



VA

U.S. Department
of Veterans Affairs

DaVINCI DoD Source Data: Overview of TRICARE Claims Data

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Produced by Kennell & Associates, Inc. for Veterans Affairs (VA)


KENNEL
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DaVINCI Webinar Series

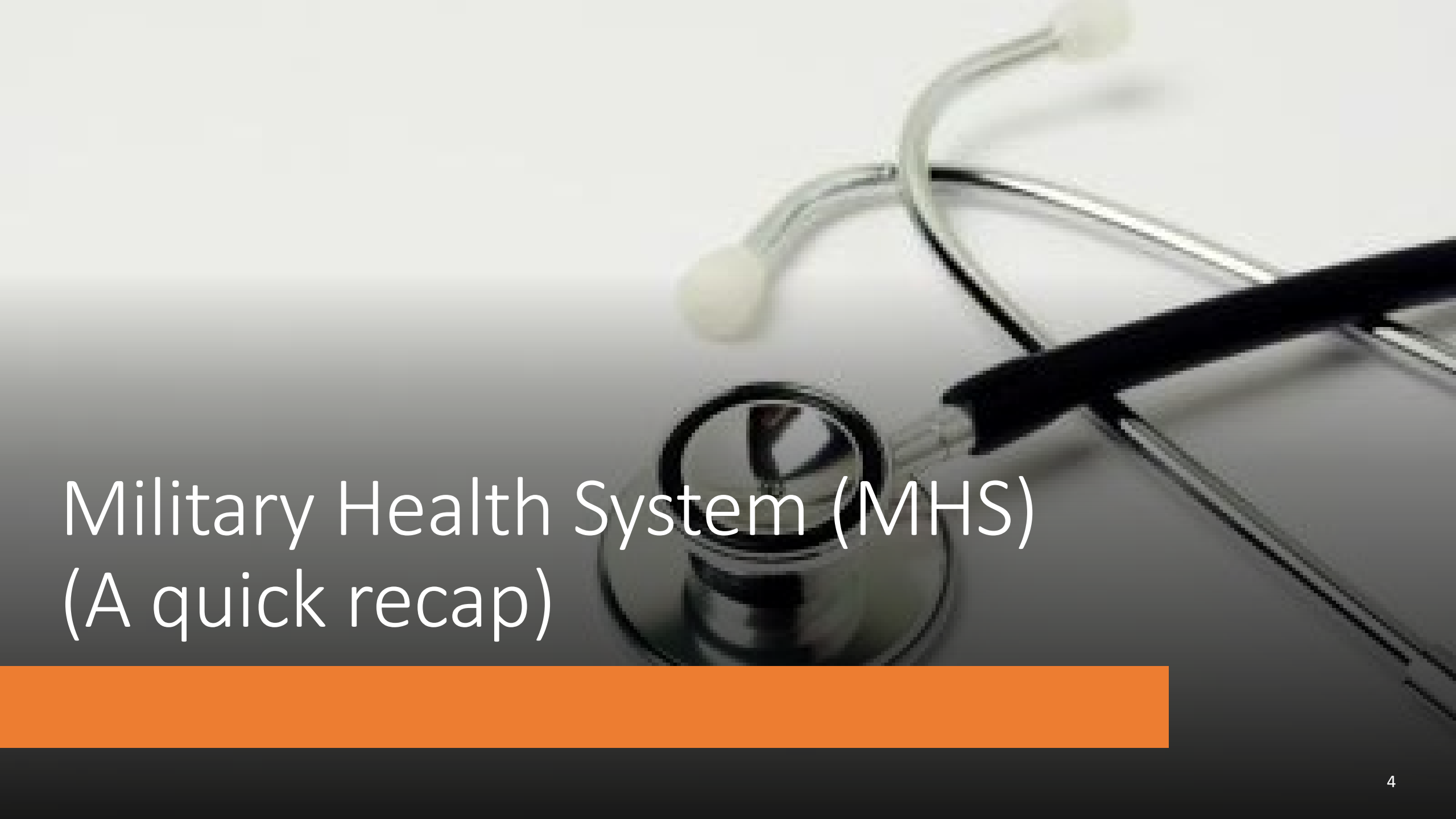
This the third of four webinars that focus on DaVINCI's DoD Electronic Health Record (EHR) and TRICARE claims data sources.

- **Webinar #1: Overview Session (Oct 8, 2020)**
 - DoD source data capture and processing flow
 - Key differences in coding between DoD EHR data ("direct care") and TRICARE claims ("private sector care")
- **Webinar #2: DoD EHR Data and OMOP (Jan 14, 2020)**
 - DOD EHR data capture
 - Implications for OMOP
- **Webinar #3: DoD TRICARE Claims data and OMOP**
 - TRICARE Claims
 - Implications for DoD OMOP
- **Webinar #4: DoD MHS GENESIS (Cerner EHR) and OMOP**

Objectives

After attending the webinar, attendees will be able to:

- Describe the Managed Care Support Contracts (MCSCs) and their role
- Summarize TRICARE programs and their impact on private sector care use
- Provide an overview of the main TRICARE claim types
- Describe key fields in TRICARE claims files
- Discuss how to build episodes of care using TRICARE claims in OMOP

A close-up photograph of medical instruments. In the foreground, a black stethoscope is partially visible, with its chest piece resting on a dark surface. Behind it, a pair of surgical forceps with black handles and silver metal tips is also resting on the surface. The background is a soft, out-of-focus light gray.

Military Health System (MHS) (A quick recap)



What is the Military Health System?

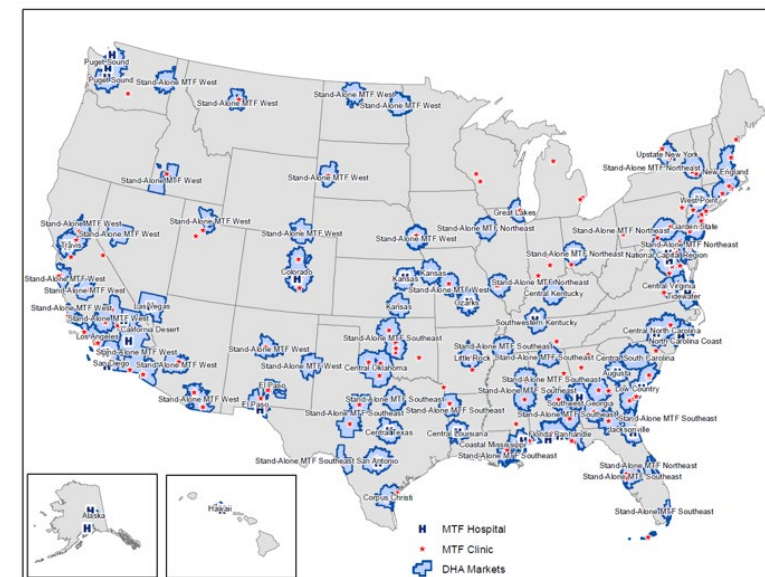
- The MHS is a network of military hospitals and clinics ('direct care')
- The 'direct care' system is supplemented by programs to enable beneficiaries to seek care in the private sector ('private sector care') in order to fulfill their healthcare needs according to access standards and to assure medical readiness of the force.

Our Mission

Enhance the Department of Defense and our nation's security by providing health support for the full range of military operations and sustaining the health of all those entrusted to our care.

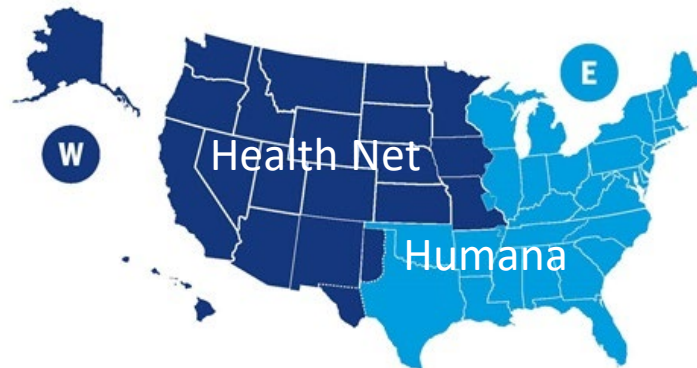
Our Vision

Be a world-class health care system that supports the military mission by fostering, protecting, sustaining and restoring health.



What is Private Sector Care?

- TRICARE Claims represent more than half 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.
- Only administrative data is available (similar to what would be available for Medicare claims) and only when TRICARE has obligation for payment.
- Managed by the Managed Care Support Contractors (MCSCs)
- There are many TRICARE health plans that dictate a beneficiary's cost-sharing and access to care



Data Available in Private Sector Care: TRICARE Institutional and Non-Institutional Claims



- TRICARE Claims include:

- Physician Services
- Hospital Stays or Services
- Ancillary Services
- Emergency Room
- Durable Medical Equipment
- Pharmacy
- Home Health
- Hospice
- Others

- 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

- Claims are only sent to TRICARE if TRICARE has a liability.
- If 100% of the allowed amount is paid by another payor, TRICARE is blind to the fact that the care occurred.

TRICARE

An Overview of TRICARE and TRICARE Programs

What is TRICARE?

- Most MHS beneficiaries have TRICARE coverage, which acts like a health insurance plan
- TRICARE was originally CHAMPUS but has evolved to include many programs like Prime, Standard, Select, etc.
- TRICARE Prime: HMO-like plan where patients have a Primary Care Manager either at the MTF or through the Managed Care Support Contractors (MCSC, aka Civilian Prime)
 - Most specialty care requires a referral from the primary care manager
 - Limits on eligibility for Prime (cannot have aged into Medicare, must live in a Prime Service Area (PSA))
 - No premiums or copays for Active Duty and Active Duty Family Members
 - Priority access at MTFs
- TRICARE Standard/Extra, now Select: PPO-like plan where beneficiaries can choose their providers
 - Select requires affirmative enrollment and will eventually require premiums for Retirees and their family members

More TRICARE Programs

- TRICARE for Life (TFL): Medicare wraparound plan for those who have bought Medicare Part B
 - TRICARE is always the second payer to Medicare
 - Care is virtually free for beneficiaries (Medicare pays ~80%, TRICARE pays the rest)
 - Data is censored for these (and other similar) beneficiaries if TRICARE has no obligation to pay, e.g. if the patient has met their Medicare deductible
- TRICARE Reserve Programs:
 - TRICARE Reserve Select (TRS): Allows Guard/Reserve members to buy TRICARE Standard, now Select eligibility during periods of inactivation
 - TRICARE Retired Reserve (TRR): Allows gray area retirees to buy TRICARE Standard/Select until they turn 60 and become eligible for normal retiree benefits
- TRICARE Plus
 - Usually paired with TRICARE Standard/Select or TFL, but empanels the beneficiary to a PCM and grants them preferred access to MTFs for primary care

Even More TRICARE Programs

- TRICARE Young Adult (TYA): Allows children of TRICARE beneficiaries to keep their coverage (Prime or Select) through age 26
- US Family Health Plan (USFHP): A flavor of TRICARE Prime where beneficiaries enroll directly to Designated Providers (DP)
 - All care is provided by the DP and the patient no longer receives care at the MTF or through TRICARE
 - Designated Providers: Six community-based, not-for-profit health care systems (e.g. Johns Hopkins)
 - The DPs accept full risk for their populations and are paid by the MHS on a risk adjusted capitated basis
 - Not available to active duty serviced members or Medicare eligibles (besides those already grandfathered in)
- If a patient is not enrolled in TRICARE Prime or Select and is not in TRICARE for Life, they are “Direct Care Only”, meaning they have no access to TRICARE and can only receive care in the MTFs

TRICARE Enrollment and Eligibility

		Enrollment Group						Total
		Direct Care Only	TRICARE Plus	TRICARE Prime	TRICARE Select	USFHP	None	
Eligibility Group	Direct Care Only	472,000	5,000					477,000
	TRICARE Eligible		26,000	4.4M	1.6M	110,000		6.2M
	TRICARE for Life		184,000	61,000		43,000	2.1M	2.4M
	TRICARE Retired Reserve				10,000			10,000
	TRICARE Reserve Select				396,000			396,000
	TRICARE Young Adult			10,000	28,000	1,000		39,000
	None						6,000	6,000
	Total	472,000	214,000	4.5M	2.1M	154,000	2.1M	9.5M

Private Sector Care Use

FY19 # purchased care institutional claims by Enrollment Group and Eligibility Group

Eligibility Group / Enrollment Group	Direct Care Only	TRICARE Plus	TRICARE Prime	TRICARE Select	Designated Provider (USFHP)	Not Enrolled	Total
Continued Health Care Benefit Program (CHCBP)						97	97
Direct Care Only	5,715						5,715
TRICARE Eligible		755	193,361	102,928	72		297,117
TRICARE for Life (TFL)		25,217	9,230	54	1	388,386	422,888
TRICARE Retired Reserve (TRR)				505			505
TRICARE Reserve Select (TRS)				30,506			30,506
TRICARE Young Adult (TYA)			755	1,329			2,085
None						8,725	8,725
Total	5,715	25,972	203,347	135,323	73	397,208	767,639

TRICARE Claims and Coding

Overview of TRICARE Claims and Coding

Private Sector Care

- TRICARE Encounter Data (TED) Records
 - Represent care, supplies or services provided to MHS beneficiaries by private sector providers under the TRICARE Program.
 - TRICARE Prime
 - TRICARE Select (Extra/Standard)
 - TRICARE for Life
 - TRICARE Reserve Select, TRICARE Retiree Reserve Select, TRICARE Young Adult
 - TRICARE Overseas Prime, TRICARE Global Remote
 - TRICARE Pharmacy
 - TED records are abstracts from TRICARE claims used to pay providers under TRICARE
 - TRICARE Systems Manual describes the rules for submitting claims.
 - Very similar to HIPAA 837 Institutional and Professional Claims

Private Sector Care



Health.mil
The official website of the Military Health System

Home | About the MHS | Topics | Training | Policies | Reference Center | News & Gallery

MHS Home > Military Health Topics > Business Support > Rates and Reimbursement

Business Support

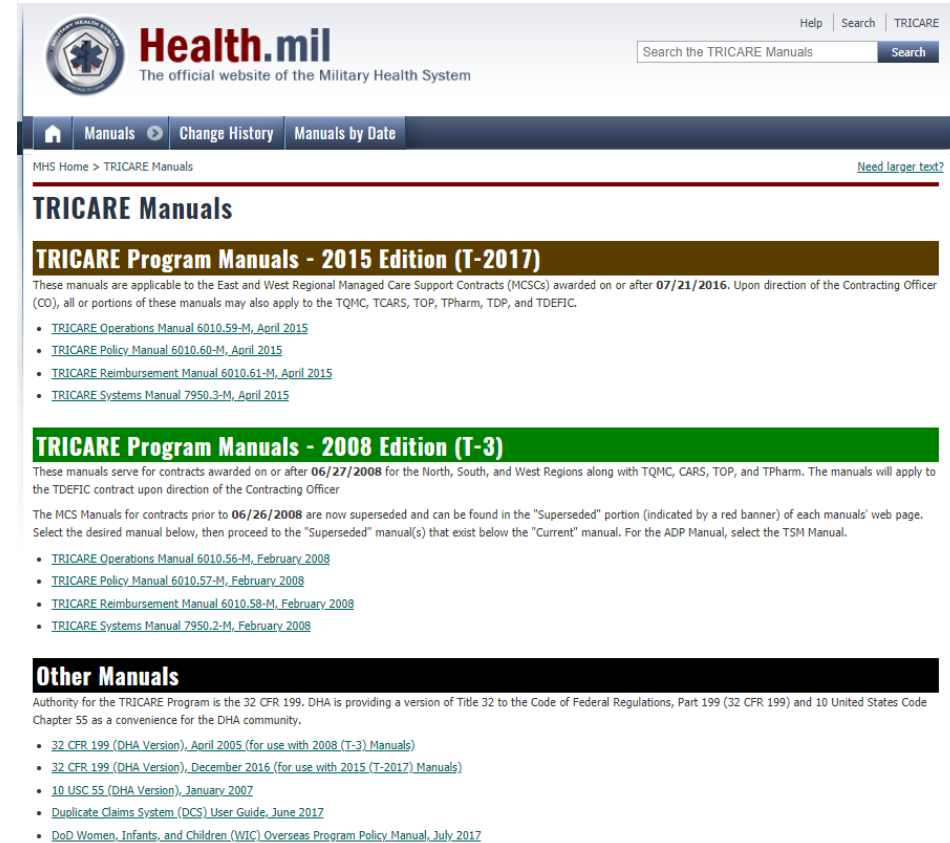
- Data Quality Management Control Program
- HIPAA Transactions, Code Sets & Identifiers
 - Transactions
 - Code Sets
 - Identifiers
- Rates and Reimbursement**
 - Age and Gender Restrictions
 - Ambulatory Surgery Rates
 - Anesthesia Rates
 - Applied Behavior Analysis Maximum Allowed Amounts
 - Banked Donor Milk Rates
 - Blend Rate Method for Radiology for Cancer and Children's Hospitals
 - Bundled Codes
 - CMAC Rates
 - Diagnosis-Related Group (DRG) Rates
 - Durable Medical Equipment Prosthetics Orthotics and Supplies

Rates and Reimbursement

The Defense Health Agency provides the following links as a reference. For the most accurate information or questions about rates, policies, etc., please contact your [managed care support contractor](#).

- [Age/Gender Restrictions](#)
- [Ambulatory Surgery Rates](#)
- [Anesthesia Rates](#)
- [Banked Donor Milk Rates](#)
- [Blend Rate Method for Radiology for Cancer and Children's Hospitals](#)
- [Bundled Codes](#)
- [CMAC Rates](#)
- [Diagnostic Related Groups \(DRG\) Rates](#)
- [Durable Medical Equipment, Prosthetics, Orthotics & Supplies \(DMEPOS\)](#)
- [Enteral and Oral Nutrition Products](#)
- [Foreign Rates](#)
- [Home Health Prospective Payment System \(HHPSP\)](#)
- [Hospital Classifications \(SCH/CAH\)](#)
- [Inpatient Procedures](#)
- [Limits on Number of Services without Override Code](#)
- [No Government Pay Procedure Code List](#)
- [Outpatient Prospective Payment System \(OPPS\)](#)
- [Mental Health and Substance Use Disorder Facility Rates](#)
- [Questionable Covered Services List](#)

<https://www.health.mil/Military-Health-Topics/Business-Support/Rates-and-Reimbursement>



Health.mil
The official website of the Military Health System

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MHS Home > TRICARE Manuals

TRICARE Manuals

TRICARE Program Manuals - 2015 Edition (T-2017)

These manuals are applicable to the East and West Regional Managed Care Support Contracts (MCSCs) awarded on or after **07/21/2016**. Upon direction of the Contracting Officer (CO), all or portions of these manuals may also apply to the TQMC, TCARS, TOP, TPharm, TDP, and TDEFIC.

- [TRICARE Operations Manual 6010.59-M, April 2015](#)
- [TRICARE Policy Manual 6010.60-M, April 2015](#)
- [TRICARE Reimbursement Manual 6010.61-M, April 2015](#)
- [TRICARE Systems Manual 7950.3-M, April 2015](#)

TRICARE Program Manuals - 2008 Edition (T-3)

These manuals serve for contracts awarded on or after **06/27/2008** for the North, South, and West Regions along with TQMC, CARS, TOP, and TPharm. The manuals will apply to the TDEFIC contract upon direction of the Contracting Officer.

The MCS Manuals for contracts prior to **06/26/2008** are now superseded and can be found in the "Superseded" portion (indicated by a red banner) of each manual's web page. Select the desired manual below, then proceed to the "Superseded" manual(s) that exist below the "Current" manual. For the ADP Manual, select the TSM Manual.

- [TRICARE Operations Manual 6010.56-M, February 2008](#)
- [TRICARE Policy Manual 6010.57-M, February 2008](#)
- [TRICARE Reimbursement Manual 6010.58-M, February 2008](#)
- [TRICARE Systems Manual 7950.2-M, February 2008](#)

Other Manuals

Authority for the TRICARE Program is the 32 CFR 199. DHA is providing a version of Title 32 to the Code of Federal Regulations, Part 199 (32 CFR 199) and 10 United States Code Chapter 55 as a convenience for the DHA community.

- [32 CFR 199 \(DHA Version\), April 2005 \(for use with 2008 \(T-3\) Manuals\)](#)
- [32 CFR 199 \(DHA Version\), December 2016 \(for use with 2015 \(T-2017\) Manuals\)](#)
- [10 USC 55 \(DHA Version\), January 2007](#)
- [Duplicate Claims System \(DCS\) User Guide, June 2017](#)
- [DoD Women, Infants, and Children \(WIC\) Overseas Program Policy Manual, July 2017](#)

<https://manuals.health.mil/>

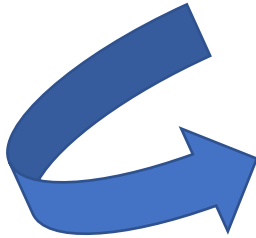
Private Sector Care

- TRICARE Encounter Data (TED) Records
 - This format of purchased care “claims” has been required by TRICARE since 1996.
 - All TED files include only “net versions” of claims; that is, all adjustments/cancellations have been applied to the records.
 - Each month, new records are added to the database, old records are updated, and cancellations are applied.
 - Prior to 1996, Health Care Service Records (or HCSRs) were used. These files did include cancelled records.
 - Only TRICARE Encounter Data (TED-Institutional and TED Non-Institutional) are included in DoD Source Tables and DoD OMOP.

Adjustments to a Claim

Initial Claim

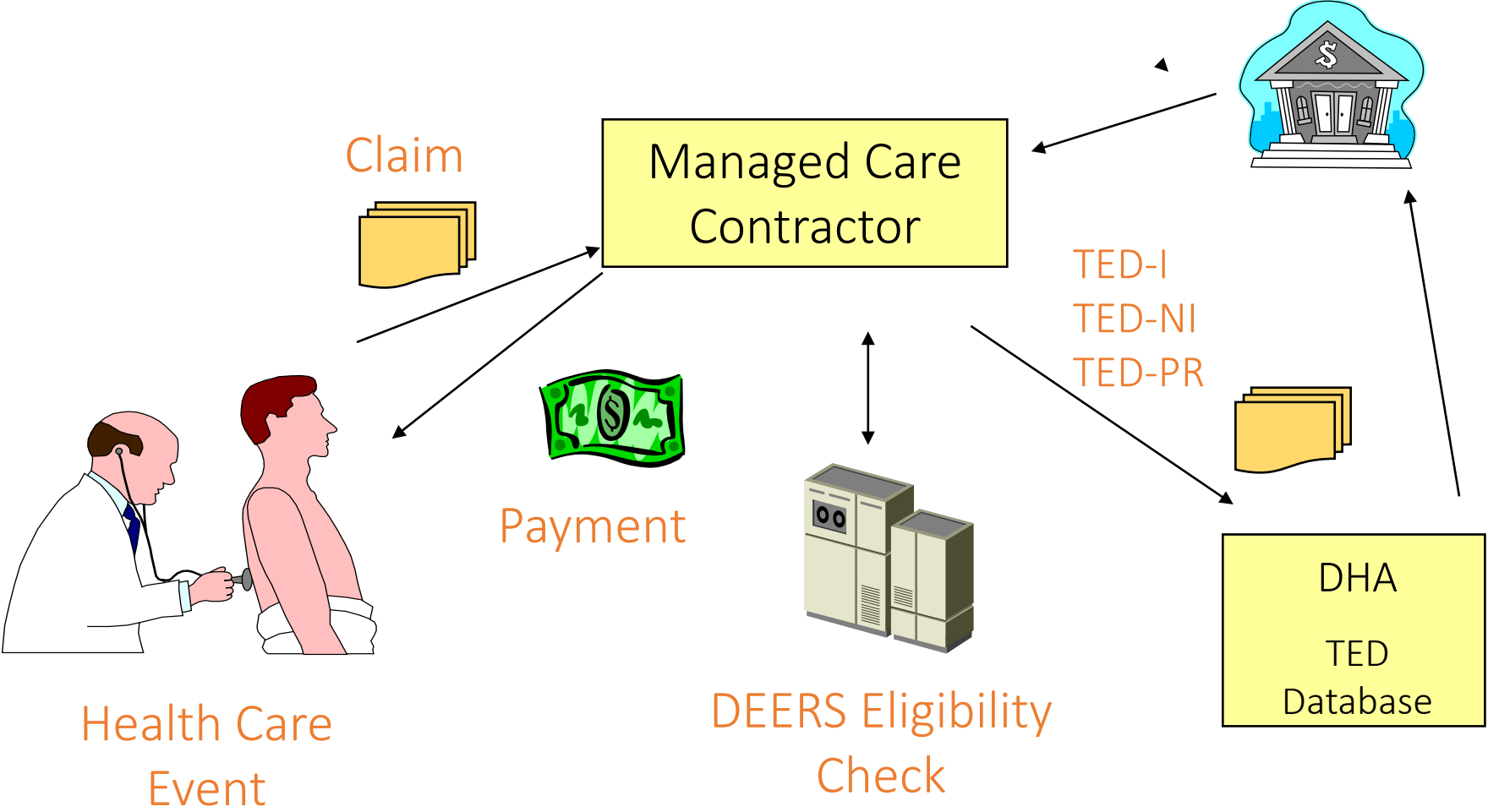
Type of Sub	Admission Date	Cycle Year/Month	Amount Paid, Raw
I	11/15/2019	2019/11	\$170,324.13



Type of Sub	Admission Date	Cycle Year/Month	Amount Paid, Raw
A	11/15/2019	2019/12	\$182,920.53

Replaced by Adjusted Claim

Claims Payment Process



Private Sector Care (recap)

- Claims Acceptance:
 - When TRICARE receives the TED, it is checked with a variety of logic tests
 - Includes claims where TRICARE is 1st or 2nd payor (OHI, Medicare).
 - TRICARE does not receive OHI claims if there is no TRICARE payment required.
- Denied claims are not included in TED data in the MDR/DaVINCI

Private Sector Care Source Data

MDR: TED Non-Institutional (TED-NI) and TED-Institutional (TED-I) Files

TED-Institutional & TED-Non-Institutional

What is a Record in the source tables?

- **TED-I (Institutional Data)**

- Each record represents an institution's bill for a range of dates for one beneficiary on one claim.
 - Some 'stays' occur at acute care facilities and others at non-acute care facilities (e.g., SNFs, home health).
 - Does not include outpatient facility bills.
- Identifying a Unique Record:
 - TED Number (TEDNO)

- **TED-NI (Non-Institutional Data)**

- Each record represents one procedure code for one date or a range of dates
- Includes non-institutional + outpatient institutional claims
- Multiple procedure codes may be present on **Non-Institutional claim as line items**
- Identifying a Unique Record:
 - TED Number + Line Item Number (TEDNO || LINUM)



TED-I Institutional Claims Data

Private Sector Institutional Data

- Most records are complete hospital stay records.
- Bed days, RWPs and costs can span years and months

Complete Inpatient Stay Records

MS-DRG	MS-DRG Description	Admission Date	End Date Of Care	FY	FM	Discharge Status	Bed Days, Raw	Amount Paid, Raw
391	ESOPHAGITIS, GASTROENT & MISC DIGES	10/01/2015	10/05/2015	2016	1	01	4	\$1,260.00
612	NEONATE, BIRTHWT <750G, DISCHARGED	06/30/2015	10/05/2015	2016	1	01	97	\$85,606.10

Private Sector Institutional Data

Code	Inst Type	Acute Care Hospital Indicator	Adm	Clams
10	General medical and surgical	1	599,548	599,706
76	Skilled Nursing Facility	0	44,483	133,608
91	Sole community	1	54,500	54,508
22	Psychiatric hospital or unit of	0	42,227	43,354
70	Home Health Care Agency	0	0	20,535
93	Critical Access Hospital	0	13,658	13,870
50	Children's general	1	12,228	12,229
46	Rehabilitation	0	8,005	8,408
72	Residential Treatment Center	0	3,247	7,466
78	Non-hospital based hospice	0	0	4,094
73	Extended Care Facility	0	3,182	3,702
48	Chronic disease	0	1,151	1,172
82	SUDRF	0	1,070	1,070

- Institution Type: Indicates the type of facility submitting the claim
- Acute Care Hospital Indicator (acute): Indicates whether the facility is an acute care hospital or not.

TEDI claims by Institution Type and Acute Care Hospital Indicator (n>1000)

- Not all settings get admission credit
- Critical access hospitals are often acute care, they are just not paid that way

Private Sector Institutional Data

- Some records represent parts of a stay
- Group by “admitting TED number” (acute care only)
 - Note continuous begin and end dates and discharge status
- Only one record gets admission credit.
 - The data field “admitting TED number” can be used to tie individual records associated with a stay together for acute care stays only.

Admitting TED Number	Pseudo Person ID	Admission Date	Begin Date Of Care	End Date Of Care	Discharge Status	Admissions, Raw	Amount Paid, Raw	Authorized Days, Raw	Bed Days, Raw
2014265IL	8D264D91	09/10/2014	09/10/2014	09/13/2014	30	1	\$3,980.00	4	3
2014265IL	8D264D91	09/10/2014	09/14/2014	09/16/2014	30	0	\$2,985.00	3	2
2014265IL	8D264D91	09/10/2014	09/17/2014	09/20/2014	30	0	\$3,980.00	4	3
2014265IL	8D264D91	09/10/2014	09/21/2014	09/23/2014	30	0	\$2,985.00	3	2
2014265IL	8D264D91	09/10/2014	09/24/2014	09/30/2014	30	0	\$6,965.00	7	6
2014265IL	8D264D91	09/10/2014	10/01/2014	10/04/2014	30	0	\$3,980.00	4	3
2014265IL	8D264D91	09/10/2014	10/05/2014	10/11/2014	30	0	\$6,965.00	7	6
2014265IL	8D264D91	09/10/2014	10/12/2014	10/18/2014	30	0	\$6,965.00	7	6
2014265IL	8D264D91	09/10/2014	10/19/2014	10/21/2014	70	0	\$1,990.00	2	2
					Sum:	1	\$40,795.00	41	

Private Sector Institutional Data

Discharge Status (DISPSTAT)

- Indicates how patient left the institution
- Values for routine discharge, death, transfer, etc
- Value of “still a patient” (30) indicates more bills are to follow to cover remainder of stay
 - 10.0% of records overall
 - 0.15% for acute care*
- Remove “still a patient” when doing average LOS, average cost, case mix

Discharge Status	Admissions, Row
30	1
30	0
30	0
30	0
30	0
30	0
30	0
30	0
70	0
Sum:	1

* Many of these are low birth weight newborns

Private Sector Institutional Data

- Fields Related to the Care
 - Discharge status (dispstat): Code indicating how the patient left the institution.
 - Not coded consistently with direct care!

FY	Discharge Status	Discharge Status Description	Admissions, Raw
2019	01	Discharged	497,986
2019	06	Discharged/transferred to home under care of organized home health service organization	91,369
2019	03	Discharged/transferred to a skilled nursing facility (SNF)	67,456
2019	30	Still patient (remaining)	34,802
2019	62	Discharged/transferred to an IRF including Rehabilitation Distinct Part Units of a hospital	17,534
2019	02	Transferred	13,211
2019	20	Expired or did not recover, Christian Science Patient	11,616
2019	50	Discharged to hospice-home	6,876
2019	51	Discharged to hospice-medical facility	4,987
2019	07	Left against medical advice or discontinued care	3,906
2019	04	Discharged/transferred to an intermediate care facility (ICF)	3,624
2019	63	Discharged/transferred to a long term care hospital	3,064
2019	61	Discharged/transferred to a hospital-based Medicare approved swing bed	2,205
2019	65	Discharged/transferred to a psychiatric hospital or psychiatric distinct part unit of a hospital	2,127
2019	70	Discharged/transferred to another type of health care institution not defined elsewhere in this code list (definition effective for discharge	1,683
2019	05	Discharged/transferred to a designated cancer center or children's hospital (definition effective for discharges on or after 04/01/2008)	1,037
2019	43	Discharged/transferred to a federal health care facility	722

Private Sector Institutional Data

Code	Inst Type	Acute Care Hospital Indicator	Adm	Clams
10	General medical and surgical	1	599,548	599,706
76	Skilled Nursing Facility	0	44,483	133,608
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73	Extended Care Facility	0	3,182	3,702
48	Chronic disease	0	1,151	1,172
82	SUDRF	0	1,070	1,070
90	Cancer	1	376	390
79	Hospital based hospice	0	0	274
52	Children's psychiatric hospital	0	147	155
44	Obstetrics and gynecology	1	33	33
56	Children's rehabilitation	0	25	25
49	Other specialty	1	7	17
74	Christian Science Facility	0	5	17
62	Institution for mental retardati	0	0	12
92	Freestanding Ambulatory Surge	0	8	8
11	Hospital unit of an institution	1	3	3
47	Orthopedic	1	2	2

Review the difference between the number of claims and the number of admissions to get an idea of when interim claims are an issue..

Private Sector Institutional Data

Some records represent home health episodes:

Person ID	Admission Date	Begin Date Of Care	End Date Of Care	Institution Type	Admissions, Raw	Authorized Days, Raw	Bed Days, Raw
000BBF7:	12/03/2014	12/03/2014	01/31/2015	70	0	0	59
000BBF7:	12/03/2014	02/01/2015	03/06/2015	70	0	0	33

- Admissions are not credited.
- Bed Days contains the length of the home health episode
- Admitting TED number is not populated.
- Can be identified using institution type “70”

Private Sector Institutional Data

- Fields Related to the Admission
 - **Admission Date (admdt):**
 - Will stay the same for interim claims
 - **Admission Diagnosis (admdx)**
 - **Admitting TED Number (admtedno):**
 - TED Number of the first claim associated with a stay.
 - **Admission Type: (admttype):**
 - 1=Emergency
 - 2=Urgent
 - 3=Elective
 - 4=Newborn
 - 5=Trauma Center
 - 9=Unknown

FY	Admission Type	Admission Type Description	Admissions, Raw
2019	1	Emergency	350,250
2019	3	Elective	225,260
2019	2	Urgent	119,676
2019	4	Newborn	63,480
2019	5	Trauma Center	7,246

Private Sector Institutional Data

- Fields Related to the Admission
 - **Admission Source (admsrc):**
 - Code indicating how the patient came to the institution.
 - Not coded consistently with direct care.
 - Newborns use a different coding schema

Admission Source	A code indicating the source for the admission.	char(1)	<p>1=Physician referral (valid thru 9/30/2007) 1=Non-Health Care Facility (valid 10/01/2007) 2=Clinic referral 3=HMO referral 4=Transfer from a hospital 5=Transfer from a skilled nursing facility or intermediate care facility 6=Transfer from another health care facility 7=Emergency Room (Admission Type = 1 better for ER admit) 8=Court/Law Enforcement 9=Information Not Available A=Transfer from a Critical Access Hospital B=Transfer from Another Home Health Agency C=Readmission to the Same Home Health Agency D=Transfer from Hospital in same facility resulting in separate claim E=Transfer from ASC F=Transfer from Hospice and is under a Hospice plan or enrolled in hospice</p> <p>For Admission Type 4 = Newborn: 1=Normal Delivery (valid thru 9/30/2007) 2=Premature Delivery 3=Sick Baby 4=Extramural baby 5=Born Inside This Hospital (valid 10/01/2007) 6=Born Outside This Hospital (valid 10/01/2007)</p>
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Private Sector Institutional Data

- Fields Related to the Care
 - MS-DRG & MDC:
 - Only populated on acute care records
 - MS-DRG 000 = Not acute care

FY2019 Top DRGs for Non-TFL patients

FY	MS-DRG	MS-DRG Description	Admissions, Raw
2019	000	ASSIGNED FOR NON-ACUTE CARE IN PURCHASED CARE DATA ONLY	54,024
2019	795	NORMAL NEWBORN	39,670
2019	807	VAGINAL DELIVERY W/O STERILIZATION/D&C W/O CC/MCC	35,362
2019	792	NEONATE, BIRTHWT >2499G, W/O SIGNIF O.R. PROC, W OTHER PROB	15,912
2019	773	CESAREAN SECTION W/O STERILIZATION W/O CC/MCC	10,221
2019	470	MAJOR HIP & KNEE JOINT REPLACEMENT OR REATTACHMENT OF LOW EXTREMITY W/O MCC	7,598
2019	806	VAGINAL DELIVERY W/O STERILIZATION/D&C W CC	5,988
2019	392	ESOPHAGITIS, GASTROENTERITIS & MISCELLANEOUS DIGESTIVE DS AGE >17 W/O MCC	3,835
2019	772	CESAREAN SECTION W/O STERILIZATION W CC	3,574
2019	871	SEPTICEMIA OR SEVERE SEPSIS W/O MV >96 HOURS AGE >17 W MCC	3,141
2019	790	NEONATE, BIRTHWT >2499G, W/O SIGNIF O.R. PROC, W MAJOR PROB	2,906
2019	833	OTHER ANTEPARTUM DIAGNOSES W/O O.R. PROCEDURE W/O CC/MCC	2,901
2019	141	BRONCHITIS & ASTHMA AGE 0-17	2,860
2019	621	O.R. PROCEDURES FOR OBESITY W/O CC/MCC	2,646

FY2019 Top DRGs for TFL patients

FY	MS-DRG	MS-DRG Description	Admissions, Raw
2019	000	ASSIGNED FOR NON-ACUTE CARE IN PURCHASED CARE DATA ONLY	62,750
2019	470	MAJOR HIP & KNEE JOINT REPLACEMENT OR REATTACHMENT OF LOW EXTREMITY W/O MCC	24,012
2019	871	SEPTICEMIA OR SEVERE SEPSIS W/O MV >96 HOURS AGE >17 W MCC	20,150
2019	291	HEART FAILURE & SHOCK W MCC OR PERIPHERAL ECMO	12,631
2019	999	UNGROUPABLE	10,411
2019	872	SEPTICEMIA OR SEVERE SEPSIS W/O MV >96 HOURS AGE >17 W/O MCC	6,167
2019	193	SIMPLE PNEUMONIA & PLEURISY AGE >17 W MCC	6,094
2019	392	ESOPHAGITIS, GASTROENTERITIS & MISCELLANEOUS DIGESTIVE DS AGE >17 W/O MCC	5,898
2019	378	G.I. HEMORRHAGE W CC	5,635
2019	690	KIDNEY & URINARY TRACT INFECTIONS AGE >17 W/O MCC	5,595
2019	190	CHRONIC OBSTRUCTIVE PULMONARY DISEASE W MCC	5,079
2019	065	INTRACRANIAL HEMORRHAGE OR CEREBRAL INFARCT W CC OR TPA IN 24 HOURS	5,005
2019	683	RENAL FAILURE W CC	4,874
2019	189	PULMONARY EDEMA & RESPIRATORY FAILURE	4,773
2019	194	SIMPLE PNEUMONIA & PLEURISY AGE >17 W CC	4,706
2019	483	MAJOR JOINT/LIMB REATTACHMENT PROCEDURE OF UPPER EXTREMITIES	4,688

Select TEDI Fields in Source Data

These fields have not yet been mapped to DoD OMOP but might be of interest in
analyses

Private Sector Institutional Data

- Fields Related to Care:
 - Present on Admission Indicators (dx;poa):
 - When a POA is present, the hospital is not paid for the condition that was incident in a stay.
 - Can be used to identify safety issues
 - Has resulted in significant cost savings to government programs/payors
 - https://www.hcup-us.ahrq.gov/reports/methods/2011_05.pdf

Private Sector Institutional Data

Present on Admission Indicator Hospital Acquired Conditions

- Foreign Object Retained After Surgery
- Air Embolism
- Blood Incompatibility
- Stage III and IV Pressure Ulcers
- Falls and Trauma
- Manifestations of Poor Glycemic Control
- Catheter-Associated Urinary Tract Infection (UTI)
- Vascular Catheter-Associated Infection
- Surgical Site Infection, Mediastinitis, Following Coronary Artery Bypass Graft (CABG):
- Surgical Site Infection Following Bariatric Surgery for Obesity
- Surgical Site Infection Following Certain Orthopedic Procedures
- Surgical Site Infection Following Cardiac Implantable Electronic Device (CIED)
- Deep Vein Thrombosis (DVT)/Pulmonary Embolism (PE) Following Certain Orthopedic Px
- Iatrogenic Pneumothorax with Venous Catheterization

Private Sector Institutional Data

- Fields Related to the Care
 - ICU Flag and OR Flag: Indicate whether an ICU or an OR were used in the stay.
 - Derived from Revenue Codes/File

ICU Flag	Number of Claims
0	466,051
1	100,327

Top ICU DRGs

MS-DRG	MS-DRG Description	Number of Claims
871	SEPTICEMIA OR SEVERE SEPSIS V	6,698
999	UNGROUPABLE	2,191
291	HEART FAILURE & SHOCK W MCC	2,081
000	ASSIGNED FOR NON-ACUTE CARE	2,022
247	PERC CARDIOVASC PROC W DRU	1,946
189	PULMONARY EDEMA & RESPIRATC	1,768
065	INTRACRANIAL HEMORRHAGE OR	1,551

OR Flag	Number of Claims
0	413,329
1	153,049

Top OR DRGs

MS-DRG	MS-DRG Description	Number of Claims
470	MAJOR JOINT REPLACEMENT OR P	24,088
766	CESAREAN SECTION W/O CC/MCC	5,689
460	SPINAL FUSION EXCEPT CERVICAL	5,585
765	CESAREAN SECTION W CC/MCC	3,644
473	CERVICAL SPINAL FUSION W/O CC	3,156

Institutional Claims

Key Fields

Patient Demographic Information	Patient Enrollment Information	Referral Information (if the stay was a result of a referral from the MTF)	Billing Data
MS-DRG	25 Diagnoses and Procedures	Dates of Care	Admission Source / Discharge Status
ICU flag <ul style="list-style-type: none">Indicates if patient stayed in an ICU for at least some of the stay	OR Flag <ul style="list-style-type: none">Indicates if patient used the operating room during the stay	Beneficiary Category	Provider Information



Non-Institutional Claims Data



TED-NI (Non-Institutional Claims) Record Reminder

TED-NI Record ID and Line Item No

Record ID	Amount Billed, Raw	Amount Paid, Raw
2016276GA.X05QJ 2513675	\$460.00	\$201.68

TED-NI Record ID and Line Item No

Record ID	Line Item No	Amount Billed, Raw	Amount Paid, Raw
2016276GA.X05QJ 2513675	001	\$180.00	\$75.05
2016276GA.X05QJ 2513675	002	\$70.00	\$23.26
2016276GA.X05QJ 2513675	003	\$70.00	\$24.98
2016276GA.X05QJ 2513675	004	\$140.00	\$78.39
	Sum:	\$460.00	\$201.68

Source Tables: Adding **Line Item No** (LINUM) shows that there are 4 records for this one Non-Institutional claim (TEDNO)

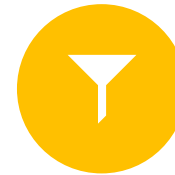
Private Sector Non-Institutional Data



Each record represents one provider and one procedure code



Includes a variety of settings and types of services



Filters will almost always need to be applied to hone the -NI file down to what is of interest.



If there is more than one provider involved in care, there will be separate claims for each provider.



Sometimes those claims will span TED-I and TED-NI



If the providers did more than one procedure, those will generally show up on the same TED number, but as distinct line items

Private Sector Non- Institutional Data

- Example Records for a Routine Office Visit
 - One claim number with 3 line items
 - All done the same day
 - One encounter with three distinct procedures

Pseudo Person	Record ID	Line Item No	Begin Date Of Care	End Date Of Care	Provider Individual NPI	Procedure Code	Procedure Description	Amount Paid, Raw
00006492C728CA 91337 01		001	04/11/2016	04/11/2016	1568692184	97140	MAN THER TECH,1/+ REG,EA 15MIN	\$9.52
00006492C728CA 91337 01		002	04/11/2016	04/11/2016	1568692184	97110	THER PX,1+,EA 15 MN;THER EXERC	\$11.93
00006492C728CA 91337 01		003	04/11/2016	04/11/2016	1568692184	97016	VASOPNEUMATIC DEVICE THERAPY	\$2.73
							Sum:	\$24.18

Private Sector Non-Institutional Data

Example Records for a Same Day Surgery

Record ID/Line Item	Pseudo F	Begin Date Of Care	Procedure Description	Provider Individual NPI	Provider Organizational NPI	Amount Paid, Raw
2016099CA FWLPC	05BCC42	04/08/2016	PRESCRIPTION DRUGS		1801802103	\$0.00
2016104CA X5FDM	05BCC42	04/08/2016	NASAL/SINUS ENDOSCOPY, SURG		1396728630	\$587.50
2016104CA X5FDM	05BCC42	04/08/2016	ENDOSCOPY, MAXILLARY SINUS		1396728630	\$3,620.65
2016113CA X0PN9	05BCC42	04/08/2016	ANESTH, NOSE/SINUS SURGERY	1740210707	1053354233	\$200.43
2016116CA C0912	05BCC42	04/08/2016	ENDOSCOPY, MAXILLARY SINUS	1629001177	1811992761	\$133.05
2016116CA C0912	05BCC42	04/08/2016	REMOVAL OF NOSE POLYP(S)	1629001177	1811992761	\$34.72
2016165CA X32ZS	05BCC42	04/08/2016	LEV III-SRG PATH,GROS&MICR EXM	1164484697	1568431088	\$19.54
					Sum:	\$4,595.89

Private Sector Non- Institutional Data

- Sample Records:
 - Is this one instance of care with two providers, or two separate instances of care on the same day?

Person	Proc	Beg Date	End Date	Place of Care	Provider Specialty
A	99213	10/5/2015	10/5/2015	Office	Internal Medicine
A	99213	10/5/2015	10/5/2015	Office	Family Practice

Private Sector Non-Institutional Data

Pseudo P	Begin Date Of Care	Program Ind Code	NDC	Procedure Code	Procedure Description
01F8AC4	04/08/2016	D	68308084201	98800	PRESCRIPTION DRUGS
0FD4F22	04/08/2016	D	00378251278	98800	PRESCRIPTION DRUGS
2043504	04/08/2016	D	68382024701	98800	PRESCRIPTION DRUGS
1F54987	04/08/2016	D	13107015405	98800	PRESCRIPTION DRUGS
0739543	04/08/2016	D	60505258009	98800	PRESCRIPTION DRUGS
0F6C6D1	04/08/2016	D	31722052001	98800	PRESCRIPTION DRUGS
0A51A34	04/08/2016	D	08290324909	98800	PRESCRIPTION DRUGS
0742CA5	04/08/2016	D	00781207601	98800	PRESCRIPTION DRUGS
01BF94C	04/08/2016	D	65862056090	98800	PRESCRIPTION DRUGS
1240FDA	04/08/2016	D	00023320503	98800	PRESCRIPTION DRUGS
1777595	04/08/2016	D	13107003105	98800	PRESCRIPTION DRUGS

- Example Pharmacy Records
 - Remove procedure code 98800 to identify Rx records
 - Rx data in TEDs are also in Pharmacy Data Transaction Service (PDTs) (except overseas purchased care)
 - Recommendation: Remove Pharmacy Records from TED-NI and use PDTs
 - For DoD OMOP: Pharmacy information is taken from PDTs (not TEDNI)
 - (So records are not double counted)

Private Sector Non-Institutional Data

- Provider information
 - **Provider Specialty, HIPAA (hipaaspc)**
 - HIPAA Taxonomy code of the billing provider.
 - Note: There's also Purchased Care Provider Specialty but recommend using HIPAA as it also appears in Direct Care.

Top HIPAA Taxonomy Codes in TED-NI

Provider Specialty, HIPAA	Description	Number of Line Items, Raw
333600000X	Pharmacy,NOS	56,209,881
183500000X	Pharmacist,NOS	25,619,119
282N00000X	General Acute Care Hospital,NOS	21,997,861
193200000X	Group,Multi-Specialty	21,431,345
207Q00000X	PHY,Family Medicine,NOS	11,427,846
291U00000X	Clinical Medical Laboratory,NOS	9,821,936
207R00000X	PHY,Internal Medicine,NOS	9,155,035
332B00000X	Durable Medical Equipment and Medical	8,983,517
225100000X	Physical Therapist,NOS	8,461,611
2085R0202X	PHY,Rad,Diagnostic Radiology	6,797,166

Private Sector Non-Institutional Data

- Provider information
 - Place of Care (place):
 - Identifies the setting of care.
 - This variable is generally very reliable because it determines how a claim is paid
 - Best used to identify 'outpatient care'
 - Be careful with using place of service to identify UCC's as they can also use 'Office'

Top Places of Care in TED-NI

Place	Place of Service Description	Count
11	Office	85,724,855
19	Pharmacy <1/16; Outpatient Hospital Off Campus 1/16+	81,806,786
22	Outpatient Hospital	35,782,281
23	Emergency Room-Hospital	12,588,038
12	Home	11,378,088
21	Inpatient Hospital	10,685,979
81	Independent Laboratory	10,159,743
24	Ambulatory Surgical Center	1,917,883
41	Ambulance - Land	1,571,060
20	Urgent Care Facility	1,222,012

Private Sector Non-Institutional Data

- Information about the Care Delivered
 - Procedure Code (cpt/hcpcs) and modifiers (cptmod1-cptmod3)
 - Procedure Code Modifiers contain additional data about the procedure.
- Important modifiers include:
 - Professional Component
 - Technical Component
 - Bilateral
 - Pre-op Only
 - Procedure Only
 - Post-op Only

Private Sector Non-Institutional Data

- Information about the Care Delivered
 - Surgical procedure codes are reported as “bundles”
 - “Global” procedure codes include routine services done by the provider associated with the procedure
 - Pre- and post- operative visits are not recorded in the private sector, generally
 - This is different than direct care, where they are recorded!

Global Period	Pre-Operative	Procedure	Post-Operative
000	N/A	Included	N/A
010	Not included	Included	Includes 10 days of follow
090	Included on Day Before	Included	Includes 90 days of follow
M	Prenatal Care Included	Included	Include post-partum

Private Sector Non-Institutional Data

- Information about the Care Delivered
 - Example Global Maternity bills
 - These procedure codes include the entire maternity package
 - Cannot discern discrete events; only that the full package of services was provided

Record ID/Line Item No	Begin Date Of Care	End Date Of Care	Procedure Code	Procedure Description	Number of Service	Number of Line Item
2014274MS X6N4Z 4432745001	10/01/2014	10/01/2014	59400	OBSTETRICAL CARE	1	1
2014275GA X2JDL 3906725001	10/01/2014	10/01/2014	59410	OBSTETRICAL CARE	1	1
2014275MD X388X 4233175001	10/01/2014	10/01/2014	59400	OBSTETRICAL CARE	1	1
2014275OH X36BZ 4949005001	10/01/2014	10/01/2014	59400	OBSTETRICAL CARE	1	1
2014275VA X30PL 3809455001	10/01/2014	10/01/2014	59400	OBSTETRICAL CARE	1	1
2014276AK X2M4Q 5021395001	10/02/2014	10/02/2014	59410	OBSTETRICAL CARE	1	1
2014276AZ X05P1 5003985001	10/01/2014	10/01/2014	59400	OBSTETRICAL CARE	1	1
2014276CA X1KHQ 4220785001	10/01/2014	10/01/2014	59409	OBSTETRICAL CARE	1	1
2014276CA X38VY 4722035001	10/02/2014	10/02/2014	59400	OBSTETRICAL CARE	1	1
2014276CA X3H9C 4722035001	10/01/2014	10/01/2014	59400	OBSTETRICAL CARE	1	1

Private Sector Non-Institutional Data

- Information about the Care Delivered
 - APC Codes (apc) are available when the care is paid via an APC
 - APCs are similar to DRGs but are for hospital outpatient care.

Top APCs in TED-NI

APC	APC Desc	Number of Line Items, Raw
00634	Hospital Clinic Visits	712,198
00614	Level 3 Type A Emergency Visits	573,823
00615	Level 4 Type A Emergency Visits	394,769
00436	Level I Drug Administration	369,168
00438	Level III Drug Administration	318,456
00437	Level II Drug Administration	310,665
00266	Level II Diagnostic and Screening Ultraso	288,428

Private Sector Non-Institutional Data

- Information about the Care Delivered
 - **Type of Service2 (typsvc2)**
 - Indicates the type of care/service provided

Type of Service 2 (Service Nature) in TED-NI

Code	Service Nature Desc	Count
1	Medical Care	77,454,045
B	Retail RX	56,231,274
M	Mail Order Rx	25,619,119
5	Diagnostic Laboratory	23,796,858
K	PT/OT	17,869,265
4	Diagnostic/Therapeutic Xray	16,654,104
2	Surgery	14,616,334
9	Other Medical Service	7,678,704
A	DME	3,901,390
H	Mental Healthcare	3,501,022
7	Anesthesia	1,754,404
I	Ambulance	1,599,419
L	Speech Therapy	1,264,310
C	Ambulatory Surgery	1,006,824
6	Radiation Therapy	1,006,254
3	Consultation	643,898
F	Maternity	365,240
8	Assistance at Surgery	195,786
J	Program for Persons with D	133,125
G	Dental	15,645
D	Hospice	721

Private Sector Non-Institutional Data

Other Fields

Visits:

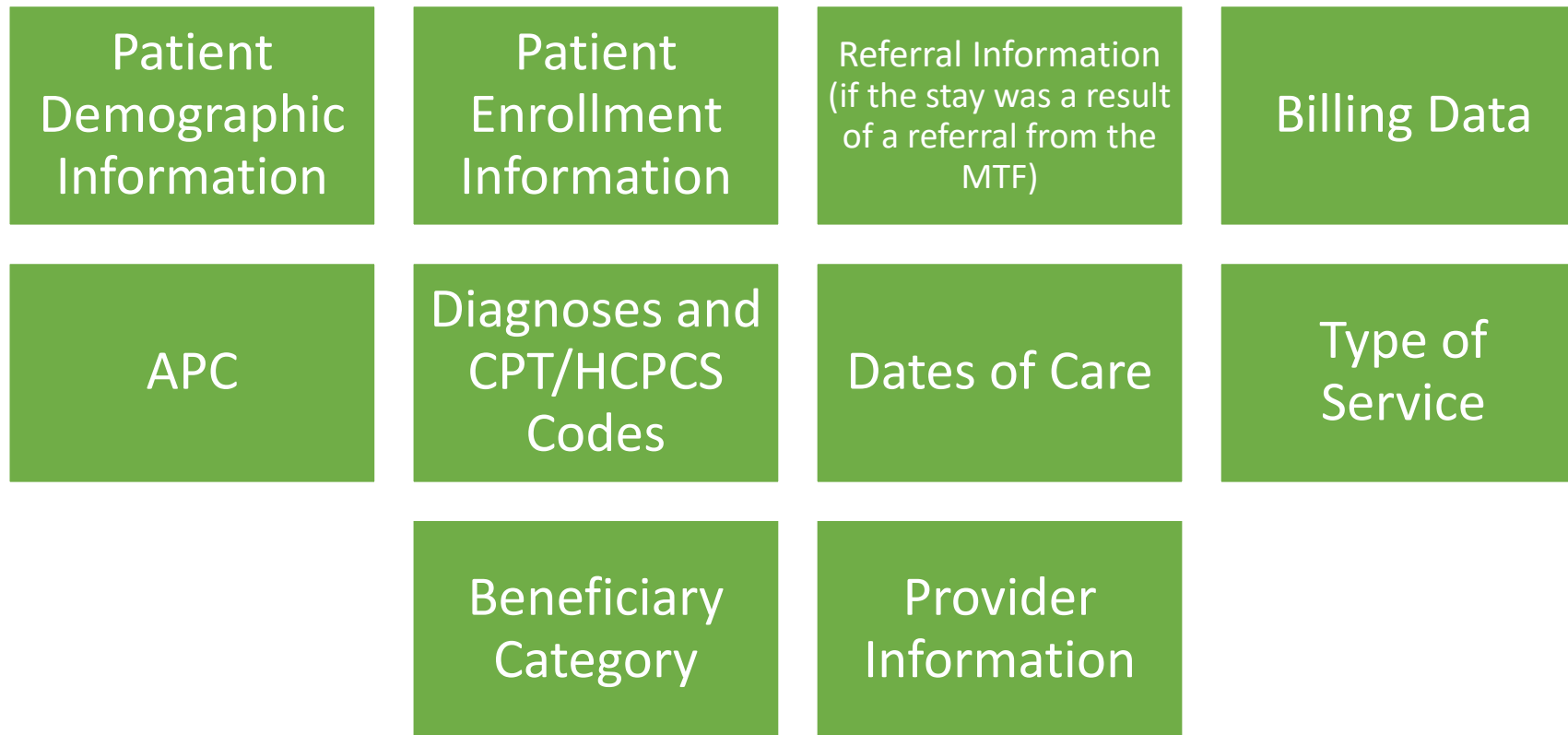
- There are no reliable fields to measure outpatient workload in the TED-NI data. Will discuss more later.

Admitting TED Number (admtedno):

- Enables linking the non-institutional and institutional components of inpatient care together.

Non-Institutional Claims

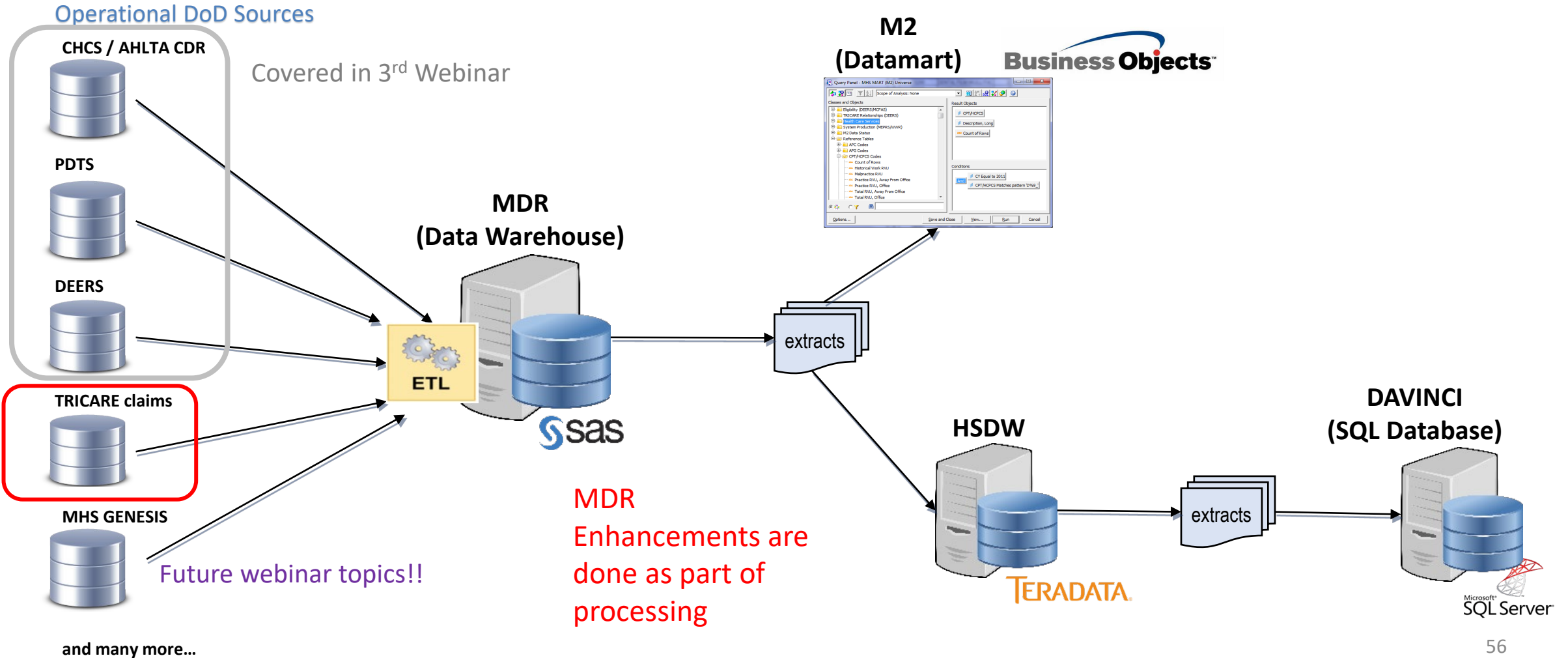
Key Fields



Private Sector Care and OMOP

DoD Private Sector Data Flow: ODS to DaVINCI

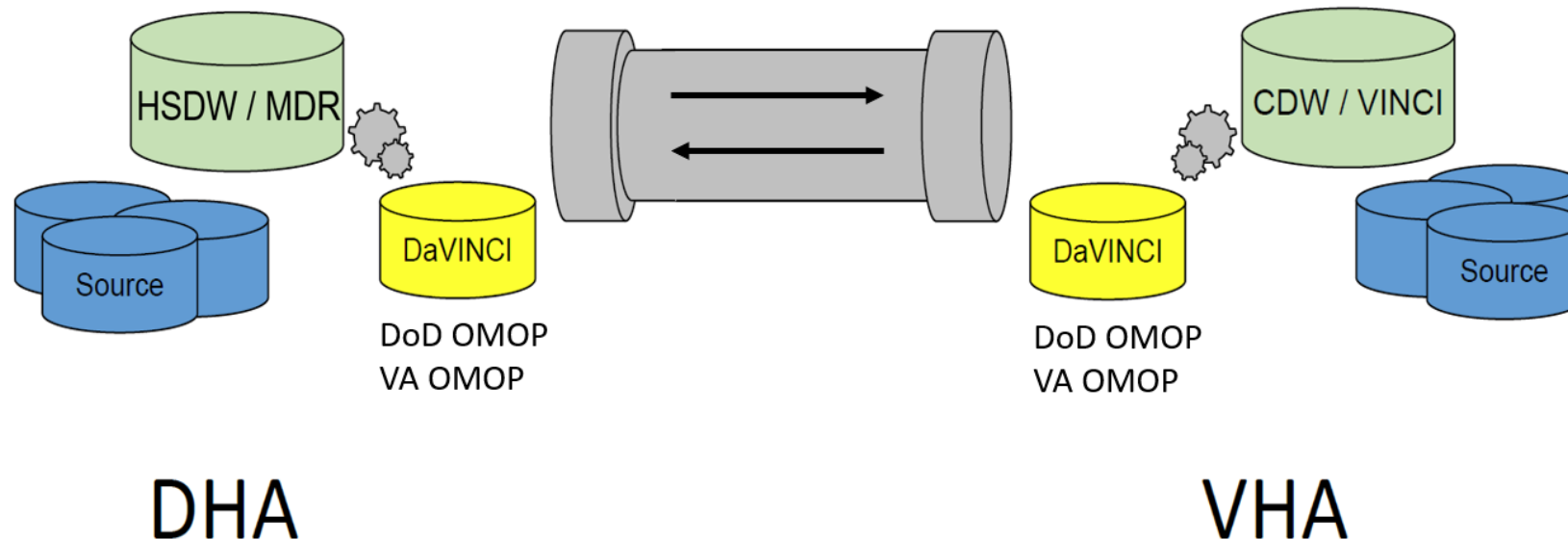
Data Flow Summary



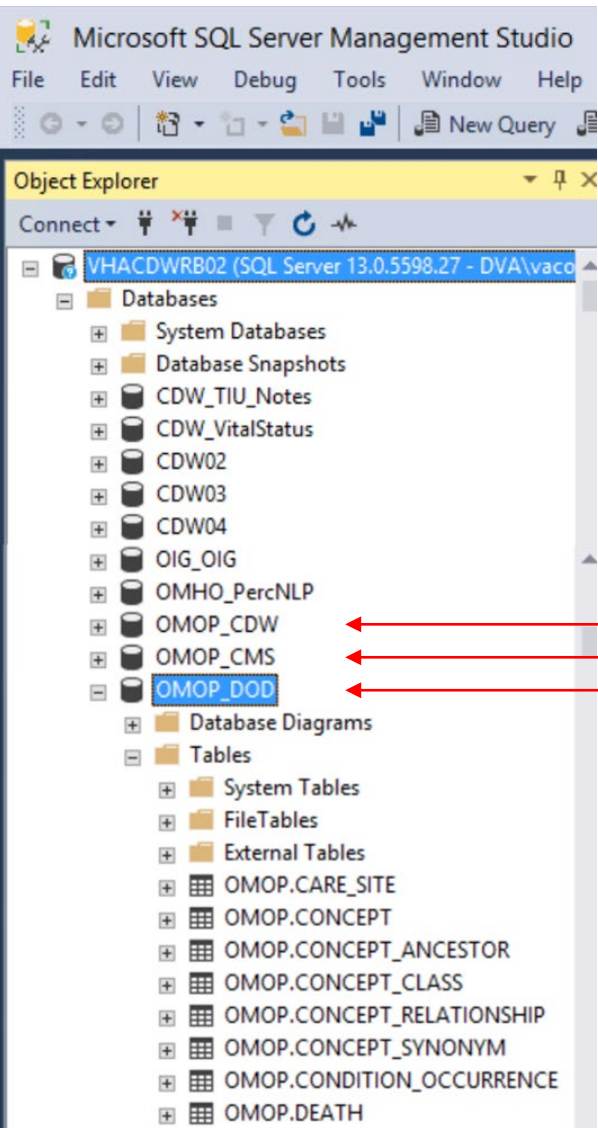
DaVINCI

- Currently, 2 separate DaVINCI databases exist: one lives in a DoD analytic environment (HSDW – Teradata), and the other in the VA analytic environment (VINCI – SQL Server)
- Both contain the same OMOP CDM data tables

DaVINCI Infrastructure (current):

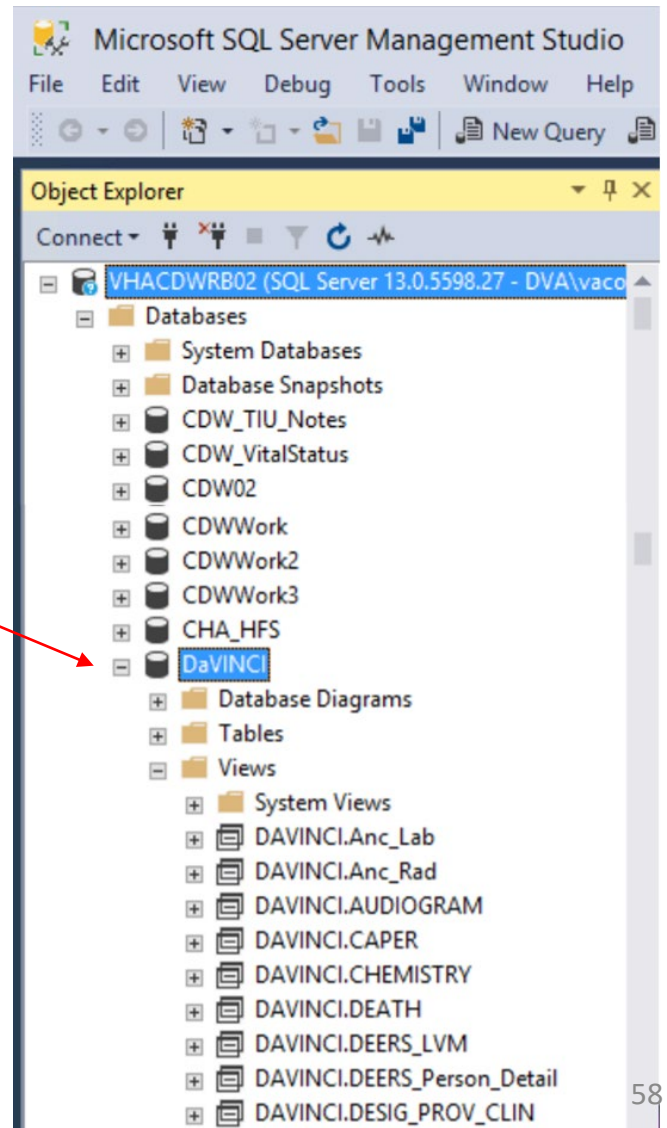


Current status: Data on VINCI RB02



DoD OMOP,
alongside
CDW and
CMS OMOPs

DaVINCI 'Source'
database

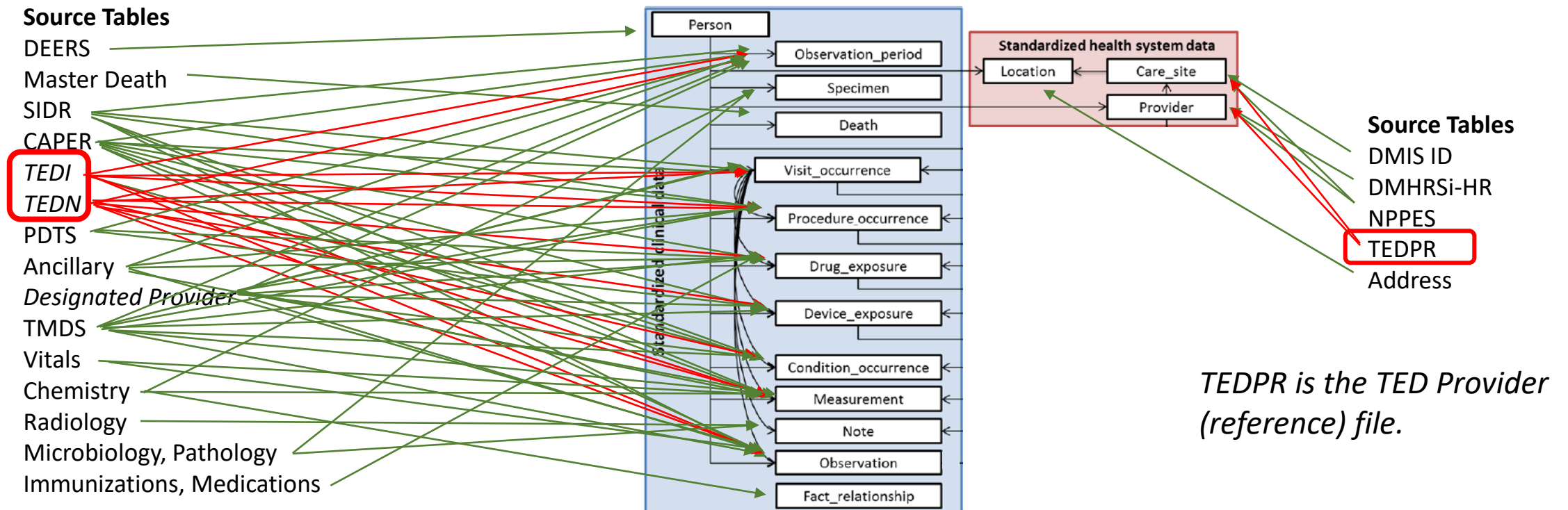


Private Sector Care and DoD OMOP

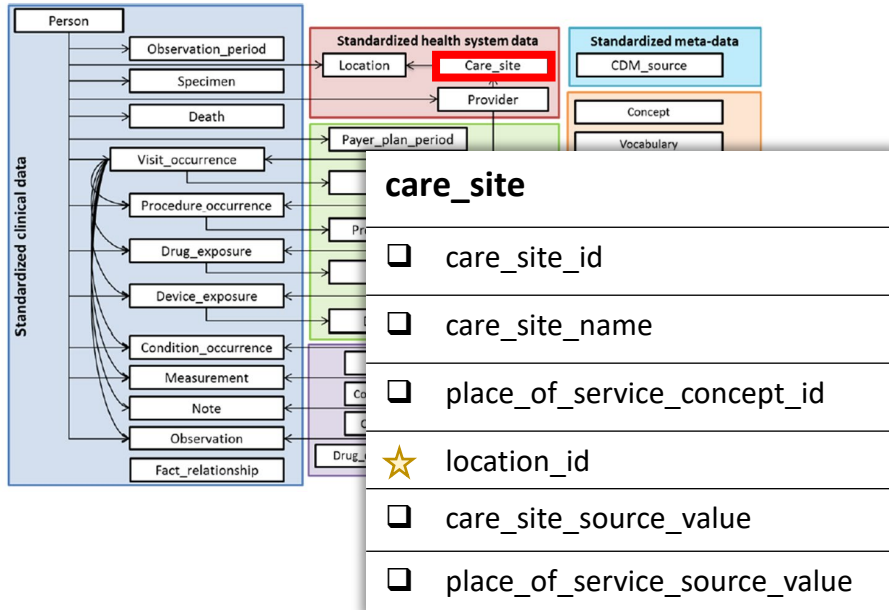


Mapping DoD Source Data to DoD OMOP Clinical Tables

- Advantage of OMOP is that data is mapped from many source tables (e.g., multiple EHR and claims files) to a limited set of standardized tables that allow for easier use.
 - Can write one query to pull all Emergency Department Procedures instead of looking at CAPER and TED-NI
- Very little data cleaning is done during the transformation into the OMOP CDM

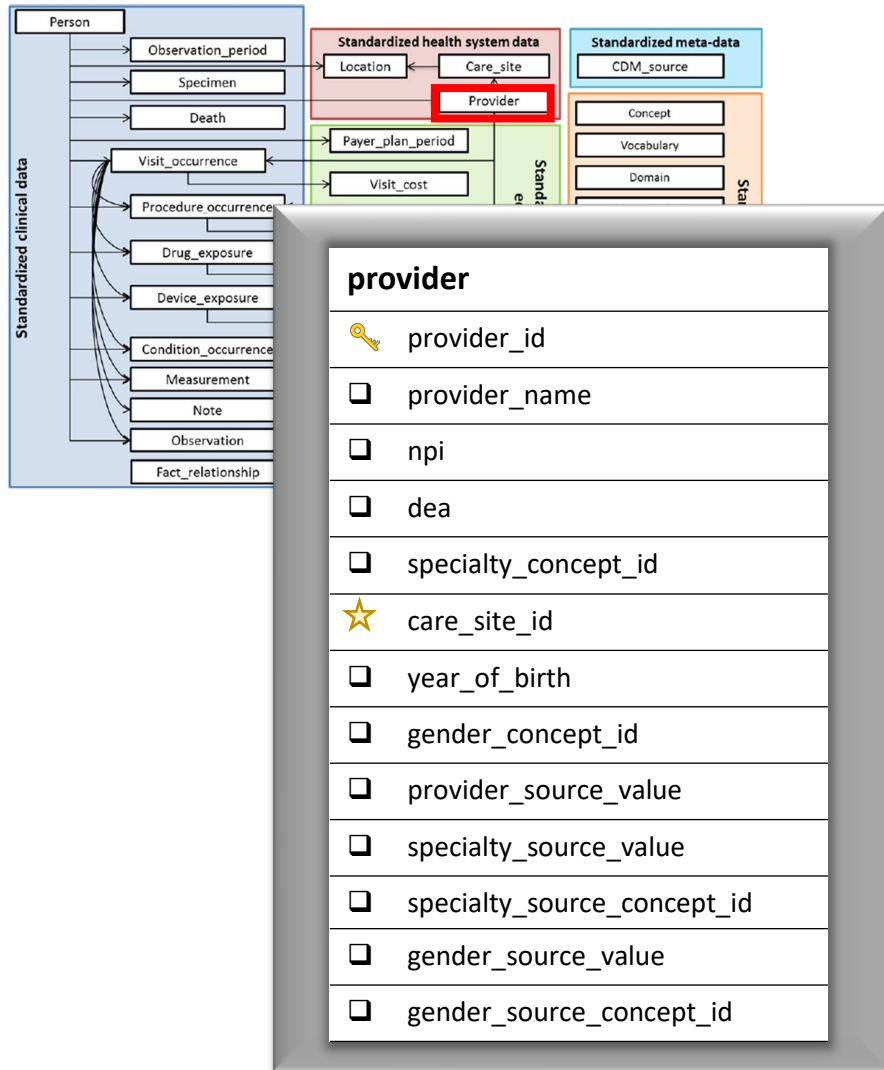


Capturing Location of DoD Direct Care at MTFs



- Care sites are unique locations where healthcare is delivered (e.g. hospitals, clinics, offices, etc.)
- Purchased care data, this would be fields such as: provider zip code, place of service, organizational NPI.
- For DoD direct care data, this would include Military Treatment Facilities (MTFs) and parts of MTFs
- For VA direct care data, this would include Veterans Affairs Medical Centers (VAMCs) and parts of VAMCs

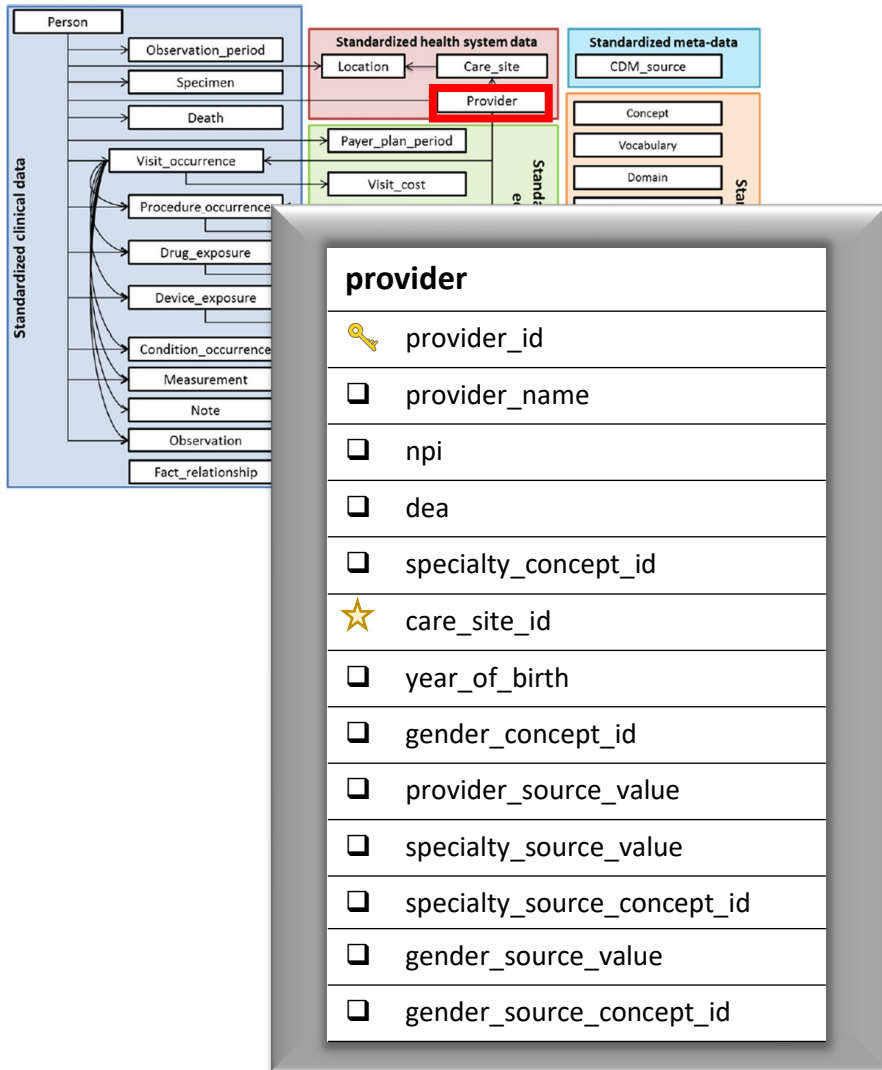
Who performed the care? Provider table



- Providers are unique individuals providing healthcare including physicians, nurses, physical therapists, etc.
- Providers can link to healthcare records (visits, procedures, etc.) as well as the Person table (e.g. Primary Care Managers) and the Care_site table (where does the provider work?)
- For Purchased Care, this includes mapping of fields like Provider NPI or Provider Group NPI (e.g., provider_id) as well as Provider Specialties (e.g., specialty_concept_id).

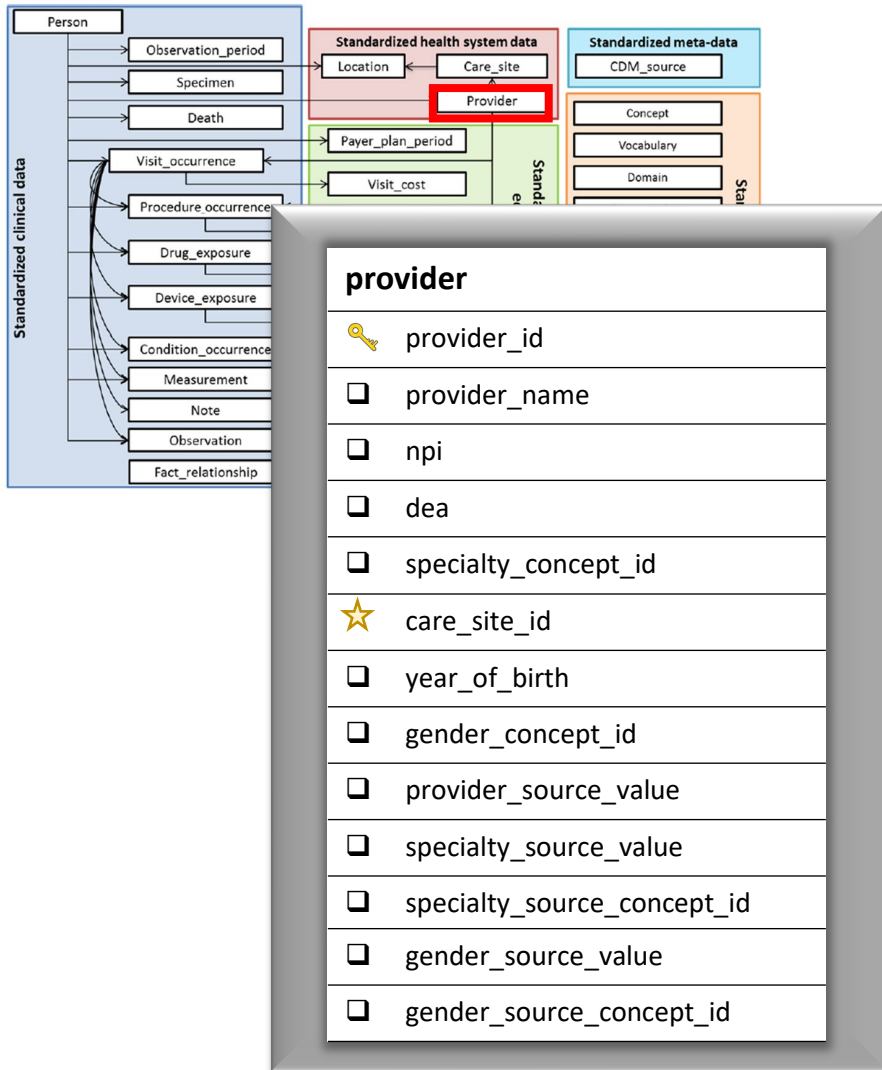
Who performed the care?

Provider table



- Uniquely identifying a provider can also be difficult, especially in the DoD data because there are so many different kinds of Provider IDs and often no way to link records for a given provider especially before the National Provider ID was implemented.
- In Purchased Care, often have to rely on combining Provider Tax ID with Multiple Provider Code and Provider Zip Code.

Who performed the care? Provider table






- DoD Data also has 3 different Provider Specialty Code Sets that had to be mapped.
 - Direct Care Specialty (at MTFs)
 - Purchased Care Specialty (in TRICARE Claims)
 - [HIPAA Taxonomy \(MTFs & TRICARE Claims\)*](#)

DoD OMOP Visit_occurrence Table

visit_occurrence	
🔑	visit_occurrence_id
★	person_id
☐	visit_concept_id
☐	visit_start_date
☐	visit_start_datetime
☐	visit_end_date
☐	visit_end_datetime
☐	visit_type_concept_id
★	provider_id
★	care_site_id
☐	visit_source_value
☐	visit_source_concept_id
☐	admitting_source_concept_id
☐	admitting_source_value
☐	discharge_to_concept_id
☐	discharge_to_source_value
☐	preceding_visit_occurrence_id

- The DoD OMOP Visit_occurrence table has encounters from inpatient and outpatient data, direct care and purchased care
- MDR/HSDW Source tables:
 - SIDR (direct care inpatient)
 - CAPER/SADR (direct care outpatient)
 - TEDI (purchased care inpatient)
 - TEDNI (purchased care outpatient)
 - Note: Every TEDNO is a record to avoid double counting; individual procedures linked to the TEDNO are included in other OMOP tables
- Designated Provider (Clinical)
- TMDS Encounters (theater encounters)

DoD OMOP Visit_occurrence Table

visit_occurrence	
	visit_occurrence_id
	person_id
<input type="checkbox"/>	visit_concept_id
<input type="checkbox"/>	visit_start_date
<input type="checkbox"/>	visit_start_datetime
<input type="checkbox"/>	visit_end_date
<input type="checkbox"/>	visit_end_datetime
<input type="checkbox"/>	visit_type_concept_id
	provider_id
	care_site_id
<input type="checkbox"/>	visit_source_value
<input type="checkbox"/>	visit_source_concept_id
<input type="checkbox"/>	admitting_source_concept_id
<input type="checkbox"/>	admitting_source_value
<input type="checkbox"/>	discharge_to_concept_id
<input type="checkbox"/>	discharge_to_source_value
<input type="checkbox"/>	preceding_visit_occurrence_id

- The DoD OMOP Visit_occurrence table has encounters from inpatient and outpatient data, direct care and purchased care
- MDR/HSDW Source tables (x_source_table):
 - SIDR (direct care inpatient) & CAPER/SADR (direct care outpatient)
 - TEDI (purchased care institutional) (x_source_table=I)
 - Institutional Type, Acute Care Hospital Indicator
 - TEDNI (purchased care non-institutional) (x_source_table=N)
 - Place of Service, Program Indicator Code, Service Nature
 - Designated Provider (Clinical)
 - TMDS Encounters (theater encounters)





Purchased Care Network Institutional Claims (TEDI) TOC				
Source Data: TRICARE Encounter Data (TED) Institutional (TEDI)				
Record Description: Each record represents a claim from an institution for inpatient care or an institutional home health provider				
Data Element	Source element - HSDW	Source element - MDR	Destination OMOP Table	Destination OMOP Fields
Institution Type	institution_type	insttype	Visit_occurrence	visit_concept_id, visit_source_value, visit_source_concept_id
Discharge Status	discharge_status	dispstat	Visit_occurrence	discharge_to_concept_id, discharge_to_source_value
Admission Type	admission_type	admttype	Visit_occurrence	admitting_source_concept_id, admitting_source_value

DoD OMOP Condition_occurrence Table

- Rows for the Condition_occurrence table can come from many sources and many fields:

Source	Source Fields	Source Vocabularies
SIDR	Diagnosis 1-20; Diagnosis, Admitting	ICD9CM, ICD10CM
CAPER	Diagnosis 1-10; Diagnosis, Chief Complaint	ICD9CM, ICD10CM
TEDI	Diagnosis 1-12; Admission Diagnosis	ICD9CM, ICD10CM
TEDN	Diagnosis 1-5	ICD9CM, ICD10CM
Designated Provider	PDX, DX2-12, SVCDX1-6	ICD9CM, ICD10CM
TMDS Encounters	DX1-20, DXMOD1-5	ICD9CM, ICD10CM

- All concepts map to SNOMED as the standard concept vocabulary
- Very useful tool for building cohorts based on condition or disease status

 condition_occurrence_id
 person_id
<input type="checkbox"/> condition_concept_id
<input type="checkbox"/> condition_start_date
<input type="checkbox"/> condition_start_datetime
<input type="checkbox"/> condition_end_date
<input type="checkbox"/> condition_end_datetime
<input type="checkbox"/> condition_type_concept_id
<input type="checkbox"/> stop_reason
 provider_id
 visit_occurrence_id
<input type="checkbox"/> condition_source_value
<input type="checkbox"/> condition_source_concept_id
<input type="checkbox"/> condition_status_source_value
<input type="checkbox"/> condition_status_concept_id

Top Conditions in DoD OMOP in TRICARE Claims

```
SELECT cond.condition_concept_id, concept.concept_name, concept.vocabulary_id, count(*) as freq
FROM [DoD_OMOP].[OMOP].[CONDITION_OCCURRENCE] cond
LEFT JOIN [DoD_OMOP].[OMOP].[CONCEPT] concept
ON cond.condition_concept_id=concept.CONCEPT_ID
where cond.x_Source_Table in ('I','N')
GROUP BY cond.condition_concept_id, concept.concept_name, concept.vocabulary_id
ORDER BY 4 desc
```





Source field that limits data to TEDI and TEDNI.

	condition_concept_id	concept_name	vocabulary_id	freq
1	320128	Essential hypertension	SNOMED	45260053
2	432867	Hyperlipidemia	SNOMED	24314864
3	4008576	Diabetes mellitus without complication	SNOMED	22383150
4	442588	Obstructive sleep apnea syndrome	SNOMED	21255973
5	255573	Chronic obstructive lung disease	SNOMED	17513578
6	194133	Low back pain	SNOMED	17355779
7	312648	Benign essential hypertension	SNOMED	16465055
8	313217	Atrial fibrillation	SNOMED	14479860
9	77670	Chest pain	SNOMED	13657425
10	78232	Shoulder joint pain	SNOMED	10562406
11	312437	Dyspnea	SNOMED	9661530
12	317576	Coronary arteriosclerosis	SNOMED	9628779
13	437827	Pure hypercholesterolemia	SNOMED	9516280
14	200962	Primary malignant neoplasm of prost...	SNOMED	8847584
15	319835	Congestive heart failure	SNOMED	8766271
16	138825	Actinic keratosis	SNOMED	7750725
17	138525	Pain in limb	SNOMED	7505260
18	0	No matching concept	None	7285652
19	77074	Joint pain	SNOMED	7259038
20	257007	Allergic rhinitis	SNOMED	7198028

- TRICARE claims account for 63% of Condition table records
- Only 0.5% of these records have unmapped codes
- Essential hypertension maps from ICD9 401.9 and ICD10 I10
- Low back pain maps from ICD9 724.2 and ICD10 M54.5

DoD OMOP Procedure_occurrence Table

- Rows for the Procedure_occurrence table can come from many sources and many fields:

 procedure_occurrence_id
 person_id
<input type="checkbox"/> procedure_concept_id
<input type="checkbox"/> procedure_date
<input type="checkbox"/> procedure_datetime
<input type="checkbox"/> procedure_type_concept_id
<input type="checkbox"/> modifier_concept_id
<input type="checkbox"/> quantity
 provider_id
 visit_occurrence_id
<input type="checkbox"/> procedure_source_value
<input type="checkbox"/> procedure_source_concept_id
<input type="checkbox"/> qualifier_source_value

Source	Procedure Fields	Procedure Vocabularies	Diagnosis Fields	Diagnosis Vocabularies
SIDR	Procedure 1-20	ICD9Proc, ICD10PCS	Diagnosis 1-20; Diagnosis, Admitting	ICD9CM, ICD10CM
CAPER	E&M Code 1-3, Procedure 1-10	CPT4, HCPCS	Diagnosis 1-10; Diagnosis, Chief Complaint	ICD9CM, ICD10CM
TEDI	Procedure 1-6	ICD9Proc, ICD10PCS	Diagnosis 1-12; Admission Diagnosis	ICD9CM, ICD10CM
TEDN	Procedure Code	CPT4, HCPCS	Diagnosis 1-5	ICD9CM, ICD10CM
Ancillary	Procedure Code	CPT4, HCPCS		
Designated Provider	SVCPROC1-6, HOSPPRC1, HOSPPRC2-6	CPT4, HCPCS, ICD9Proc, ICD10PCS	PDX, DX2-12, SVCDX1-6	ICD9CM, ICD10CM
TMDS Encounters	CPT1, EM_CODE	CPT4, HCPCS	DX1-20, DXMOD1-5	ICD9CM, ICD10CM

- Notice that diagnosis codes can map to the procedure domain as well





Top Procedures in DoD OMOP: TRICARE Claims

```
SELECT pc.procedure_concept_id, concept.concept_name, concept.vocabulary_id, count(*) as freq
FROM [DoD_OMOP].[OMOP].[PROCEDURE_OCCURRENCE] pc
LEFT JOIN [DoD_OMOP].[OMOP].[CONCEPT] concept
ON pc.procedure_concept_id=concept.CONCEPT_ID
where pc.x_Source_Table in ('I','N')
GROUP BY pc.procedure_concept_id, concept.concept_name, concept.vocabulary_id
ORDER BY 4 desc
```

	procedure_concept_id	concept_name	vocabulary_id	freq
1	2414397	Office or other outpatient visit for the evaluation a...	CPT4	82064508
2	2414398	Office or other outpatient visit for the evaluation a...	CPT4	64841965
3	2314284	Therapeutic procedure, 1 or more areas, each 15 ...	CPT4	42694596
4	2314290	Manual therapy techniques (eg, mobilization/ mani...	CPT4	23231468
5	2514408	Subsequent hospital care, per day, for the evaluati...	CPT4	20892387
6	2108115	Collection of venous blood by venipuncture	CPT4	20018500
7	2414396	Office or other outpatient visit for the evaluation a...	CPT4	15408273
8	2213283	Level IV - Surgical pathology, gross and microscop...	CPT4	12735943
9	2314294	Therapeutic activities, direct (one-on-one) patient ...	CPT4	11791099
10	2211361	Radiologic examination, chest, 2 views, frontal an...	CPT4	11382866
11	2314285	Therapeutic procedure, 1 or more areas, each 15 ...	CPT4	10466433
12	2514409	Subsequent hospital care, per day, for the evaluati...	CPT4	10312666
13	2414392	Office or other outpatient visit for the evaluation a...	CPT4	10127073
14	0	No matching concept	None	9895441
15	2211359	Radiologic examination, chest; single view, frontal	CPT4	9714252
16	2514435	Emergency department visit for the evaluation and...	CPT4	9029166
17	2213601	Unlisted dialysis procedure, inpatient or outpatient	CPT4	8995577
18	2514436	Emergency department visit for the evaluation and...	CPT4	8510706
19	2514437	Emergency department visit for the evaluation and...	CPT4	8420350

- TRICARE claims account for 47% of Procedure table records

DoD OMOP Drug_exposure Table

drug_exposure	
	drug_exposure_id
	person_id
<input type="checkbox"/>	drug_concept_id
<input type="checkbox"/>	drug_exposure_start_date
<input type="checkbox"/>	drug_exposure_start_datetime
<input type="checkbox"/>	device_exposure_end_date
<input type="checkbox"/>	drug_exposure_end_datetime
<input type="checkbox"/>	verbatim_end_date
<input type="checkbox"/>	drug_type_concept_id
<input type="checkbox"/>	stop_reason
<input type="checkbox"/>	refills
<input type="checkbox"/>	quantity
<input type="checkbox"/>	days_supply
<input type="checkbox"/>	sig
<input type="checkbox"/>	route_concept_id
<input type="checkbox"/>	lot_number
	provider_id
	visit_occurrence_id
<input type="checkbox"/>	drug_source_value
<input type="checkbox"/>	drug_source_concept_id
<input type="checkbox"/>	route_source_value
<input type="checkbox"/>	dose_unit_source_value

- Rows for the Drug_exposure table can come from many sources and many fields including drug-specific sources and other sources by CPT/HCPCS:

Source	Source Fields	Source Vocabularies
PDTS	NDC	NDC
CDR Medications	NDC	NDC
Designated Provider (Pharmacy)	NDC	NDC
CDR Immunizations	IMMUNIZATION_ID	CVX
GENESIS Immunizations	CVX	CVX
CAPER	E&M Code 1-3, Procedure 1-10	CPT4, HCPCS
TEDNI	Procedure Code	CPT4, HCPCS
Designated Provider (Clinical)	SVCPROC1-6, HOSPPRC1, HOSPPRC2-6	CPT4, HCPCS
Ancillary	Procedure Code	CPT4, HCPCS
TMDS Encounters	CPT1, EM_CODE	CPT4, HCPCS

- Concepts map to either RxNorm or CVX as standard concept vocabularies
- Use in combination with the Drug_strength vocabulary table to analyze data by dosage

Top Drugs in DoD OMOP: TRICARE Claims





```
SELECT drug.[DRUG_CONCEPT_ID], concept.concept_name, concept.vocabulary_id, count(*) as freq
FROM [DoD_OMOP].[OMOP].[DRUG_EXPOSURE] drug
LEFT JOIN [DoD_OMOP].[OMOP].[CONCEPT] concept
ON drug.drug_concept_id = concept.concept_id
GROUP BY drug.drug_concept_id, concept.concept_name, concept.vocabulary_id
ORDER BY 4 desc
```

	drug_concept_id	concept_name	vocabulary_id	freq
1	1518606	dexamethasone 1 MG	RxNorm	2567478
2	2616396	Unclassified drugs or biologicals	HCPCS	2381999
3	35605564	epoetin alfa Injection	RxNorm	2231297
4	40950844	Triamcinolone 10 MG	RxNorm Extension	2227997
5	40213153	Influenza, seasonal, injectable	CVX	1549602
6	36885577	Sodium Chloride Injectable Suspension	RxNorm Extension	1410213
7	36888679	Methylprednisolone 40 MG Injectable Suspension	RxNorm Extension	1402270
8	40836918	Vitamin B 12 1 MG Injectable Solution	RxNorm Extension	1272262
9	1517767	paricalcitol 0.001 MG	RxNorm	1155808
10	35606532	methylprednisolone Injection	RxNorm	1109476
11	44071823	Ceftriaxone 250 MG Injectable Solution	RxNorm Extension	1072048
12	35604753	testosterone Injection	RxNorm	1023591
13	2718651	Unclassified drugs	HCPCS	892776
14	40018865	betamethasone Injectable Solution	RxNorm	877903
15	40048828	ketorolac Injectable Solution	RxNorm	863840
16	35605480	ondansetron Injection	RxNorm	786827
17	1718370	heparin Injectable Solution	RxNorm	771688
18	44186991	Albuterol / Ipratropium Injectable Solution	RxNorm Extension	718444
19	40213202	pneumococcal vaccine, unspecified fomulation	CVX	627255
20	40227542	diphenhydramine hydrochloride 50 MG	RxNorm	609740

Note: Drugs mainly come from the PDTS Table

- 29% of records originate from Retail Pharmacy records in PDTS
- 4% of records come from TEDN (i.e. immunizations)
- There are no unmapped codes in these records but unclassified drug concepts with HCPCS codes

DoD OMOP Measurement Table

measurement	
	measurement_id
	person_id
<input type="checkbox"/>	measurement_concept_id
<input type="checkbox"/>	measurement_date
<input type="checkbox"/>	measurement_datetime
<input type="checkbox"/>	measurement_type_concept_id
<input type="checkbox"/>	operator_concept_id
<input type="checkbox"/>	value_as_number
<input type="checkbox"/>	value_as_concept_id
<input type="checkbox"/>	unit_concept_id
<input type="checkbox"/>	range_low
<input type="checkbox"/>	range_high
	provider_id
	visit_occurrence_id
<input type="checkbox"/>	measurement_source_value
<input type="checkbox"/>	measurment_source_concept
<input type="checkbox"/>	unit_source_value
<input type="checkbox"/>	value_source_value

Top Measurements in DoD OMOP: TRICARE Claims

```

SELECT meas.measurement_concept_id, concept.concept_name, concept.vocabulary_id, count(*) as freq
FROM [DoD_OMOP].[OMOP].[MEASUREMENT] meas
LEFT JOIN [DoD_OMOP].[OMOP].[CONCEPT] concept
ON meas.measurement_concept_id=concept.CONCEPT_ID
WHERE meas.x_source_table in ('I','N')
GROUP BY meas.measurement_concept_id, concept.concept_name, concept.vocabulary_id
ORDER BY 4 desc
    
```

	measurement_concept_id	concept_name	vocabulary_id	freq
1	2212648	Blood count; complete (CBC), automated (Hgb, Hct, RBC, WBC and platelet count) an...	CPT4	16109347
2	2212093	Comprehensive metabolic panel This panel must include the following: Albumin (82040) ...	CPT4	11967356
3	2313816	Electrocardiogram, routine ECG with at least 12 leads; interpretation and report only	CPT4	10202940
4	2212095	Lipid panel This panel must include the following: Cholesterol, serum, total (82465) Lipo...	CPT4	9915760
5	2313814	Electrocardiogram, routine ECG with at least 12 leads; with interpretation and report	CPT4	8152714
6	2212731	Prothrombin time	CPT4	7444812
7	2212090	Basic metabolic panel (Calcium, total) This panel must include the following: Calcium, to...	CPT4	5247138
8	2212392	Hemoglobin; glycosylated (A1C)	CPT4	5139431
9	2212168	Urinalysis, by dip stick or tablet reagent for bilirubin, glucose, hemoglobin, ketones, leuk...	CPT4	4570735
10	2313815	Electrocardiogram, routine ECG with at least 12 leads; tracing only, without interpretatio...	CPT4	4405586
11	2212593	Thyroid stimulating hormone (TSH)	CPT4	4227123
12	2212166	Urinalysis, by dip stick or tablet reagent for bilirubin, glucose, hemoglobin, ketones, leuk...	CPT4	4171207
13	2212542	Prostate specific antigen (PSA); total	CPT4	3609359
14	2212167	Urinalysis, by dip stick or tablet reagent for bilirubin, glucose, hemoglobin, ketones, leuk...	CPT4	3053519
15	2212165	Urinalysis, by dip stick or tablet reagent for bilirubin, glucose, hemoglobin, ketones, leuk...	CPT4	3004873
16	2212649	Blood count; complete (CBC), automated (Hgb, Hct, RBC, WBC and platelet count)	CPT4	2669216
17	2212091	General health panel This panel must include the following: Comprehensive metabolic p...	CPT4	2136417
18	4272032	Prostate specific antigen measurement	SNOMED	2111397
19	2212290	Creatine kinase (CK), (CPK); total	CPT4	1971758
20	2212605	Troponin, quantitative	CPT4	1933305

- Only 9% of Measurement records come from Purchased Care
- Records mostly contain lab orders

Summary/ Recap

- **TED-I contains claims from:**

- Institutional Inpatient claims such as:
 - Hospitals
 - Skilled nursing facilities
 - Mental health institutions,
 - Etc.
 - Home Health episodes

- **TED-NI contains all other claims (not included in TED-I)**

- Hospital Outpatient Facility Claims (ER, HOPD)
- Urgent Care Centers
- Doctors and other Professional Providers
- Suppliers
- Service Companies (i.e. ambulance)
- Labs
- (Pharmacies)
- Etc... etc... etc...



Questions?