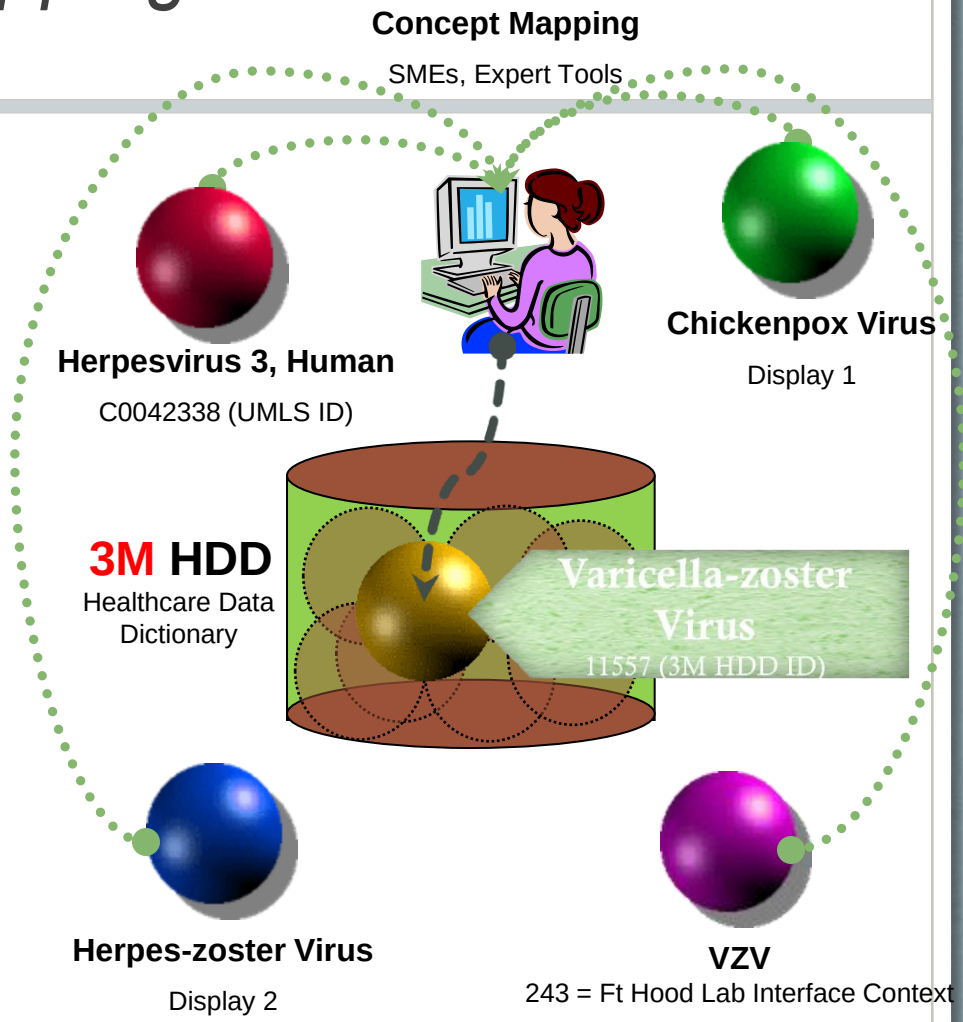
- Subset of content from 3M HDD
- Over 289,000 concepts and growing
- Over 952,000 relationships
- Monthly updates

What is the goal of HDD Access?

- The goal of the HDD Access project is to make the functionality of HDD Access available to the public in a manner that will:
  - Serve up terminology concept codes (identifiers) to be used to encode clinical data – coded data is key to the advanced data functions required for **meaningful use**
  - Provide a cross-walk between different codes and names from standard and legacy/local terminologies that have the same meaning – for **semantic interoperability**
  - Offload from users the maintenance and update effort to manage releases from standard terminologies
  - Organize domains (groupings of concepts, e.g. "specimen") and relationships to enable data comparison and aggregation in decision support and analytics
  - Provide **value sets** (context-specific code lists), pick-lists, search terms and other practical functionalities to support user applications
  - House terminology content in a database with Application Programming Interface (API) runtime services for other applications to call– providing an application that is easy to implement

Concept Mapping Defined

- Process of building links among concepts to integrate various vocabularies
- Context: the purpose of the map
  - Are these drugs being mapped for inventory, allergens, or as clinical drugs?
- Matching technologies/tools/process to avoid duplicate concepts and increase consistency and efficiency
  - String comparison mapping and semantic mapping
- Requires clinical practice expertise



What areas of health care are addressed by the terminology content in HDD Access?

- HDD Access aims to provide concepts that can be used to encode patient data. To help you become familiar with the functionality of the HDD Access software, we've hosted a view-only copy with domains (groupings of concepts) of terminology content that are commonly used, for example:
- Patient demographics – race, religion, gender, etc.
- Encounter – hospital service, discharge disposition, etc.
- Laboratory – test, result, specimen, microbiology, etc.
- Pharmacy – medication, drug form, route, etc.
- Allergy – allergen (drug, environment, food), reaction, etc
- Diagnosis, procedure and vital signs.

Standard Terminologies Included in HDD Access

- ICD-9-CM Diagnoses (codes and hierarchies)
- ICD-9-CM Procedures (codes and hierarchies)
- ICD-10-CM (codes and hierarchies)
- ICD-10-PCS (codes but not attributes/hierarchies)
- HCPCS LEVEL II AND MODIFIERS
- MS-DRG
- TRICARE/CHAMPUS MS-DRG
- APC
- MS-DRG MDC
- TRICARE/CHAMPUS MS-DRG MDC

Common Misconceptions

- You should not use HDD because it is not a standard terminology.
  - HDD is not a standard Terminology, it is a controlled medical vocabulary server, housing standard and local terminology
- SNOMED CT is the only medical reference terminology needed for structured, coded clinical data capture.
  - Multiple standard terminologies are required for Meaningful Use criteria.
  - No one terminology covers all domains of clinical data capture.
- HDD is not useful because it is a proprietary product
  - The 3M HDD is proprietary however, HDD Access is free and available in the public domain.

Standardized Mapping of Nursing Assessments Across 59 U.S. Military Treatment Facilities: Conclusions

- Implement software constraints in the system to support the data governance policy by disallowing inappropriate, uncontrolled changes.
- Encoded assessment measures are required for all portions of the nursing process. These coding measures need to be consistent and semantically structured across settings. The first requirement for a good terminology is content coverage.
- 50% of the concepts did not exist in either SNOMED CT or LOINC

Patient Safety Use Case

- Patient Journey
  - Admitted to Walter Reed National Military Medical Center and given “Penicillin” where the patient had an adverse reaction
  - Allergic reaction to “Penicillin” is documented in the patient record
  - Patient is later admitted to DC VA Medical Center and requires an antibiotic
  - The clinician searches the patient record for patient allergies and there are no allergies returned
  - A peer review of the process reveals that DC VA Medical Center documents “Penicillin” as “Penc”

PENI

Penc

VA

DoD

Walter Reed National Military Medical Center

Penicillin

INOVA™

PCN

Civilian Hospital

PENI

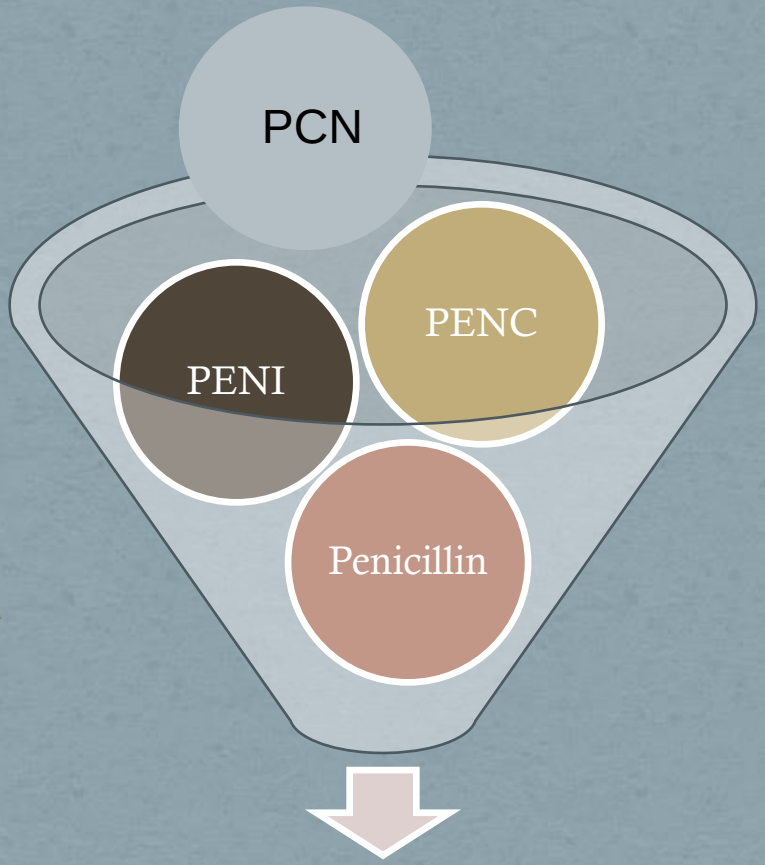
Penc

INOVA™

PCN

Walter Reed National Military Medical Center

Penicillin



HDD Concept

- In the example Penicillin has 4 different meanings/ representations
- HDD ties the 4 different Penicillin into one meaning/ representation
- Having one meaning for Penicillin prevents bad clinical outcomes.

Summary

You Can Leverage HDD Access…

- Are you part of an Accountable Care Organization (ACO)?
- Do you have multiple systems (EHR, Lab, Billing) in your organization?
- Are you part of an Health Information Exchange (HIE)?
- Do you need to improve physician satisfaction and EHR usability?
- Do you need to standardize data in a centralized data repository?
- Are you interested in improving organizational efficiency through data governance?
- Do you need to improve structured data capture at the point of care?

Conclusion

- Given HITECH/ACA and reality of multiple disparate systems, there is an increasing need for analytics and data Interoperability
- HDD Access is available to help healthcare providers to accelerate implementation of electronic health records and help healthcare organizations achieve interoperability between disparate systems.
- HDD Access enables clinical data capture, queries and analytics, and organizes healthcare data to support requirements under meaningful use. It provides the foundation for enhancing healthcare analytics, decision support, and business intelligence.

Q&A

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DISCUSSION

NATIONAL FORUM ON DATA & ANALYTICS

AUGUST 1-2, 2013 WASHINGTON DC

eHEALTH INITIATIVE

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2nd Annual National Forum on Data & Analytics in Healthcare

Gaylord Convention Center

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August 1-2, 2013

5 GREAT REASONS TO ATTEND

- **Learn** Best Practices from Industry Leaders
- **Discuss** Experiences, Problems, and Solutions with HIT Peers and Experts
- **Network** and Make Valuable New Contacts within the HIT Community
- **Discover** Cutting-Edge Data & Analytic Products and Tools at the Forum
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NATIONAL FORUM ON DATA & ANALYTICS

AUGUST 1-2, 2013 WASHINGTON DC

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FEATURED SPEAKERS:

George Lazenby, CEO, Emdeon

John Glaser, CEO, Health Services, Siemens

Rodney Cain, VP, Strategic Initiatives, OptumInsight

Christopher Ross, CIO, Mayo Clinic

Dan Garrett, Principal & HIT Practice Leader, PwC

PANEL DISCUSSIONS:

- Achieving Quality Improvement Through Data and Analytics
- Leveraging Analytics to Facilitate Accountable
- For Big Data to Realize its Promise, Industry Collaboration Will Be Key
- Building the Business Case for Data Analytics
- Predictive Analytics for Genomics and Personalized Medicine
- Health Insurance Exchange (HIX) Analytics
- Driving Down Healthcare Costs: Using Data and Analytics to Achieve Savings
- Analytic Techniques for Community, Population Health Management and
- Policy/Privacy Issues in the Era of Big Data & Analytics

NATIONAL FORUM ON DATA & ANALYTICS

AUGUST 1-2, 2013 WASHINGTON DC

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Next Briefing from the Beltway

Topic: ONC Governance Framework

Thursday, June 20, 2013

4:00 - 5:00 pm (ET)

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Thank You

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