DAVINCI: COMBINING DOD AND VA DATA IN HEDIS METRICS AND OTHER MILITARY STUDIES

February 10, 2022

Wendy Funk

wfunk@kennellinc.com

Kennell and Associates, Inc.

Prepared for VHA by Kennell and Associates, Inc.

Objectives:

1. Provide background on Healthcare Data and Information Set (HEDIS) Measures and their uses for population health management.
   - Highlight the Diabetes and Mammogram HEDIS Measures.

2. Describe the market share of VA and DoD care provided by geographic market.

3. Provide background on Musculoskeletal Injuries (MSKI) in the DoD

4. Show the impact of combining VA and DoD data in tracking post traumatic osteoarthritis (PTOA) in Service members who underwent Anterior Cruciate Ligament (ACL) Reconstruction and describe OMOP queries

HEDIS MEASURES

Background on HEDIS Measures

- The Healthcare Effectiveness Data and Information Set (HEDIS), developed and maintained by the NCQA, includes >90 measures across 6 domains of care:
    1. Effectiveness of Care
    2. Access/Availability of Care
    3. Experience of Care
    4. Utilization and Risk Adjusted Utilization
    5. Health Plan Descriptive Information
    6. Measures Reported Using Electronic Clinical Data Systems

Background on HEDIS Measures

- The MHS runs HEDIS measures on monthly basis, using rolling windows
  - Performance is reviewed by market directors
  - Patients are actively managed with registries

- To create HEDIS measures, the MHS uses:
  - Data collected at MTFs
  - Claims data
  - Data entered when patients present proof of having received services (such as a shot record); called TSWF (TriService WorkFlow Forms; similar to Power Forms in MHS GENESIS)
  - And recently for HEDIS breast cancer screening, VA data was added.

- The MHS is exploring adding VA data into more measures.

- The extra data sources have been approved by NCQA, and are very important, especially to smaller military treatment facilities (MTFs), or to MTFs that are near VA facilities.

HEDIS DIABETES MEASURES

Diabetic Retinal Screenings

HEDIS Diabetes Effective Care

- The Diabetes Comprehensive Care measure rates health plans on providing effective care for diabetic patients.
- Measure definition*: The percentage of members 18-75 years of age with diabetes (type 1 and type 2) who had each of the following:
  - Hemoglobin A1c (HbA1c) testing
  - HbA1c poor control (>9.0%)
  - HbA1c control (<8.0%)
  - HbA1c control (<7.0%) for a selected population
  - Eye exam (retinal performed
  - Medical attention for nephropathy
  - BP control (<140/90 mm Hg)

 * This measure has changed for measurement year 2022.

Methodology

- Limited to Prime enrollees

- Eye Exams were limited to 'Diabetic Retinal Screenings' from HEDIS Code Set, which make up 99.99% of eye exam types

- These CPTs were done by optometrists or ophthalmologists. Exams were limited to one per person per day for each source.

- For the June 2020 A1C Diabetes Cohort, eye exams were queried for July 2019 to June 2020 from:

- Direct Care Outpatient (CAPER): MTF Encounters

- TRICARE Claims (TEDNI)

- VA DaVINCI

CPTs identifying Diabetic Retinal Screenings

67028	67208	92230
67030	67210	92235
67031	67218	92240
67036	67220	92250
67039	67221	92260
67040	67227	99203
67041	67228	99204
67042	92002	99205
67043	92004	99213
67101	92012	99214
67105	92014	99215
67107	92018	99242
67108	92019	99243
67110	92134	99244
67113	92225	99245
67121	92226	S0620
67141	92227	S0621
67145	92228	S3000

June 2020 A1C Military Health System (MHS) Prime Enrolled Cohort (N= 145,401)

Number of Eye Exams for Jun2020 A1C MHS Prime Enrolled Cohort by FY/FM and Source

COVID-19 Effect
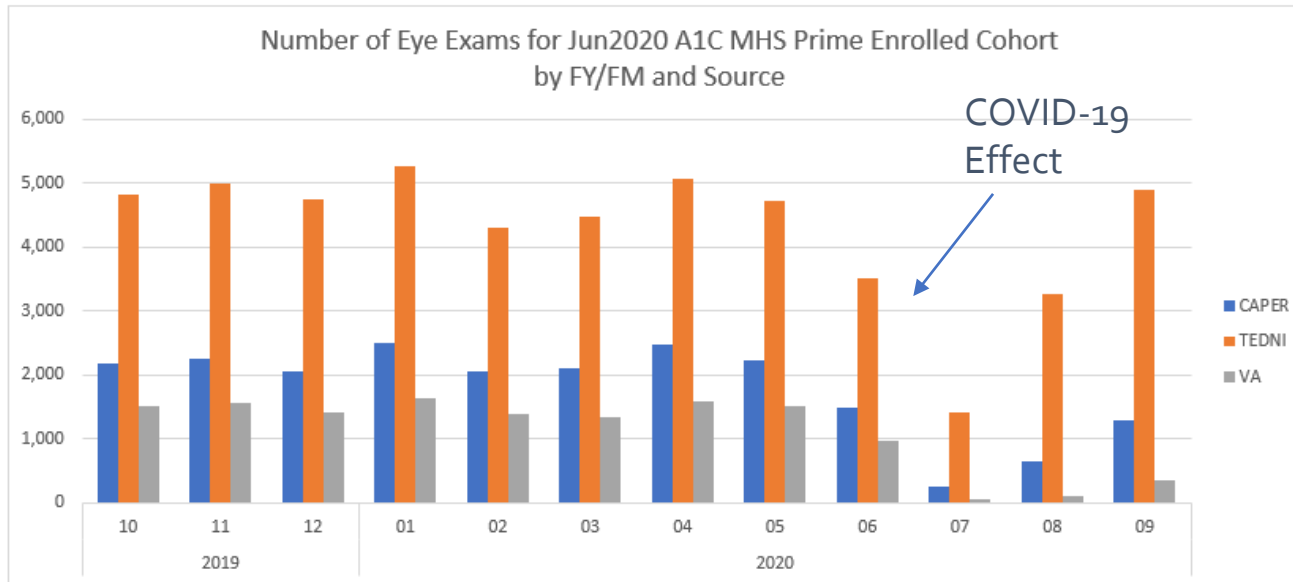
This chart is by fiscal month, so March 2020 is FM6, 2020.

COVID impact is obvious.

Includes enrollees to military treatment facilities and those with civilian PCMs.

Most exams are provided in the private sector for this cohort.

The VA contributes considerably to the number of eye exams done for Prime Enrollees.

Prime enrollees can be aligned to an MTF (MTF Prime), or can have a civilian private sector primary care manager (CIV Prime). Usage patterns are different between these groups.

June 2020 A1C **Civilian** Prime Enrolled Cohort (N= 62,641)

DoD Private Sector Care is divided into Region East and West.

The percentage of diabetics with an eye exam was similar for Region East (0.29) and Region West (0.27) for diabetic enrollees.

Adding in the VA number Region East and West increased to 0.36 and 0.32, respectively.

Civilian Prime enrollees rarely use MTFs

It is more common for them to receive their eye exams at the VA than in MTFs

About 18% of eye exams were done in VA

Number of Eye Exams for Jun2020 A1C Civ Prime Enrolled Cohort by FY/FM and Source

COVID-19 Effect

- VA
- TEDNI
- CAPER
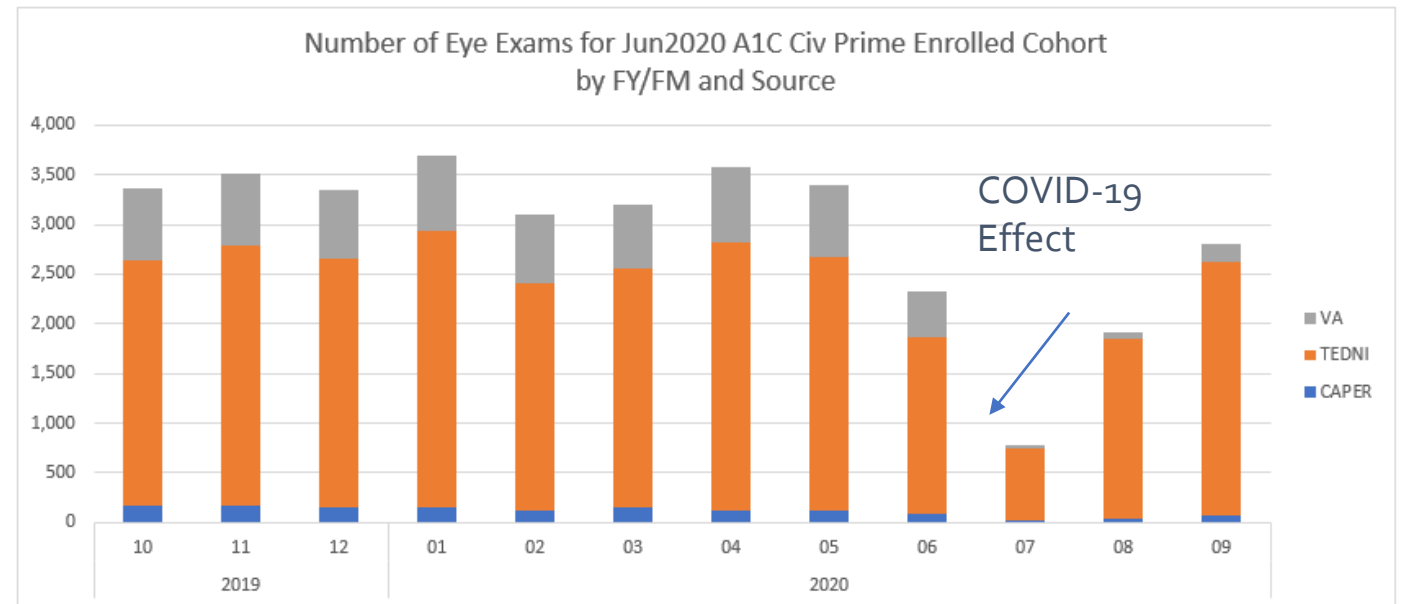
June 2020 A1C MTF Prime Enrolled Cohort (N=74,918)

The percentage of diabetics with an eye exam in MTF Prime Enrolled A1C population (at non-GENESIS sites) was 0.41.

Private Sector Eye Exams make up about 46% of the total number of eye exams done for MTF Prime Enrolled diabetics.

About 14% of the eye exams for this cohort are done in the VA.

Number of Eye Exams for Jun2020 A1C MTF Prime Enrolled Cohort by FY/FM and Source

COVID-19 Effect
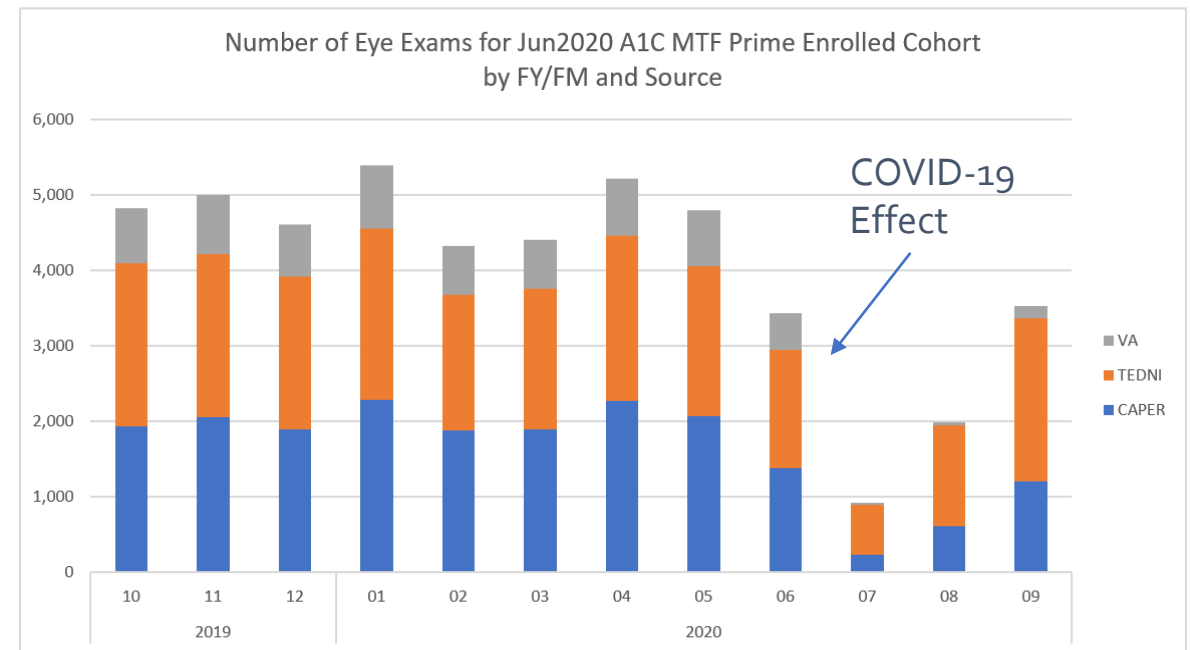
June 2020 A1C National Capital Region (NCR) Prime Enrolled Cohort (N=7,288)
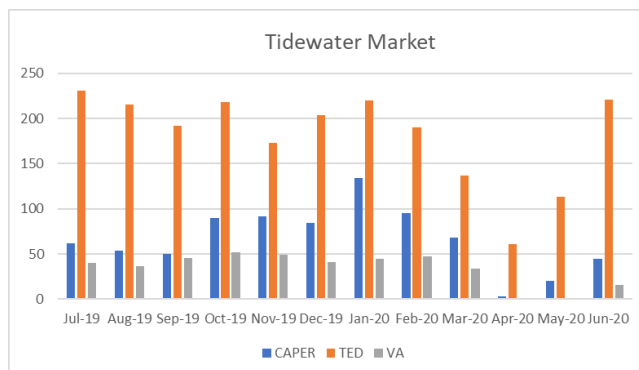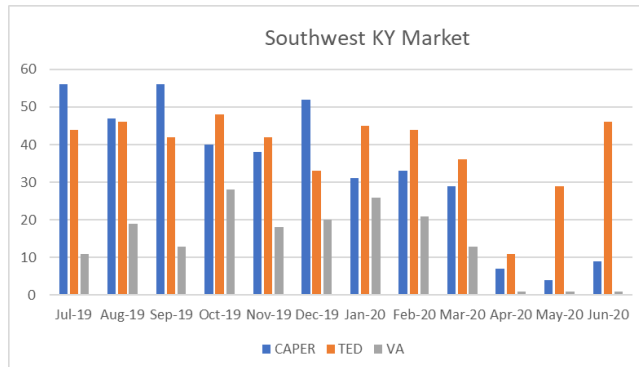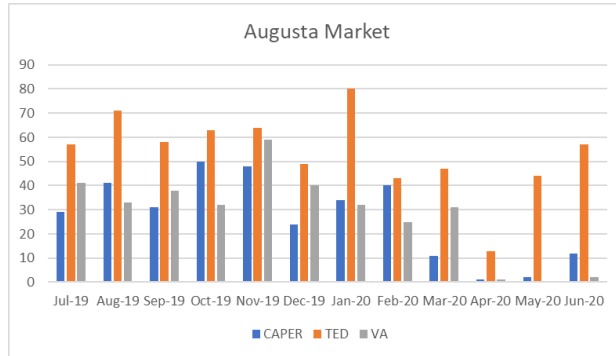
"Local" snapshot!

The percentage of diabetics with an eye exam in the NCR Prime Enrolled A1C population was 0.35.

The NCR has a smaller reliance on the Private Sector for eye exams (about 27%) with about 10% of eye exams being performed in the VA.

Number of Eye Exams for Jun2020 A1C NCR Prime Enrolled Cohort by FY/FM and Source

COVID-19 Effect
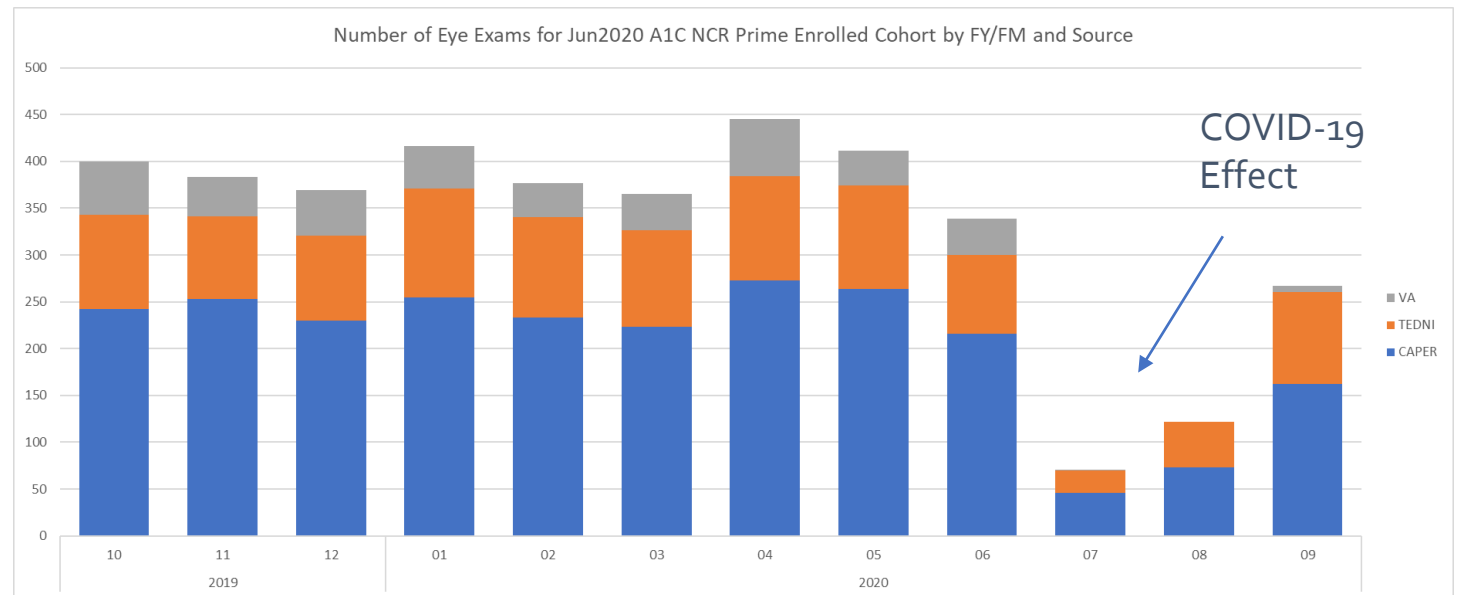
Eye Exams in the Diabetic Cohort – Selected Markets

Augusta Market

Southwest KY Market

Tidewater Market

- All Markets had a COVID impact on the number of eye exams being conducted in the diabetic cohort.

- There is a very different balance of direct, purchased and VA care across markets.

- Some markets have diabetic patients who use the VA for eye exams frequently, especially Augusta.

BREAST CANCER SCREENING

Breast Cancer Screening

- Denominator:
  - Women 52-74, continuously enrolled in Prime, with a 45-day gap.
  - Exclusions: Mastectomies

- Numerator: Women with a mammogram:
  - Direct Care (MTFs)
  - Private Sector Care (PSC) -- TRICARE Claims
  - VA
  - Tri Service Work Flow Forms (TSWF) (entered by site when patients present proof of screenings)

- VA data are used in this production measure in the MHS

Source of Mammograms in MTFs (November 2021)

Source of Mammogram in MTFs
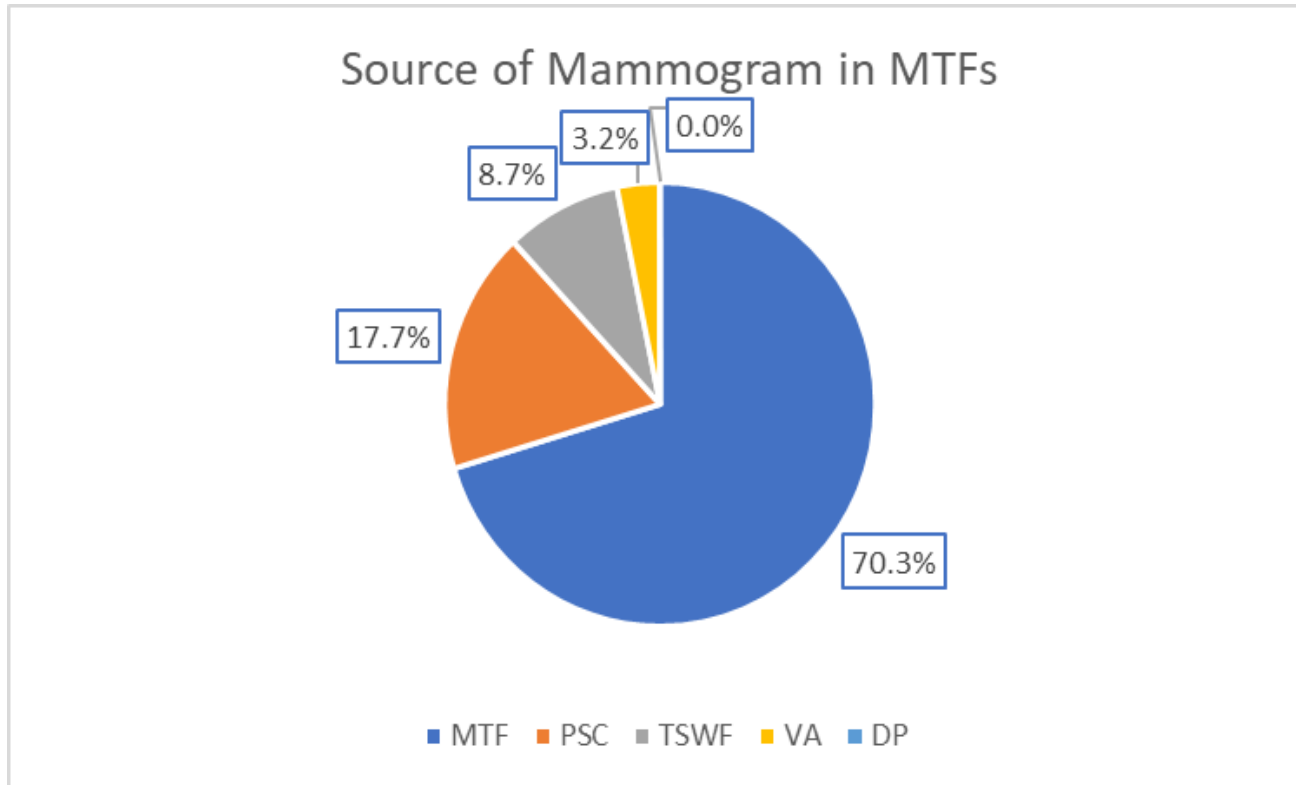
Source	Percent
MTF	70.3%
PSC	17.7%
TSWF	8.7%
VA	3.2%
DP	<0.1%

PSC: Private Sector Care
DP: Designated Provider

Pie chart legend: MTF, PSC, TSWF, VA, DP

Pie chart values: 70.3%, 17.7%, 8.7%, 3.2%, 0.0%

MAMMOGRAM SOURCE BY MARKET

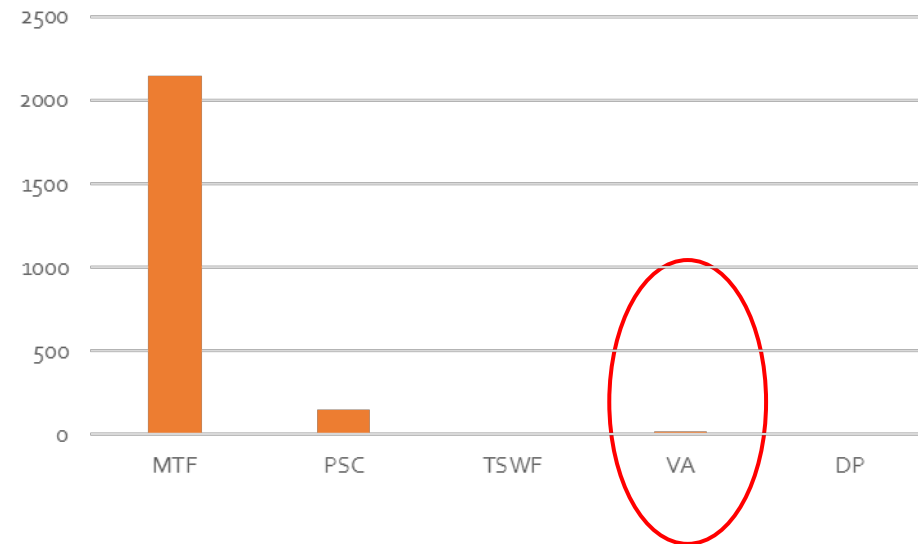| Market	MTF	PSC	TSWF	VA	DP	Total	% VA
Alaska	1,092	251	26	2	2	1,373	0.1%
Augusta	1,211	829	208	156	1	2,405	6.5%
Central North Carolina	2,658	301	531	128	1	3,619	3.5%
Central Texas	3,066	267	255	199	0	3,787	5.3%
Coastal Mississippi	1,278	115	54	2	2	1,451	0.1%
Coastal North Carolina	1,022	211	368	18	1	1,620	1.1%
Colorado	3,428	141	21	100	0	3,690	2.7%
El Paso	1,323	86	61	2	0	1,472	0.1%
Europe	183	30	30	1	2	246	0.4%
Florida Panhandle	2,343	931	140	7	1	3,422	0.2%
Indo-Pacific	2,066	110	66	88	0	2,330	3.8%
Jacksonville	2,917	475	152	169	1	3,714	4.6%
Low Country	1,573	68	51	1	0	1,693	0.1%
National Capital Region	11,094	995	976	144	12	13,221	1.1%
Puget Sound	3,154	923	2	7	3	4,089	0.2%
Sacramento	768	115	1	226	1	1,111	20.3%
San Antonio	7,850	277	93	631	3	8,854	7.1%
San Diego	3,571	76	5	102	0	3,754	2.7%
Small Market Stand-Alone Office	15,378	12,123	5,958	920	3	34,382	2.7%
Southwest Georgia	2,142	145	7	14	0	2,308	0.6%
Soutwestern Kentucky	1,598	86	34	51	1	1,770	2.9%
Tidewater	6,434	654	396	481	4	7,969	6.0%
Total	76,149	19,209	9,435	3,449	38	108,280	3.2%

Percent of VA market share ranged from 0.1% to 20.3%

Market Example:
Share of Mammograms in MTFs vs. VA in Sacramento vs Southwest GA Markets
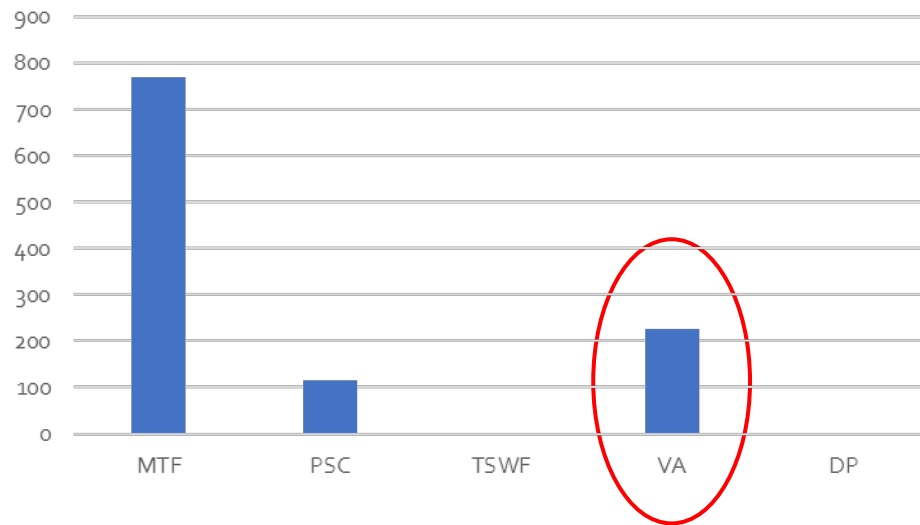
Sacramento has 20% VA market share compared to Southwest Georgia with <1%
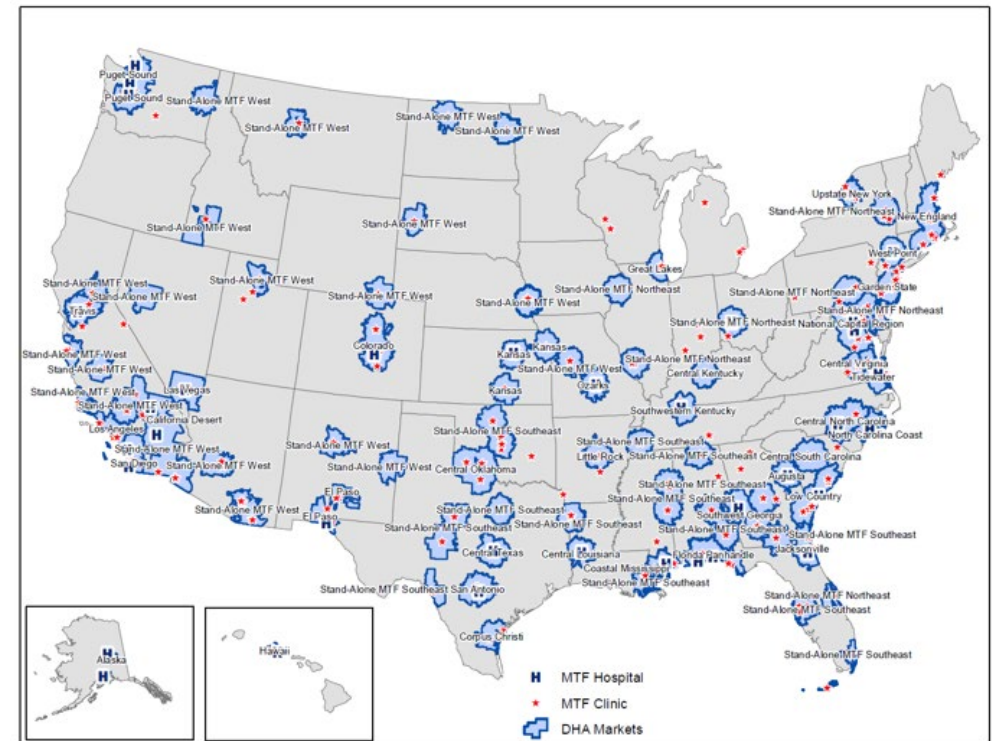
DoD/VA Sharing

Where DoD and VA facilities are co-located, there may be higher levels of resource sharing that will vary by availability of specialists/services.

VA Medical Centers

AK and HI sites not pictured
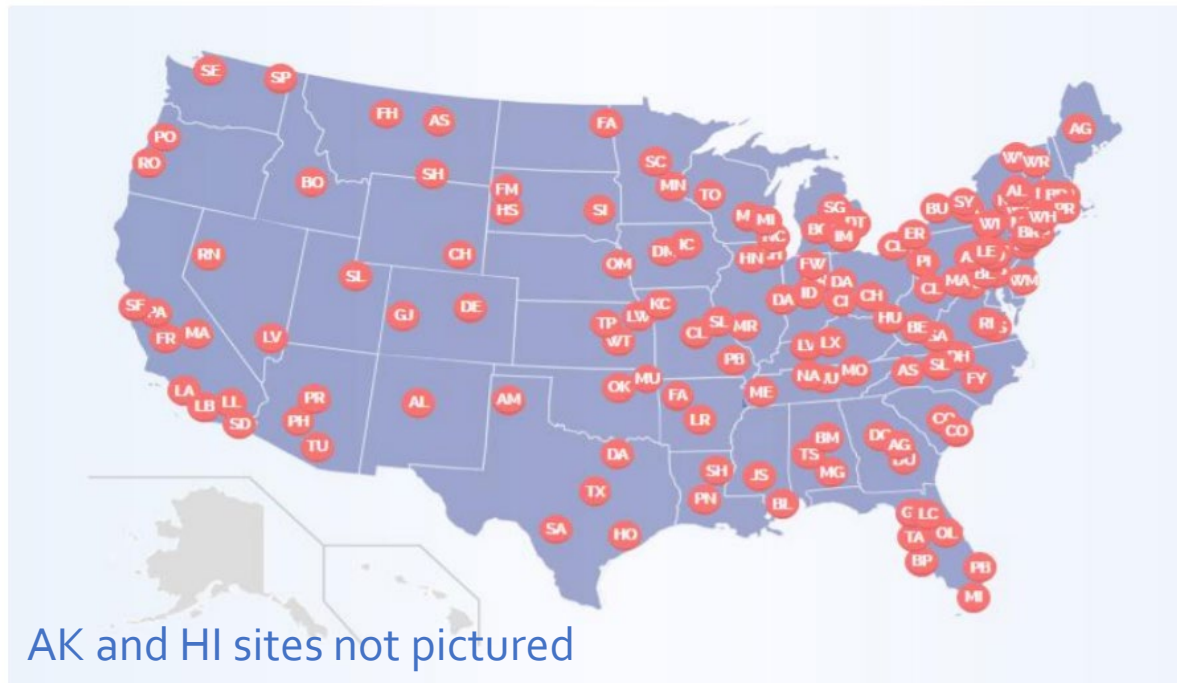
DoD Markets

MUSCULOSKELETAL INJURIES (MSKI) IN THE DOD

Example DaVINCI Analysis:

Time from ACL Reconstruction to onset of Post-traumatic Osteoarthritis (PTOA)

Musculoskeletal Injuries In the DoD

- Military service members are a young and physically active population at high risk for sustaining musculoskeletal injuries and conditions related to physical training exercises and sports.[1,2]

- Musculoskeletal injuries and conditions result in significant time loss from activity (i.e., "limited duty") and negatively affect military readiness (ability to perform physical military tasks).

1. Owens BD, Mountcastle SB, Dunn WR, DeBerardino TM, Taylor DC. Incidence of Anterior Cruciate Ligament Injury among Active Duty U.S. Military Servicemen and Servicewomen. *Mil Med*. 2007;172(1):90-91. doi:10.7205/milmed.172.1.90
2. Peebles LA, O'Brien LT, Dekker TJ, Kennedy MI, Akamefula R, Provencher MT. The Warrior Athlete Part 2—Return to Duty in the US Military: Advancing ACL Rehabilitation in the Tactical Athlete. *Sports Med Arthrosc*. 2019;27(3):e12-e24. doi:10.1097/jsa.0000000000000237

Anterior Cruciate Ligament (ACL) Tears

- Anterior cruciate ligament (ACL) tears are one of the most common functionally limiting musculoskeletal diagnoses treated in the United States (US) Military.[1,2]
  - Incidence: 3.79 cases per 1,000 person-years for men and 2.95 cases per 1,000 person-years for women[1,3]

- ACL injuries in US Service members have a 10-fold higher incidence than that of the civilian population due to the rigorous physical demands of military training.[3]

1. Owens BD, Mountcastle SB, Dunn WR, DeBerardino TM, Taylor DC. Incidence of Anterior Cruciate Ligament Injury among Active Duty U.S. Military Servicemen and Servicewomen. *Mil Med*. 2007;172(1):90-91. doi:10.7205/milmed.172.1.90
2. Peebles LA, O'Brien LT, Dekker TJ, Kennedy MI, Akamefula R, Provencher MT. The Warrior Athlete Part 2—Return to Duty in the US Military: Advancing ACL Rehabilitation in the Tactical Athlete. *Sports Med Arthrosc*. 2019;27(3):e12-e24. doi:10.1097/jsa.0000000000000237
3. Tennent DJ, Posner MA. The Military ACL. *J Knee Surg*. 2018;32(02):118-122. doi:10.1055/s-0038-1676565

Post-Traumatic Osteoarthritis (PTOA)
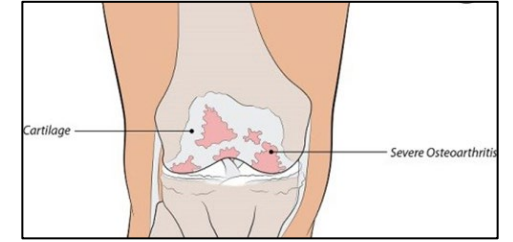
- Post-traumatic osteoarthritis (PTOA), a subtype of osteoarthritis, develops after joint injury such as an intra-articular fracture, a ligament injury, or other cartilage (articular or meniscus) injuries within a joint.

- ACL reconstruction is a significant risk factor for post-traumatic osteoarthritis (PTOA) in

- The estimated proportion of PTOA at 5, 10, and 20 years following ACLR is:

Time since ACLR	Proportion of PTOA
5 Years	11.3% (95% CI, 6.4%-19.1%)
10 Years	20.6% (95% CI, 14.9%-27.7%)
20 Years	51.6% (95% CI, 29.1%-73.5%)

- Incorporating VA data into MHS studies on PTOA is very important given the timing

4. Cinque ME, Dornan GJ, Chahla J, Moatshe G, LaPrade RF. High Rates of Osteoarthritis Develop After Anterior Cruciate Ligament Surgery: An Analysis of 4108 Patients. *Am J Sports Med*. 2018;46(8):2011-2019. doi:10.1177/0363546517730072

Methodology

- Cohort: Active Duty Service Members (ADSMs) who underwent ACL reconstruction by a DoD provider or in TRICARE private sector care
  - TRICARE beneficiaries were organized into a hierarchy of subcohorts to identify the ADSM population*
  - ACL reconstruction was identified using CPT code 29888 with a left or right modifier
    - ACLRs were performed in same-day surgery locations:
      - Direct care: MEPRS codes (i.e., B**5 or B**7) at MTFs
      - Private sector: places of service (i.e., 21, 22, or 24)
    - First ACLR found for each ADSM was selected
      - (For some in this cohort, the "first" ACL found could be a revision ACLR instead of a primary ACLR.)
 - We used a selection of ICD 9 and 10 codes to identify PTOA**

Methodology for Identifying Cohorts in DaVINCI

- As we covered in our December Cyberseminar – it is not easy to record patient characteristics over time in OMOP.

- Also, patients in DaVINCI can have multiple relationships with DoD and VA.

- For our "ACLR/PTOA" example, we used the ADSM definition we derived using the methodology below, where individuals from the DoD and VA are uniquely assigned to a cohort following a hierarchy (for each calendar year):

1. **Old deceased**: deaths occurring in previous years
2. **New Deceased**: deaths occurring in the current year
3. **Active Duty/Guard Reserve ("Service Members"): those who in the Military Health System (MHS) have a DEERS Beneficiary Category (bencat) status of active duty, guard or reserve during the year***
4. **Retired**: those who have a DEERS bencat of retired during the year
5. **DoD Family Memb**er: those who have DEERS bencat of a dependent of a Service Member during the year
6. **Veteran VA User**: those who are recognized in the VA system and are flagged as veteran, who also do not have future DEERS bencats of active duty/Guard/Reserve ("Service Members")
7. **Non-Veteran VA User**: those known to the VA system but are not flagged as veteran users
8. **Separatee:** individuals who have past instances of active duty, Guard, Reserve or retired but have not appeared in the VA data.
9. **Future Active Duty/Guard Reserve ("Service Members"):** individuals who have been identified in the DoD/VA cohort population but do not fit into any other hierarchy group but have a future Service Member bencat.
10. **Fall Through:** a data integrity group that catches those that fail to be assigned to other parts of the hierarchy.

DaVINCI
VA & DoD OMOP Tables Used in Analysis

Category	OMOP Table Name	VA OMOP	DoD OMOP
Clinical	CONDITION_OCCURRENCE	2,273,566,044	1,869,624,856
Clinical	DEATH	8,005,742	1,188,184
Clinical	DEVICE_EXPOSURE	171,795,075	102,852,998
Clinical	DRUG_EXPOSURE	4,967,974,344	1,231,632,863
Clinical	FACT_RELATIONSHIP	9,272,022	1,831,727,646
Clinical	MEASUREMENT	15,033,573,540	1,993,313,977
Clinical	NOTE	0	43,856,260
Clinical	OBSERVATION	491,173,530	2,217,744,783
Clinical	OBSERVATION_PERIOD	15,209,496	9,307,536
Clinical	PERSON	23,753,749	9,860,907
Clinical	PROCEDURE_OCCURRENCE	2,256,294,443	1,818,098,199
Clinical	SPECIMEN	6,752,554,511	125,527,063
Clinical	VISIT_OCCURRENCE	2,926,319,211	940,892,776
Health System	CARE_SITE	1,221,209	1,422,724
Health System	LOCATION	44,449,311	197,992
Health System	PROVIDER	6,903,537	11,189,042
	Total	**34,982,065,764**	**12,208,437,806**
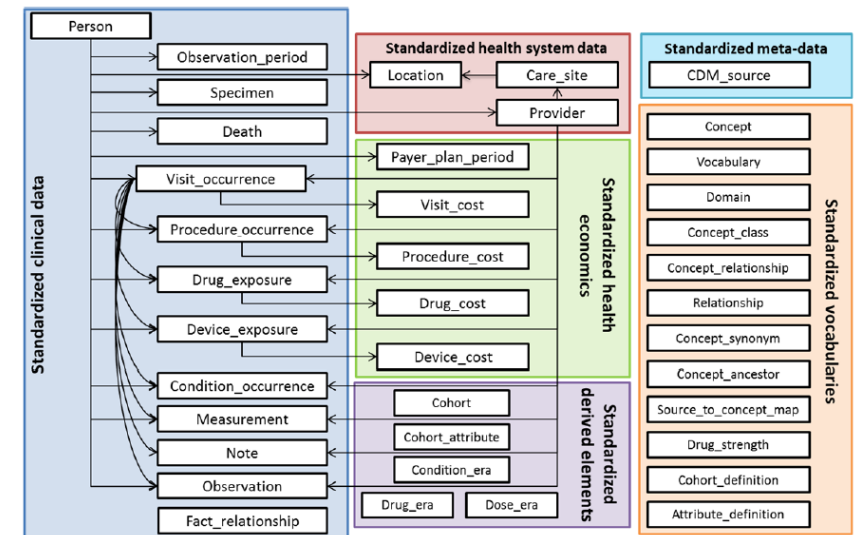
ACLs in the DoD

- There were 2,758 of ACLRs yearly with 44.72% done in direct care (at MTFs)
- 0.13 percent (0.09-0.16 percent) of ADSMs undergo ACLR yearly

Year	Total ADSMs	Direct Care	Purchased Care	Total
2005	2,161,280	839	1,104	**1,943**
2006	2,111,618	904	1,220	**2,124**
2007	2,101,221	945	1,336	**2,281**
2008	2,152,395	1,124	1,558	**2,682**
2009	2,217,138	1,212	1,747	**2,959**
2010	2,227,852	1,413	1,682	**3,095**
2011	2,197,352	1,466	1,876	**3,342**
2012	2,158,266	1,483	1,733	**3,216**
2013	2,109,140	1,475	1,872	**3,347**
2014	2,049,050	1,284	1,782	**3,066**
2015	1,996,647	1,287	1,657	**2,944**
2016	1,998,271	1,287	1,595	**2,882**
2017	2,009,692	1,369	1,526	**2,895**
2018	2,039,020	1,307	1,339	**2,646**
2019	2,077,039	1,296	1,385	**2,681**
2020	2,120,216	1,044	987	**2,031**
Total	**33,726,197**	**19,735**	**24,399**	**44,134**
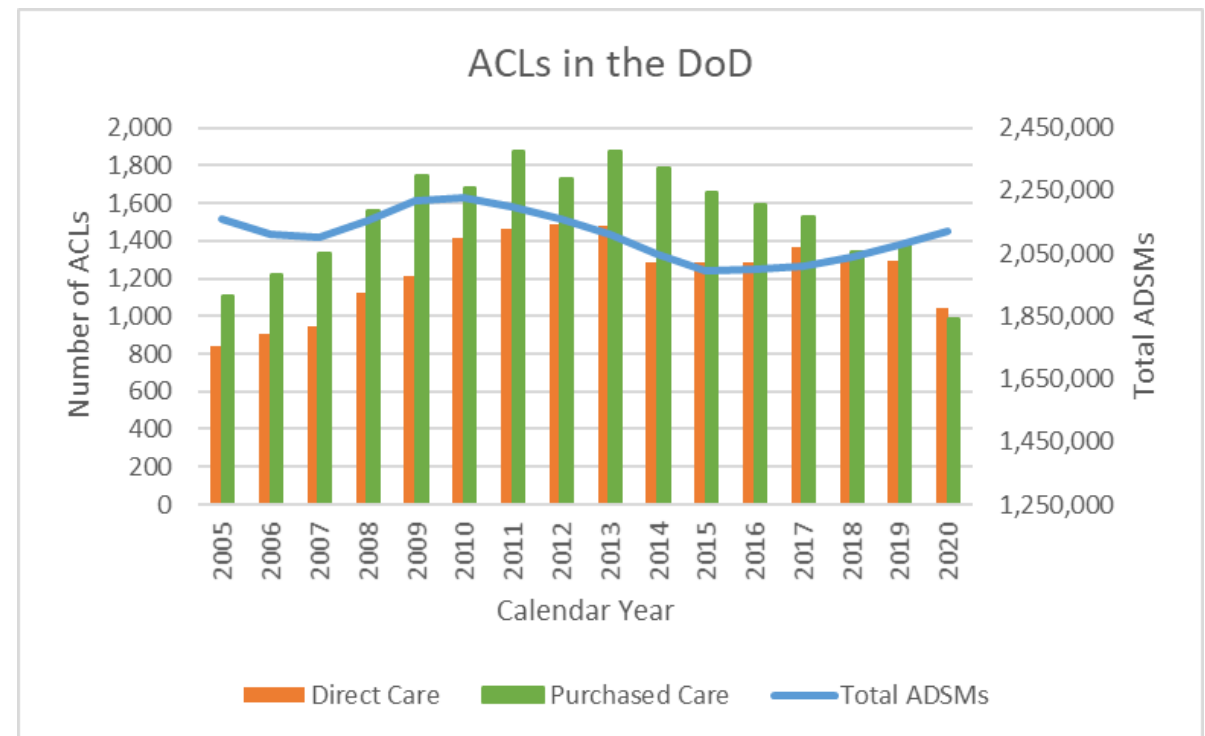
The ADSM definition used to derive "Total ADSM" includes anyone who was ever on active duty the year they had their ACLR.

Example ACLR OMOP Query

```sql
--Q2
INSERT INTO [DoD].[FebCyberSem_Knee_ACLR]
    ([Step] ,[Person_ID]     ,[Status]   ,[Status_Start_Date]     ,[Status_End_Date] ,[PROCEDURE_OCCURRENCE_ID]
    ,[x_Source_Table]   ,[Procedure_Datetime]        ,[QUALIFIER_SOURCE_VALUE]    ,[PROCEDURE_CONCEPT_ID] ,[VISIT_OCCURRENCE_ID])
SELECT
    '2' ,A.Person_ID     ,A."Status" ,A.Status_Start_Date     ,A.Status_End_Date   ,B.PROCEDURE_OCCURRENCE_ID
    ,B.x_Source_Table    ,B.Procedure_Datetime    ,B.QUALIFIER_SOURCE_VALUE    ,B.PROCEDURE_CONCEPT_ID ,B.VISIT_OCCURRENCE_ID
FROM [DoD].[FebCyberSem_Knee_ACLR] AS A
LEFT JOIN [DoD_OMOP].[OMOP].[PROCEDURE_OCCURRENCE] AS B
ON A.Person_ID = B.Person_ID
    AND A.Step = '1'
    AND B.PROCEDURE_CONCEPT_ID = '2106052' --C_ID for CPT 29888
    AND (B.QUALIFIER_SOURCE_VALUE = 'LT'
        OR B.QUALIFIER_SOURCE_VALUE = 'RT')
where B.PROCEDURE_OCCURRENCE_ID is not null;
```

- This program grabs all procedures for left and right ACLRs.
  - Note: This code retrieves repeat (multiple) procedures, but later we narrowed down to the first occurrence of each surgery on each leg.

ICD 9	ICD 10	Short Description
71509	M150	PRIMARY GENERALIZED OSTEOARTH
71510	M1991	PRIMARY OSTEOARTH,UNSPEC SITE
71516	M170	BILAT PRIMARY OSTEOARTH OF KNE
71516	M1710	UNILAT 1 OSTEOARTH,UNSPEC KNEE
71516	M1711	UNILAT PRIM OSTEOARTH,RT KNEE
71516	M1712	UNILAT PRIM OSTEOARTH,LF KNEE
71520	M1992	POST-TRM OSTEOARTH,UNSPEC SITE
71520	M1993	SEC OSTEOARTH,UNSPEC SITE
71526	M172	BILAT POST-TRM OSTEOARTH,KNEE
71526	M1730	UNILAT PST-TR OSTEOAR,UNS KNEE
71526	M1731	UNILAT PST-TR OSTEOARTH,RT KNE
71526	M1732	UNILAT PST-TR OSTEOARTH,LF KNE
71526	M174	OTH BILAT SEC OSTEOARTH,KNE
71526	M175	OTH UNILAT SEC OSTEOARTH, KNEE
71580	M154	EROSIVE (OSTEO)ARTHRITIS
71580	M158	OTHER POLYOSTEOARTHRITIS
71589	M153	SECONDARY MULTIPLE ARTHRITIS
71590	M159	POLYOSTEOARTHRITIS,UNSPECIFIED
71590	M1990	UNSPEC OSTEOARTH,UNSPEC SITE
71596	M179	OSTEOARTHRITIS OF KNEE,UNSPEC

*We limited our query to the highlighted knee-specific codes

PTOA CODES

5 Year Occurrence of PTOA in the DoD and VA

DoD Only

	PTOA Rate		Months to PTOA		
Year	Count	Percentage	Mean (SD)	Median	IQR
2005	217	11.2%	27 (18.1)	23	12-42
2006	257	12.1%	26 (17.8)	24	11-43
2007	271	11.9%	27 (18.0)	25	12-44
2008	317	11.8%	28 (17.6)	27	13-43
2009	360	12.2%	26 (17.0)	25	11-41
2010	320	10.4%	28 (16.7)	26	15-41
2011	346	10.4%	28 (18.5)	26	12-44
2012	372	11.6%	29 (18.5)	30	12-46
2013	365	10.9%	27 (17.1)	26	12-41
2014	326	10.7%	27 (16.6)	26	13-39
2015	325	11.1%	25 (16.5)	22	11-37

DoD & VA (DaVINCI)

	PTOA Rate		Months to PTOA		
Year	Count	Percentage	Mean (SD)	Median	IQR
2005	244	12.6%	28 (18.0)	25	14-44
2006	287	13.5%	27 (17.6)	26	13-43
2007	302	13.3%	27 (17.5)	26	13-43
2008	352	13.1%	29 (17.5)	29	15-44
2009	398	13.5%	28 (17.6)	27	13-44
2010	375	12.1%	30 (17.0)	27	17-46
2011	432	12.9%	31 (18.6)	31	14-48
2012	482	15.0%	31 (17.9)	33	14-47
2013	482	14.4%	30 (16.9)	30	15-45
2014	416	13.6%	29 (16.4)	28	16-42
2015	417	14.2%	26 (16.5)	24	13-39

- Addition of VA data in DaVINCI added 2.2 percentage points (1.3-3.5 points)
- Mean and median time to PTOA increased due to extended follow-up with addition of VA data

10 Year Occurrence of PTOA in the DoD and VA

DoD Only

	PTOA Rate		Months to PTOA		
Year	Count	Percentage	Mean (SD)	Median	IQR
2005	361	18.6%	51 (34.8)	49	20-80
2006	416	19.6%	51 (35.9)	46	20-82
2007	456	20.0%	52 (35.5)	49	21-83
2008	563	21.0%	55 (35.5)	53	24-85
2009	619	21.0%	52 (34.8)	48	21-82
2010	554	17.9%	53 (33.9)	50	23-80

DoD & VA (DaVINCI)

	PTOA Rate		Months to PTOA		
Year	Count	Percentage	Mean (SD)	Median	IQR
2005	441	22.8%	55 (35.3)	55	23-86
2006	508	24.0%	56 (37.0)	51	23-91
2007	566	24.9%	57 (36.2)	56	25-91
2008	710	26.5%	60 (35.3)	61	30-90
2009	788	26.7%	58 (35.2)	59	27-88
2010	750	24.3%	59 (33.6)	60	27-86

- Addition of VA data in DaVINCI added 5.1 average percentage points (4.1-6.3 percentage points)
- Mean time to PTOA increased due to extended follow-up with addition of VA data (4-6 months)

Occurrence of PTOA in the DoD and VA

DoD Only

	PTOA Rate		Months to PTOA		
Year	Count	Percentage	Mean (SD)	Median	IQR
2005	524	27.0%	83 (57.0)	76	30-131
2006	587	27.7%	78 (53.5)	74	27-127
2007	581	25.5%	72 (49.4)	67	27-113
2008	658	24.6%	67 (44.5)	63	29-105
2009	693	23.5%	61 (41.1)	56	24-93
2010	590	19.1%	57 (37.3)	56	24-86
2011	575	17.2%	51 (33.9)	51	21-80
2012	573	17.8%	48 (30.4)	47	20-71
2013	546	16.4%	43 (27.4)	41	18-67
2014	416	13.6%	37 (23.9)	33	17-58
2015	350	11.9%	28 (19.5)	24	12-43
2016	297	10.3%	26 (16.5)	23	12-38
2017	240	8.3%	22 (13.4)	20	11-32
2018	155	5.9%	17 (10.5)	15	9-25
2019	129	4.8%	12 (6.6)	12	7-16
2020	40	2.0%	7 (4.2)	7	5-10

DoD & VA (DaVINCI)

	PTOA Rate		Months to PTOA		
Year	Count	Percentage	Mean (SD)	Median	IQR
2005	720	37.2%	94 (57.4)	93	43-144
2006	798	37.7%	89 (53.9)	95	39-135
2007	759	33.3%	79 (49.6)	80	34-121
2008	880	32.9%	75 (44.9)	75	36-113
2009	903	30.6%	68 (41.1)	70	32-101
2010	821	26.6%	64 (37.6)	65	31-96
2011	829	24.9%	58 (33.9)	59	30-85
2012	809	25.2%	52 (30.4)	52	27-77
2013	738	22.1%	46 (27.0)	45	24-69
2014	544	17.8%	39 (23.8)	36	19-59
2015	464	15.8%	31 (20.2)	27	14-47
2016	362	12.6%	27 (16.5)	26	14-39
2017	293	10.2%	23 (13.5)	22	12-32
2018	184	7.0%	17 (10.6)	16	9-25
2019	143	5.4%	12 (7.0)	12	7-18
2020	43	2.1%	7 (4.4)	8	5-11

- Addition of VA data in DaVINCI added 5.3 average percentage points (0.1-10.1 points)
- Mean time to PTOA increased due to extended follow-up with addition of VA data (0-11 months)

Limitations

- We were unable to determine left or right for PTOA for years prior to 2015
  - Can't always match the leg of the ACLR to the PTOA

- On the procedure table, there are multiple instances of an ACLR procedure code, as it is used in pre- and post-operative care
  - We took the first instance of the code for each person (in a surgical setting)
    - As we did not require a "clean" period, the ACLR could be a revision surgery

- Data may not show inactive guard/reserve without eligibility flag
  - Would not show up in the data if they got the surgery during a period of ineligibility

- Only ACL reconstructions captured in DoD EHR or claims data among ADSMs were considered (i.e., DoD OMOP)
  - ACLRs done at VA facilities by VA providers under DoD/VA resource sharing agreements would be excluded

- We did not limit our cohort to those who had continuous follow-up visibility in DoD/VA (e.g., some ADSMs might not have been eligible for VA benefits or had variation in DoD follow up time post ACLR).
  - Our proportion of PTOA following ACLR are therefore likely underestimated for each time period

DAVINCI CONSIDERATIONS

Value Added from DaVINCI

- Value Added for VA Researchers: DaVINCI can add data regarding care prior to VA eligibility/care

- Value Added for DoD Researchers: DaVINCI can add data regarding care after someone leaves Active Duty

Separation/
Retirement

Predominantly DoD

Predominantly VA

⟵――――――――――――――――――――⟶
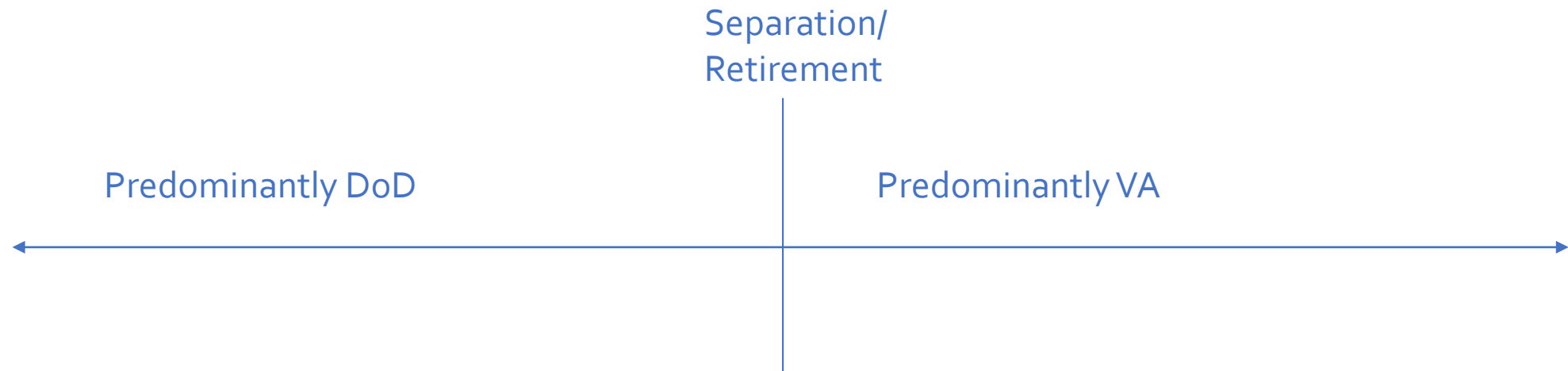
Considerations for Combining DoD and VA Data

- Need to make sure you are not duplicating data
  - Due to DoD-CIV and DOD/VA Resource Sharing Agreements, the same episode of care(e.g., ACLR) can show up in multiple source tables that feed OMOP
    - DoD/VA Resource Sharing: VA and CAPER records both flow to Procedure table
    - DoD/CIV Resource Sharing: CAPER and TED-NI records both flow to Procedure table

  - Patients' demographic, military, and VA characteristics and affiliations can change in a given year and over time & Patients can have multiple relationships with VA/DoD
    - Need to be specific when defining the study cohort

Recap

- In this presentation we covered:

✓ Provide background on Healthcare Data and Information Set (HEDIS) Measures and their uses for population health management.
  ✓ Highlight the Diabetes and Mammogram HEDIS Measures.

✓ Describe the market share of VA and DoD care provided by geographic market.

✓ Provide background on Musculoskeletal Injuries (MSKI) in the DoD

✓ Show the impact of combining VA and DoD data in tracking post traumatic osteoarthritis (PTOA) in Service members who underwent Anterior Cruciate Ligament (ACL) Reconstruction and describe OMOP queries

QUESTIONS?