DAVINCI: MILITARY HEALTH SYSTEM (MHS) PART 2 THE DATA

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KENNELL AND ASSOCIATES

OBJECTIVES

- The attendee can:
  - Discuss the DaVINCI project and the DoD data that feeds it.
  - Describe the Operational Systems in use in the Military Health System (MHS)
  - Identify key strengths and weakness of operational data.
  - Describe Management Information Systems/Central Systems in use in the MHS.
  - Discuss the MHS Data Repository and its Role in Supporting Research of the MHS.
  - Discuss the types of data that are available to use in research.

POLL QUESTION #1

Have you ever used the Military Health System?

POLL QUESTION #2

Have you ever used the Military Health System Data?

POLL QUESTION #3

Did you attend last month's MHS Basics session?

DA VINCI

WHAT IS DAVINCI?

- Joint DoD and VA Data Warehouse intended for research and operational support
- Data are fed from VINCI and the MHS Data Repository (MDR)
- Mapped to a common logical model for easier use.
- https://www.ohdsi.org/data-standardization/the-common-data-model/
- Initial datasets have been exchanged and mapping work is ongoing.
- There is a DoD/VA MOU in place to streamline the use of data.
- This presentation will focus on the DoD sources of data.
- A previous session focused on the MHS Benefits
  - https://www.hsrd.research.va.gov/for_researchers/cyber_seminars/archives/video_archive.cfm?SessionID=2422

WHAT IS DAVINCI?

- Many DoD data files have been sent to VINCI.

- Will soon be available on CDW

- Analysts will be able to add DoD sources to their normal access forms (e.g. ePAS)

- Files sent already include:
  - Lab and rad
  - Professional Encounters
  - Pharmacy
  - Eligibility
  - Direct Care Inpatient
  - Claims
  - Vital Signs

Mapping into
OMOP Common
Data Model

OPERATIONAL SYSTEMS

OPERATIONAL SYSTEMS

- The MHS has relied and/or does rely upon many operational systems
  - A Benefits System, to keep track of who is eligible for care, which programs the beneficiary is eligible for, Service history, demographics, etc. This system is not operated by the MHS, but rather by the DoD personnel community.
  - Human Resources System, to keep track of staff assignments and available hours
  - Several separate Clinical and Administrative systems being replaced by MHS Genesis
  - Claims Processing System
  - Pharmacy Drug Utilization Review System

OPERATIONAL SYSTEMS -- DEERS

- DMDC/DEERS:
  - Defense Manpower Data Center is a DoD component that tracks personnel information.
    - Who is on active duty, guard/reserve status, retirement information, separations, deployments, what benefits members have, sponsorship of family members, etc.
  - The Defense Eligibility and Enrollment System (DEERS) is a very important branch of DMDC – the legal source of healthcare eligibility and enrollment with the MHS.

DMDC/DEERS

- DEERS has offices at service installations and also around the world where needed so that active duty and others can be added/updated.

- DEERS also provides web-interfaces for some types of updates.

- When information is updated in DEERS, it must come from an official source.

  - The Services, birth certificates, death certificates, Social Security Administration, marriage certificates, Medicare, etc.

- Service member information is generally of high quality because the Services keep it up to date.

- Beneficiary data may not be as high of quality because much of it is self-reported. Even though information is vetted, when something changes the beneficiaries do not always tell DEERS.

https://en.wikipedia.org/wiki/Real-Time_Automated_Personnel_Identification_System

DMDC/DEERS

Types of Health Benefits Maintained by DEERS:

- Direct Care Eligibility (treatment at a military hospital)

- Health Plans:
  - Standard/Extra: Indemnity/PPO insurance. Being replaced in 2018 with TRICARE Select
  - Prime: 4.5 million member HMO
  - Reserve Select/Retiree Reserve Select: Guard/Reserve plan to purchased TRICARE standard/extra
  - Young Adult: Standard or Prime coverage up to age 26 for family members
  - TRICARE for Life: Free Medicare supplement for eligibles who buy part B.
  - Plus: preferred access to space available care at MTFs. (not really a health plan)

https://www.congress.gov/bill/114th-congress/house-bill/4909/text

DMDC/DEERS

DEERS Checks

- When an MHS Beneficiary needs to access care, DEERS is checked to assess eligibility and priority and to determine coverage for "purchased care"

- Requestors ask DEERS for healthcare coverage information, and DEERS sends that back, along with an update of DEERS data for the requesting system.

- Sometimes the transactions break, so that local data in the requesting systems is not as high of quality as that which comes from DEERS.

NATIVE DATA CAPTURE

DEERS

Eligibility
Enrollment
Service Information
Family Members
Demographics

OPERATIONAL SYSTEMS - DMHRS

- DMHRS:
  - Defense Medical Human Resources System (DMHRS)
  - Tracks information about medical staff at military hospitals; including doctors, other professionals, nurses, technicians and administrative staff
  - Includes information about where staff are assigned: Military Treatment Facility (MTF), Clinic or Ward
  - Is used as the timekeeping system for medical staff.
  - Important to understand staffing, provider/support staff ratios, productivity, etc.

CLINICAL AND ADMINISTRATIVE SYSTEMS AT MILITARY TREATMENT FACILITIES

CLINICAL AND ADMINISTRATIVE SYSTEMS

- The MHS is in transition with respect to clinical and administrative information systems.

- Historical legacy systems are being replaced by MHS Genesis.

  - All MTFs are still on legacy systems except for the Puget Sound area.

- Legacy systems being replaced by MHS Genesis include:

  - Administrative operational system (Composite Healthcare System)

  - Electronic Health Record systems (AHLTA and Essentris)

  - Dental System (CDA)

COMPOSITE HEALTH CARE SYSTEM

- The Composite Health Care System (CHCS):
  - Primary system used at each MTF to conduct operational and many clinical activities.
  - Appointing, registration, scheduling, ordering, results reviewing, etc…
  - 100+ CHCS Host Servers house local CHCS data.
  - Local CHCS Hosts only have visibility of data collected within the host itself.
  - Data quality problems occur because of the lack of connectivity across CHCS servers

CHCS

- CHCS contains many important data files
  - Patient Registry
  - National Enrollment Database
  - Ambulatory Data Module
  - Admit, Discharge and Transfer Files
  - Lab, Rad, and Pharmacy Modules
  - Provider File
  - Provider Schedules
  - Appointment File
  - Referral File,   Etc….

CHCS

- Real-time, raw nature of CHCS data is a significant advantage.

  - Data are available here and now, when needed at MTF Level.

- Some limitations in CHCS:

  - No central access. Local data only. Users who need global data must maintain 100+ separate accounts to retrieve worldwide data.

  - Demographic and enrollment update processes are not fail-safe.

  - Inconsistent data across CHCS servers

  - Built in the 1980s – missing many important features that modern healthcare systems rely upon.

NATIVE DATA CAPTURE

DEERS

Eligibility
Enrollment
Service Information
Family Members
Demographics

CHCS

Registration
Providers
Schedules
Inpatient Dx and Px
Some ambulatory Dx and Px
Lab
Rad
Pharmacy
Etc…

AHLTA

- MHS Unique, office-based electronic health record system.

- AHLTA contains many of the features of commercial EHRs.

- Only used in offices; other types of care are not generally in AHLTA.

  - This is a significant limitation resulting in incomplete healthcare data when querying AHLTA. Must use with other sources for most studies.

- Ability to take structured notes using Tri-Service WorkFlow (TSWF) forms. Work groups decide what should be structured.

- AHLTA stores data in the Clinical Data Repository.

AHLTA

- AHLTA contains many important data files
  - Patient File
  - Appointment File
  - Encounter File
  - Lab, Rad, and Pharmacy Files
  - Provider File
  - Historical Procedures
  - Immunizations
  - Etc….

NATIVE DATA CAPTURE

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CHCS

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Rad
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Etc…

AHLTA

Electronic Notes
Vital Signs
Historical Procedures
Most ambulatory CPT and DX
Tri Service Work Flow Forms
Tobacco/Alcohol History
Immunization History
Etc.

AHLTA

- There is significant interaction between AHLTA and CHCS:
  - AHLTA does not communicate with DEERS, but rather, receives DEERS information from CHCS.
  - AHLTA transmits office-based professional services data to CHCS but not other types of data.
  - CHCS transmits lab, rad, pharmacy, appointment and other data to AHLTA. CHCS does not transmit encounters to AHLTA.
  - Communications between the two systems are not fail-safe.

DATA FLOWS BETWEEN CHCS, AHLTA AND DEERS

DEERS
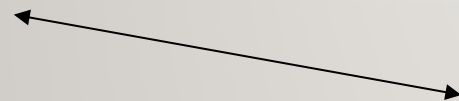
CHCS

Patient/Provider
Appointments
Ancillary Services

AHLTA

Eligibility Checks
Demographic Updates
PCM Assignments

Coded Professional
Encounter Records

AHLTA

- Fundamental flaw in design related to identification of a person.
- AHLTA assigns a "unique identifier" to each individual; except that it's not unique for beneficiaries with more than one sponsor or with incorrectly coded relationship to sponsor
  - Active Duty Service Member married to Guard Member
  - Active Duty Dependent who subsequently goes on active duty.
  - Child with two Active Duty parents
- Impacts a very large number of beneficiaries.
- Must use patient social security number in AHLTA to retrieve records correctly from AHLTA.

AHLTA/CDR AND ESSENTRIS

- Since AHLTA doesn't work outside of office-settings, Essentris is also used at MTFs to capture electronic notes
  - ER, Inpatient, SDS, etc.
- Essentris was not initially implemented centrally and is not connected to DEERS, CHCS or AHLTA/CDR.
- There are differences in Essentris implementation across MTFs. Makes data feeds from Essentris difficult. There are no central Essentris data stores
- Providers document care in Essentris but the MTF still must also record in CHCS in order for data to flow centrally.
  - Professional services information does not consistently flow from Essentris to other systems.
  - Outpatient, ER and SDS are usually well captured, but inpatient professional services data are incomplete. This is a large "hole" in MHS data.

NATIVE DATA CAPTURE

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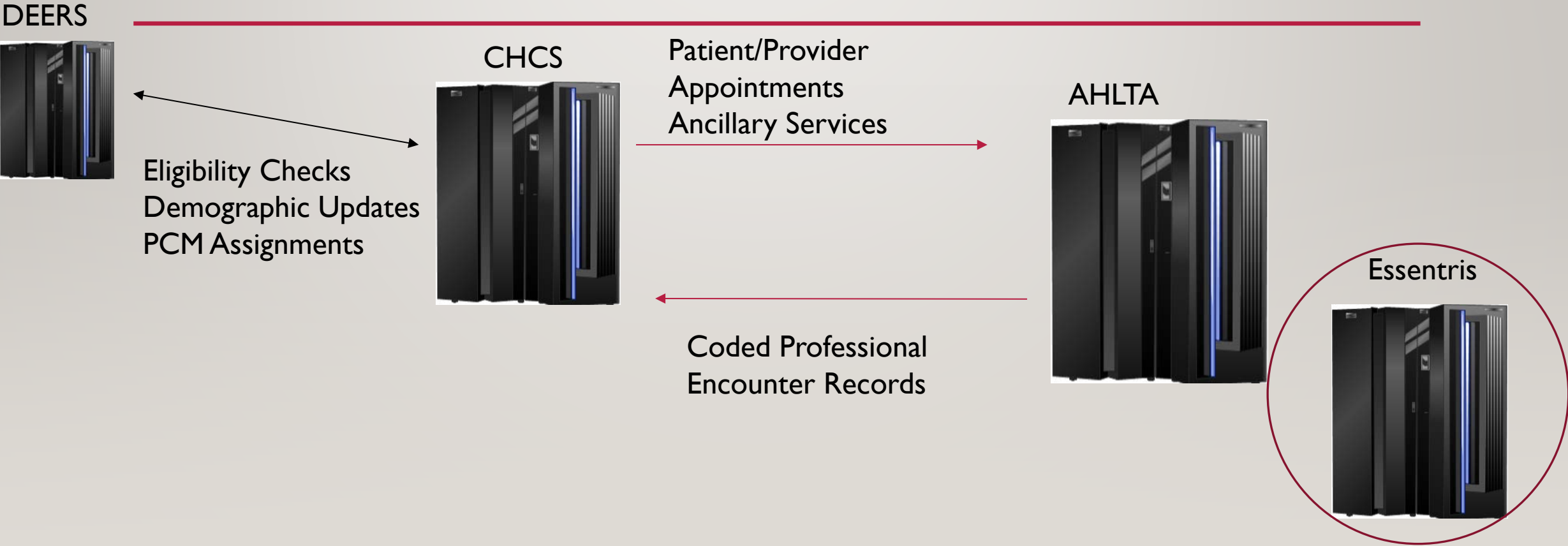Lab
Rad
Pharmacy
Etc…

AHLTA

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Immunization History
Etc.

Essentris

IP Electronic Notes
IP Vital Signs
Etc.

DATA FLOWS BETWEEN CHCS, AHLTA, DEERS AND ESSENTRIS

DEERS

CHCS

Patient/Provider
Appointments
Ancillary Services

AHLTA

Eligibility Checks
Demographic Updates
PCM Assignments

Essentris

Coded Professional
Encounter Records

MHS GENESIS

- MHS Genesis will replace CHCS, AHLTA and Essentris.
- Data collection will occur on one system (dental will be separate from medical, still)
- Less of a chance for inconsistencies.
- Has proven to be a major paradigm shift in daily operations.
- Many challenges getting data out of MHS Genesis.

MHS GENESIS DATA DOMAINS

Anatomical Pathology

Blood Bank

Clinical Events

Documentation

Encounters

General Laboratory

Maternity

Pharmacy

Procedure/Diagnosis

Schedules

Social History

Surgery

Anesthesia

Care Mgmt

Case Notes

Family History

Question

Power Note

Health Plan

Radiology

Micro

Orders

PURCHASED CARE

TRICARE PURCHASED CARE DATA

- TRICARE Claims represent more than <u>half</u> of the care provided to MHS beneficiaries.

- Particularly important for those who live near small MTFs and for those who don't have priority at MTFs, such as retirees or Medicare eligibles.

- When TRICARE services are used in the private sector, claims are filed with a fiscal intermediary.

- The FI sends an extract of claims, called "TRICARE Encounter Data" records to DHA.

- The TRICARE Operational Data Store system validates, accepts and processes the claims.

- Only administrative data is available, similar to what would be available for Medicare claims.

- Limits the ability to use the data for some studies and some cohorts.

TRICARE PURCHASED CARE DATA

- TRICARE Claims include items such as:
  - Physician Services
  - Hospital Stays or Services
  - Ancillary Services
  - Emergency Room
  - Durable Medical Equipment
  - Pharmacy
  - Home Health
  - Hospice
  - Others

PURCHASED CARE DATA

- Individual claims are available
- Diagnosis and Procedure Codes, dates and location of care
- Billing and patient data
- Patient and Provider
- Other administrative data
- Clinical data are not available
  - Lab and Rad CPTs, but no results.
  - No vital signs
  - No electronic notes

PHARMACY UTILIZATION REVIEW

PHARMACY DATA TRANSACTION SERVICE

- Real-Time Drug Utilization Review System
- Entities filling prescriptions for MHS Beneficiaries use PDTS to see if it is safe to dispense the drug.
- Includes programs related to opiod abuse
- Used by MTFs, Private Sector pharmacies, the mail order program, the VA (on dual eligible patients), and "line" units (such as shipboard pharmacies or MASH-type units).
- Only used for outpatient prescriptions
- Required at MTFs and if TRICARE is paying a claim.
- Does not include overseas private sector fills (but does include overseas when operated by DoD).

THEATER MEDICAL DATA STORE

- CHCS/AHLTA-like systems used in theater medical units.
- Examples of the types of units that use TMDS:
  - Navy Ships
  - Combat Support Hospitals
- Significant in that this data contains the health history of service members while they are deployed.

MANAGEMENT INFORMATION SYSTEMS

MANAGEMENT INFORMATION SYSTEMS

- MEPRS
- MHS Data Repository
- P4i – MHS Dashboard
- Carepoint

MEDICAL EXPENSE PERFORMANCE AND REPORTING SYSTEM

- MEPRS is a tri Service cost accounting system
- Data Sources for MEPRS:
  - Workload from CHCS, some is hand-entered
  - Labor information from DMHRS
  - Expense information from Service-unique accounting systems.
- Standard methodology is used to assign costs to clinical areas.
- Significant limitations in quality of timesheet reporting data; impacts costs.

MHS DATA REPOSITORY

MHS DATA REPOSITORY

- MHS Data Repository was developed in 2000 to:
  - Provide a central location where all data could flow in and be processed ONCE, to correct known anomalies and append useful fields
  - Particularly necessary to:
    - Put everything in one place
    - Correct known errors
    - Reduce costs
    - Improve quality

MHS DATA REPOSITORY

- What is the MDR?
  - The most robust source of MHS data centrally available.
- Many operational systems have data warehouses associated with them, for example:
  - PDTS
  - AHLTA/CDR
  - DEERS
  - CHCS does not have a warehouse, but to some extent the system HSDW serves as one
- These warehouses have the intent of exactly mimicking what is in the operational source. Problems that originate at the sources are also in the warehouses.
- The MDR is not that type of warehouse, at all!
  - The MDR is/was designed by data users, for data users.

MHS Data Repository

- Many data warehouses simply display source data as provided.
  - The MDR always stores original values that are received from sources,
  - But, when possible, programs have been written to add new variables, to correct source system errors, to standardize data amongst sources or to enhance utility.
  - This makes the MDR a cleaner source of data than other systems.
  - Corrections are not always possible so the data are not perfect.

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ROUTINE MDR ENHANCEMENTS

- Person Identification Enhancement:
  - MDR maintains a "Master Person Index" file that contains all known person identifiers and associations for each member.
  - John has three records in DEERS; one associated with two active duty parents, and one for himself, when he goes on active duty.
  - Enables the MDR to consistently assign the DEERS ID no matter how John presents for care.
  - Fixes the AHLTA issue.

Person	Sponsor SSN	Relation	Pat SSN	DEERS ID
John Smith	111-11-1111 (Mom)	Child	333-33-3333	1111111111
John Smith	222-22-2222 (Dad)	Child	333-33-3333	1111111111
John Smith	333-33-3333 (John)	Sponsor	333-33-3333	1111111111

ROUTINE MDR ENHANCEMENTS

- Uses DEERS files to properly assign benefit information, enrollment information and demographics.
  - Fixes inconsistencies related to there being 100+ separate CHCS servers.
- Groups diagnosis and procedure codes into categories
  - Diagnosis Related Groups (TRICARE Unique)
  - Major Diagnostic Categories
  - Ambulatory Payment Classifications
  - AHRQ Clinical Classification Software
  - Risk Adjustment (TRICARE Unique)

ROUTINE MDR ENHANCEMENTS

- Application of workload weights:
  - Relative Value Units
  - Relative Weighted Products (DRG weights)
- Application of risk scores
  - Financial risk
- Application of estimated costs
  - Full costs and variable costs

ROUTINE MDR ENHANCEMENTS

- Application of deployment history

- Development of Some Types of Clinical Episodes
  - Ancillary services linked to direct care events. Helpful for studying physician practice patterns.
  - Purchased care acute care inpatient episodes to tie hospital and professional claims together to understand the full scope of inpatient purchased care.

- Application of AHRQ Prevention Quality Indicators

- Application of NYU ER Algorithm

- Etc…..

MDR ENHANCEMENTS

- The idea behind the MDR enhancements is:

    - Get the most accurate data available to the users

    - Apply consistent tools/logic to the data

    - Make the data easy to use

    - Transparency, transparency, transparency

- There are many other enhancements as well, some unique to each type of data.

https://health.mil/Military-Health-Topics/Technology/Support-Areas/MDR-M2-ICD-Functional-References-and-Specification-Documents
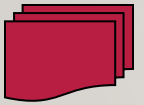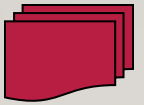
BASIC DATA FLOW
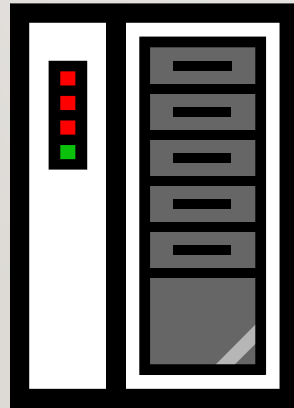
Data sent to MDR 24/7

TED

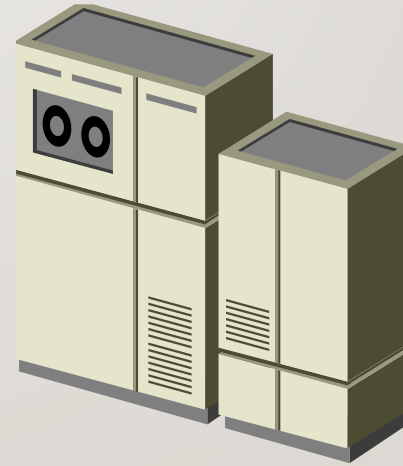CHCS/AHLTA

DEERS

PDTS

Others

**MDR
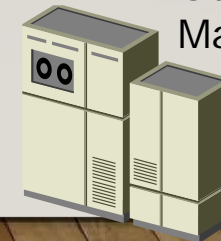Feed Node**

Batches

Weekly
Monthly

MDR File Storage &
Limited Access

M2 and
Other Data
Marts

User Access in Data
Marts

MHS DATA REPOSITORY AND OFFICIAL REPORTING

- Determining the contribution from DoD to a joint DoD/Medicare fund that pays for TRICARE for Life.
- Management of purchased care claims payment
- Developing payment rates used by TRICARE
- Calculating "risk sharing" amounts on billion dollar managed care support contracts. Estimating costs of changes to the contracts.
- Calculating the Services budgets from DoD for operating MTFs.
- Calculating payment amounts for third party payors such as the Coast Guard and the VA.
- Reports to Congress, such as the recent MHS Review, or the Military Compensation and Retirement Commission.
- Hundreds of clinical research studies, including feeding DaVINCI
- IOM reports, CDC reporting, etc.

TYPES OF DATA IN THE MDR

- There are many types of data in the MDR. Some types of data are described in the next several slides

- Person Data:

Source	Name	Content
DEERS	VM6	Eligibility, enrollment, demographics, service, etc
DMDC	Contingency Tracking System (CTS)	Deployment related information
DMDC	Separatee	Separation from Service information
DMHRS	DMHRS	Human Resources/Staffing
MDR-Processed	Health Risk	Disease State, Financial Risk Adjustment
Death File	Death	Deaths from SSA, DMDC, Casualty Affairs, etc.

CHCS/AHLTA DATA PRODUCTS IN THE MDR

Standard Inpatient Data Record	SIDR	Inpatient Hospital
Comprehensive Prof Encounter Record	CAPER	Professional Services
Appointment	APPT	Appointments
Referral	REF	Referrals (MTF or Purchased Care)
Chemistry	Chem	Chemistry Exams & Results
Microbiology	Micro	Microbiology Exams & Susceptibility
Pathology	Path	Pathology Exams & Results
Radiology	Rad	Radiology Exams & Results
Schedulable Entity	SE	MTF Appointment Schedules
Pharmacy	RX	Dispensing Events
Subjective/Objective Notes	SO	Clinical Notes (AHLTA based only)
Immunizations	IMM	Immunization History
Vital Signs	Vitals	Vitals and Other questionnaire type data

OTHER DATA PRODUCTS IN THE MDR

MEPRS	MEPRS	MTF Accounting and Staff
Pharmacy Data Transaction Service	PDTS	Pharmacy Utilization Review
TRICARE Encounter Data - Institutional	TEDI	Purchased Care Claims - Institutional
TRICARE Encounter Data - Non Inst'l	TEDN	Purchased Care Claims - Non Institutional
National Provider ID	NPI	Provider Directory
Designated Provider	DP	Purchased Care Claims - Designated HMO
Theater Medical Data Store	TMDS	Theater Healthcare Data
Direct Care Dental	DC Dental	Direct Care Dental records
Purchased Care Dental	PC Dental	Purchased Care Claims - Dental
Case Management	CM	Case Management - Direct Care
Behavioral Health Data Portal	BHDP	Behavioral Screening Exams

P4I – HSDW - CAREPOINT

- Provides HEDIS reports to MTFs.
- Serves as the display for MHS Enterprise Metrics.
- Provides registries for MTFs.
- Receives data from MDR and also data directly from CHCS/AHLTA.
- Passes data through from MDR to the VA for DaVINCI.

MHS DATA AND RESEARCH

MHS DATA AND RESEARCH

- The MHS has a long history of using data for research.
  - There are active agencies within each Service dedicated to conducting research
  - There is not a research mandate within the MHS, however.
  - Receiving and using MHS data w/o DoD sponsorship can be difficult. The most difficult part tends to be finding a way to get the data pulled.
  - The DaVINCI project is intended to streamline and assist researchers and other users in gaining easier access to data to combine the DoD and VA experience for a more robust set of data to study.

MHS DATA AND RESEARCH

- The data files and fields that are needed for research are generally available and there is long history, with some files going back decades.

- Using MDR is the most complete source of healthcare information in one place about the MHS
  - Information in MDR is of higher quality than the source systems.
  - MDR feeds data to many other systems within and outside the MHS.
  - There are still some bits of information that are not in the MDR that must be considered when using MHS data.

- It is particularly important that users understand the MHS and the different benefits in order to properly apply the data to research.

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