Chasing Data: Adapting to Changing Sources and Resources for Measuring Inpatient and Outpatient VA Healthcare Use

VIReC Database and Methods Cyberseminar

December 7, 2015

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Acknowledgements

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Poll #1: Who Is Out There? Research/QI Role

What is your role in research and/or quality improvement?

- Research investigator
- Data manager/analyst
- Project coordinator
- Other – please describe via the Q&A function

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Poll #2: Who Is Out There?
Data Experience

How many years of experience do you have working with VA data?

- Less than 1
- 1-2
- 3-6
- 7+

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Objectives

- Learn about CDW and Medical SAS datasets
- Learn ways to measure inpatient / outpatient use.
- Theoretical, operational, and technical issues related to measuring utilization in VA data
- Understand limitations on resources for developing measures of inpatient / outpatient use.
- Identify resources for additional information or assistance
- See selected SAS coding approaches to measuring inpatient / outpatient use <Bonus Slides>

Outline

- What do I need to know? MedSAS and CDW
- Outpatient healthcare utilization - encounters, medications, lab results
- Inpatient healthcare utilization - encounters, medications, lab results
- Developing measurement constructs from inpatient/outpatient data
- Bonus Slides:
  - SAS code examples from research projects
  - Note: There are many other ways to code utilization

What do I need to know?

- **MedSAS** (Medical SAS Datasets) the "old" library of SAS data
- **CDW** (Corporate Data Warehouse) -- the "new" collection of SQL data
- **VINCI** (VA Informatics & Computing Infrastructure) – a central <powerful> computing environment - includes data services
- **DART** (Data Access Request Tracker) – research data request tool

What is MedSAS?

- Collection of SAS datasets containing patient demographics, care utilization, diagnosis and treatment – the Medical SAS Data
- Sourced from VistA – the VA's Electronic Health Record
- "Business rules" applied to clean and summarize data
- Per Fiscal Year (FY)
- On the Austin mainframe
- Scrambled SSN MedSAS national data available through local facility approvals – see VHA Data Portal Data Access
- Real SSN SQL version of MedSAS national data available on VINCI through DART request
- Research User Guides (RUGs) available on VIReC website

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What is MedSAS? Examples of Files

- Inpatient data
  - Acute care (e.g., hospitals)
  - Extended care (e.g., nursing homes)
  - Non-VA care (e.g., community care paid for by VA)
  - Observation care (e.g., less than 24 hours in hospital)
- Outpatient data
  - Encounters (events)
  - Visits (a day's worth of events)
  - Inpatient encounters (outpatient events that occur when patient is in the hospital – inconsistent collection)

MedSAS To Be Replaced by New Data Views in CDW

- National Patient Care Database (NPCD) being replaced
  - NPCD is the source for MedSAS Outpatient data
  - MedSAS Outpatient currently scheduled to be replaced by equivalent data in CDW 9/30/2016
  - SAS datasets through FY16 will remain available for foreseeable future
- Patient Treatment File (PTF) – not part of NPCD
  - Source for MedSAS Inpatient data
  - Will continue to be generated for foreseeable future

What is CDW?

- Data sourced from and accurately reflecting content of VistA
- Includes sources of national data not previously available
- Most data available from October 1998 – present
- No "Business rules" applied
- SQL format data in relational database
  - Re-organized in distinct domains that roughly parallel VistA files/applications
- Data domains are either production or raw

CDW Production Data

- Sourced from VistA nightly
- Organization reflects VistA structure and enhanced to facilitate linking tables
- Metadata and select documentation available
  - CDW SharePoint - Metadata Report
  - VIReC website – Factbooks
  - VINCI – CDW Data Documentation

- **Advantage:** CDW Production provides national level data not available elsewhere

CDW Raw Data

- Data not yet integrated into CDW production database
- Sourced from VistA periodically
- Organization reflects VistA structure
- Metadata and select documentation available
  - VINCI – CDW Data Documentation
  - Metadata available on CDW SharePoint site
  - Data Architecture Repository (DAR)
- Requests for data extracts may require additional time
- May be more difficult to use

- **Advantage:** CDW Raw may be the only source of some data not available in CDW production

Examples of CDW Data Domains

Production	RAW
Allergies	Compensation & Pension Exam
Appointment	Emergency Dept. Int. Software (EDIS)
BCMA (Bar Code Medication Admin) - Inpatient	Echocardiogram
Consult	Equipment Inventory
Fee (Purchased Care)	Inpatient Pharmacy, IV
Health Factors	Inpatient Pharmacy, Unit Dose
Immunization	NonVA Meds
Inpatient	Oncology
Mental Health Assessment	Prosthetics
Orders (CPRS)	Radiology
Outpatient Pharmacy	Surgery
Outpatient Visits	
Patient, SPatient	
Staff, Sstaff	
Surgery (Pre-surgery)	
Vital Signs	

What is VINCI?

- VA Informatics & Computing Infrastructure resources
- Computing environment resources (a cloud of servers)
  - Free workspace for your projects
  - Free analytic tools: SAS, Stata, Word, Excel, etc.
- Services
  - Delivers approved data to your workspace
  - Help from VINCI Concierge Services, such as expert help on Natural Language Processing

What is DART?

- Data Access Request Tracker
  - Data request submission, review, approval and management tool
  - Research requests for data access approvals managed by National Data Systems (NDS), e.g.,
    - CDW data
    - National MedSAS data with real SSNs
    - Other data – examples
      - CAPRI/VistAWeb
      - HERC Average Cost Data

Types of Data Access

- MedSAS Austin Mainframe
  - Direct access to entire data sets
  - Austin mainframe: Outpatient & Inpatient
- Custom Data Extracts
  - CDW
  - Pharmacy Benefits Management System
- VHA Reports & Data Cubes
  - VHA Support Service Center (vssc.med.va.gov)
- Electronic Health Records (CPRS)
  - Easiest for single site (yours) study
  - CAPRI and VISTAWEB are system-wide options

Getting Data (After approval)

- Old way (MedSAS from Austin mainframe)
  - Batch submission of JCL + SAS programs
    - Write out flat files
    - Download over slow connection
    - Read into local SAS to recreate SAS binary files
- New way (CDW data through VINCI Data Manager)
  - Approved SQL tables from CDW delivered to research project
  - Can access using SAS Proc SQL
- During transition –both types of data are available

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- **Outpatient healthcare utilization - encounters, medications, lab results**
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- Bonus Slides:
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  - Note: There are many other ways to code utilization

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Outpatient Utilization Questions

- Patient-Provider visits and encounters
  - What kind?
    - Primary Care
    - Specialty Care
    - Mental & Behavioral Health Care
  - Did it happen (ever in my time frame)?
  - How many times did it happen (during my time frame)?

Outpatient Utilization Data

- Type of health care identified by
  - Provider Type,
  - Clinic Type,
  - CPT Codes
- For a logical indicator, “Ever” = “1” = “yes” or “true”
- Number of times it happened =
  - count of distinct dates, or
  - count of distinct events
- Time frame depends on analysis approach and study design =
  - Fiscal Years,
  - Quarters,
  - Months

Outpatient Utilization- SE (EVENT) Files

- MedSAS data from VistA (remember –business rules applied)
- Event
  - May be more than 1 event per day (Allergy nurse, Dr. visit, Flu shot)
  - Identified by clinic type, procedures, provider type(s), diagnoses

Outpatient Utilization SF (One day) Files

- MedSAS SF files (a.k.a. visit)
  - At date level
  - Each record contains a summary of all clinics visited during one day
- Parallel data in CDW for SE, SF
  - Outpatient Workload domain

Outpatient Prescription Questions

- Did patients fill any prescriptions for statins in FY2015?
- How may days' supply did they receive in FY2015?
- How many different drug (or drug classes) were they taking?
- How adherent were they (e.g., Medication Possession Ratio)?

Outpatient Prescription Data

- Managerial Cost Accounting National Data Extracts (MCA NDEs) Pharmacy table
  - Variable "in_out" identifies inpatient or outpatient setting
- Pharmacy Benefits Management (PBM) System
  - National database for prescriptions dispensed in the VHA, including VHA's Consolidated Mail Outpatient Pharmacy
  - Maintains current Formulary
  - Record of historical changes
  - Visit https://vaww.cmopnational.va.gov/cmop/PBM/NationalFormulary & search for "changes"

Outpatient Lab Result Questions

- Did patients have high cholesterol?
  - HDL-C level
  - LDL-C level
  - triglyceride level
  - non-HDL level

- Were patients monitored on metabolic parameters?
  - blood glucose test (yes / no)
  - hemoglobin A1c test (yes/no)
  - level detected? (valid results in range per project specs such as 3-25% for A1c)
  - or level relative to a published standard, such as >126 mg/dL for fasting glucose

Outpatient Lab Result Data

- MCA = Managerial Cost Accounting
  - Formerly DSS = Decision Support System
- NDE = National Data Extract
- “Lab Results” not “Labs”

Outpatient Lab Result Data

- Variety of lab results available is greater in CDW than in the MCA (DSS) NDE LAR files
- Pathology is becoming available in CDW

Outpatient Mental Health Questions

- What was patient's maximum Pain level?
- Was Alcohol use related to surgery outcomes?
- Did Depression scores correlate with new-onset dx?
- Where were PTSD symptom scores assessed?

Outpatient Mental Health Factors Data

- Symptom scores are in CDW
- Source for Mental Health or Health Factors Data
- 95 different instruments are populated with at least some cases
  - Pain scores
  - AUDIT-C – alcohol frequency-quantity, binge
  - PCL-C & PCL-M – for PTSD sx
  - PHQ9 – depression sx including self-harm (“item 9”)

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- Outpatient healthcare utilization – Questions & Data
- **Inpatient healthcare utilization – Questions & Data**
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Inpatient Utilization Questions

Was patient admitted to the hospital?

- In a specific time frame (yes/no)
- Time from request until admission (days)
- How many inpatient days (per FY)?

Inpatient Utilization Questions

Was patient admitted for a specific condition, such as CHF or PTSD?

- Focus on the primary diagnosis on the discharge record
- What was diagnosed?
- Comorbidity profile – what else was diagnosed?

Inpatient Utilization Questions

While patient was in the hospital, did he…

- get admitted to the ICU?
- have major surgery?
- have inpatient alcohol rehab?
- move from ICU to psych or nursing home "bedsection"?
- die?
- get discharged to NH?

Inpatient Utilization Questions

While patient was in the ICU, did he…

- have mechanical ventilation?
- have guideline-concordant antibiotics (need inpatient RX data now)?
- have a diagnosis of VAP

Inpatient Utilization Questions

After patient was discharged from the hospital, did he…

- Get readmitted within 30 days?
- Die within 30 days / 1 year / 5 years?
  - (merge in Vitals data for survival studies)

Inpatient Utilization Data – MedSAS Files

Separate fiscal year-end files (+ census) for types of care provided

- PM = Patient Main record of stay in VA hospital
- XM = Main record in Extended Care
- NM = Main record in Non-VA Hospital
- PB = Bedsection detail record, VAH
  - XB, NB
- PP = Procedure detail, VA Hospital
  - XP, NP
- PS = Surgery detail, VA Hospital
  - XS, NS

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Inpatient Utilization Data – MedSAS Files

- Diagnoses in the inpatient stay record
- Procedures on an inpatient basis
- Types of clinicians managing patient's care ("bedsections")
- Readmission after discharge

Inpatient Prescription Medication Questions

Upon admission, did patient get…

- antibiotics within 48-72 hours?
- macrolides? fluoroquinolones?
- non-guideline concordant ABX?
- continuation of outpatient statins?
- continuation of outpatient antipsychotics?

Data source for inpatient Rx

- MCA = Managerial Cost Accounting
  - Formerly DSS = Decision Support System
- NDE = National Data Extract
- PHA = PHArmacy data
- MCA NDE PHA files (formerly, DSS NDE PHA files)
- IP vs OP: use variable IN_OUT="I" for inpatient pharmacy data
- Record level is rx within day of hospitalization

Inpatient Lab Result Questions

- Upon admission, did patient get…
  - tested for Legionella antibody?
- When were lab results available (time of day)?
- What was the result?

Data source for inpatient lab results

- MCA = Managerial Cost Accounting
  - Formerly DSS = Decision Support System
- NDE = National Data Extract
- LAR = Lab Results data
- MCA NDE LAR files (formerly, DSS NDE LAR files)
- IP vs OP: use variable IN_OUT="I" for inpatient data
- Record level is lab result within date

Break time – Poll #3
Quiz on data available for research

- How many files are available for research use?
  - one, the CDW
  - two, the CDW and the NPCD (MedSAS)
  - hundreds
  - thousands
  - we are still counting…

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Poll #4 Measuring Constructs

- Would you like a short diversion into a quick overview of developing measurement constructs from inpatient and outpatient data?
  - 1) yes
  - 2) no

Health Care is Measured at Many Levels

- Patient (e.g., sex, race, age at baseline)
- Patient-Provider visit
- Admission
- Blood draw date
- Test results from blood draw, per date
- Prescription fill (may be many per month)

Analysis Occurs at Some Level

- Patient
  - E.g., multiple logistic regression on 30-day death
- Patient per FY
  - E.g., repeated measures analysis of per-year use
- Patient per month
  - E.g., times series analysis of monthly cost buckets

Health Care Data is Codified

- Set of Diagnosis Codes
- Sets of Procedure Codes
- Sets of Provider Types, Clinic Types
- Sets of National Drug Codes
- Sets of LOINC (codes for lab tests)

…and organized

  - Files of Admission dates
  - Files of Visit dates
  - Files of Events within visit dates

Collect Data and Summarize to Case Level

- Get codified data at the level you want to count or indicate
  - E.g., dates on which visits occurred
  - E.g., dates on which patient filled a statin prescription
- Use logic to make indicators that are "1" when true
  - E.g., if drug prescribed is a statin then STATIN=1
- Summarize to case level
  - E.g., looking across all drug records for a patient, if ever STATIN=1 then at patient level STATIN=1, otherwise STATIN=0
  - E.g., looking across all drug records for a patient, count how many prescription fill dates patient had where STATIN=1 to get nSTATIN=xx, where "xx" is some positive integer

Good Practices

- Code all constructs with logical indicators at event level
  - E.g., DATA step
- Summarize all constructs at the chosen case level
  - E.g., SQL step(s)
  - Is summary to per-day level needed prior to summary to case level?
- Merge indicators and counts at the case level to make the analytic dataset

Links to Resources

- VHA Data Portal
  - http://vaww.vhadataportal.med.va.gov/
- CDW Resources
  - CDW SharePoint Site
  - CDW Metadata Report
- VINCI Central & HelpDesk:
  - http://vaww.vinci.med.va.gov/vincicentral/default.aspx
  - vinci@va.gov
- DART (Data Access Request Tracker)
  - http://vaww.vhadataportal.med.va.gov/DataAccess/DARTRequestProcess.aspx
- Data Architecture Repository (DAR)
  - http://vaausdarmul81/pls/apex/f?p=2000:1:3531763035911961

VIReC Resources

- Website
  - http://vaww.virec.research.va.gov/Index.htm
- Helpdesk
  - VIReC@va.gov
- Data LISTSERV Archive
  - http://vaww.listserv.va.gov/scripts/wa.exe?A0=HSRDATA-L
- Factbooks & Research User Guides
  - http://vaww.virec.research.va.gov/RUGs/RUGs-Index.htm

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QUESTionS?

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BONUS Slides – Code Samples for using Inpatient and Outpatient Data on AITC Mainframe

Old SAS Programs

```
//S671LACO JOB TSOUNKA9,'LAUREL',MSGCLASS=R,NOTIFY=S671LAC
//STEP1 EXEC SAS,TIME=(59,45)
//LIBRARY DD DSN=MDPPRD.MDP.FMTLIB6,DISP=SHR
//IRAQ DD DSN=RMTPRD.MED.SAS.OEFOIF.ROSTER,DISP=SHR
//PM06 DD DSN=MDPPRD.MDP.SAS.PM06,DISP=SHR,UNIT=AFF=IRAQ
//XM06 DD DSN=MDPPRD.MDP.SAS.XM06,DISP=SHR,UNIT=AFF=IRAQ
//NM06 DD DSN=MDPPRD.MDP.SAS.NM06,DISP=SHR,UNIT=AFF=IRAQ
//SE06 DD DSN=MDPPRD.MDP.SAS.SE06,DISP=SHR,UNIT=AFF=IRAQ
… and so on …
//TMP1 DD DSN=&&A,DISP=(,PASS),UNIT=RMTBIG,
//     SPACE=(CYL,(1200,75),RLSE)
//TMP2 DD DSN=&&B,DISP=(,PASS),UNIT=RMTBIG,
//     SPACE=(CYL,(1200,75),RLSE)
//TMP3 DD DSN=&&C,DISP=(,PASS),UNIT=RMTBIG,
//     SPACE=(CYL,(1200,75),RLSE)
//TMP4 DD DSN=&&D,DISP=(,PASS),UNIT=RMTBIG,
//     SPACE=(CYL,(1200,75),RLSE)
//WORK DD UNIT=SYSDA,SPACE=(CYL,(50,10))
//SYSIN DD *

OPTIONS LINESIZE=132 NOCENTER NOFMTERR NODATE;
```

Old Way – Inpatient Data

```
…
OPTIONS LINESIZE=132 NOCENTER NOFMTERR NODATE;
* oef.sas;
* Laurel A Copeland;
* Oct 28 2006*;
* For IIR * * How many OEF/OIF vets get care in VA? * What kind of care?;

 *1* how many OEF/OIF vets are getting care in VA?;
* Read in OEF/OIF Roster members with valid svc date;
DATA oef;
 SET iraq.roster ( KEEP = scrssn Srv_End_Date Combat_End_Date );
    WHERE Srv_End_Date>. OR Combat_End_Date>.;
BY scrssn;  IF FIRST.scrssn; run; * 121788 of 76829 obs ;

*2* Create format to Match cohort to PTF;
DATA coh;
 SET oef (KEEP=scrssn);
  RETAIN label 'xxxxxxxxx'
         fmtname 'coh_';  start=scrssn; format start z9.;
RUN;
proc format
          cntlin=COH ;QUIT;
```

Old Way – Inpatient Admission

```
*2* Match to PTF;
 * assess Psychiatric Admission fy06 *;
DATA pmxmnm06;
 SET  pm06.pm06( KEEP=scrssn VISN sex age dxprime dxf2-dxf13
                 WHERE = ( PUT(scrssn, COH_.) = 'xxxxxxxxx' ) );
      xm06.xm06( KEEP=scrssn VISN sex age dxprime dxf2-dxf13
                 WHERE = ( PUT(scrssn, COH_.) = 'xxxxxxxxx' ) );
      nm06.nm06( KEEP=scrssn VISN sex age dxprime dxf2-dxf13
                 WHERE = ( PUT(scrssn, COH_.) = 'xxxxxxxxx' ) );
 ARRAY DD dx:; DO OVER DD;
                IF DD IN:('29','30','310','311' )
                THEN AdmitPsyc06=1;
               END;
RUN;

PROC SQL;
  CREATE TABLE ippsy06 AS SELECT SCRSSN,
   MAX(ADMITPSY06>0) AS AdmitPsy06,
   SUM( admitpsy06>0 ) as nAdmitPsy06
    FROM pmxmnm06
    GROUP BY scrssn;
QUIT;
```

Old Way – Outpatient Visits

```
* assess types of OP use from Clinic Stop Codes (CL and CLC) *;

DATA   tmp1.a   tmp2.b;
 MERGE oef(IN=in1)    se07.se07(KEEP=scrssn VISN sex age cl IN=in2);
    BY scrssn;
  IF in1 AND in2;
    IF age LE 18 THEN age=.;
    IF age GT 85 THEN age=.;
 IF FIRST.scrssn THEN OUTPUT tmp1.a;
   IF CL NE . THEN OPviz=1;                      * could be pharmacy only ;
   IF CL IN( 301, 322, 323, 348, 350 ) THEN Primviz=1;
   IF ( Primviz NE 1 ) AND ( 300 LE CL LE 349 ) THEN Specviz=1;
   IF ( 500 LE CL LE 599 ) THEN psyviz=1;        * could split into SUD-related and other psy ;
   IF ( CL IN( 130, 131 ) THEN Edurgent=1;       * these codes were put into use March 2007 ;
   IF CL >. AND psyviz NE 1
            AND Primviz NE 1
            AND Specviz NE 1
   THEN OthViz=1;
  OUTPUT tmp2.b;
RUN;
            * aggregate to case level: here, this is the person *;
PROC SQL;
 CREATE TABLE  se07b  AS SELECT scrssn,
    MAX( opviz>0 )   AS opviz,
    MAX( primviz>0 ) AS primviz,
    MAX( specviz>0 ) AS specviz,
    MAX( psyviz>0 )  AS psyviz,
    MAX( Edurgent>) ) AS Edurgent,
    MAX( othviz>0 )  AS othviz
  FROM tmp2.b
  GROUP BY scrssn;
QUIT;
```

Outpatient – Legacy MedSAS

```
* Can still output files at VINCI for downloading and reading back into local
SAS *;


DATA _NULL_;
        SET  se10.se10 (WHERE = (PUT(SCRSSN,COH_.) = 'xxxxxxxxx'))
             se11.se11 (WHERE = (PUT(SCRSSN,COH_.) = 'xxxxxxxxx'))
;       FILE  out1  ls=240;
        PUT
     scrssn       z9.
     VIZDAY       date9.
       VISN        2.          STA5A    $5.
       ZIP         z5.
       RACE        1.          (RACE1-RACE7) ($2.)
       ETHNIC      $2.         SEX             $1.
       MARITAL     $1.
       CL          3.          CLC             3.
       (CPT1-CPT20)    ($5.)
       DXLSF       $6.         (DXF2-DXF10)    ($6.)
        ;
     run;
```

Inpatient – Legacy MedSAS

```
LIBNAME PS09 "MDPPRD.MDP.SAS.PS09" DISP=SHR;
LIBNAME XS09 "MDPPRD.MDP.SAS.XS09" DISP=SHR;
LIBNAME PP09 "MDPPRD.MDP.SAS.PP09" DISP=SHR;
LIBNAME XP09 "MDPPRD.MDP.SAS.XP09" DISP=SHR;
LIBNAME PS10 "MDPPRD.MDP.SAS.PS10" DISP=SHR;
LIBNAME XS10 "MDPPRD.MDP.SAS.XS10" DISP=SHR;
LIBNAME PP10 "MDPPRD.MDP.SAS.PP10" DISP=SHR;
LIBNAME XP10 "MDPPRD.MDP.SAS.XP10" DISP=SHR;
LIBNAME PS11 "MDPPRD.MDP.SAS.PS11" DISP=SHR;
LIBNAME XS11 "MDPPRD.MDP.SAS.XS11" DISP=SHR;
LIBNAME PP11 "MDPPRD.MDP.SAS.PP11" DISP=SHR;
LIBNAME XP11 "MDPPRD.MDP.SAS.XP11" DISP=SHR;
```

…and so on…

Inpatient – Legacy MedSAS

```
* Create cohort of patients with inpatient hip fracture or hip fracture repair in
FY2009 *;
* To qualify as inpatient surgery, patient must have correct CPT code and also ADMITDAY
equal to OUTPATIENT DATE (Day of Surgery Admission or DOSA) ;

data SE09; DO UNTIL (FIRST.SCRSSN);
          set se09.se09
                        ( where = (
             (dxlsf=:'820' or dxf2=:'820' or
             dxf3=:'820' or dxf4=:'820' or dxf5=:'820' or
             dxf6=:'820' or dxf7=:'820' or dxf8=:'820' or
             dxf9=:'820' or dxf10=:'820') OR

            (cpt1 in('27236','27244','27245','27248','27267','27268','27269') OR
             cpt2 in('27236','27244','27245','27248','27267','27268','27269') OR
             cpt3 in('27236','27244','27245','27248','27267','27268','27269') OR
…<<< AND SO ON >>>…
            cpt18 in('27236','27244','27245','27248','27267','27268','27269') OR
            cpt19 in('27236','27244','27245','27248','27267','27268','27269') OR
            cpt20 in('27236','27244','27245','27248','27267','27268','27269') )
          )) ;
                BY SCRSSN; IF FIRST.SCRSSN; end;
          KEEP SCRSSN; RUN;
```

Inpatient – Legacy MedSAS

```
* Cohort of Hip Fracture Patients:
* Repeat for the inpatient files – PM, XM, NM *;
* Repeat for each fiscal year of interest *;
* Use macros to decrease typing burden *;
* Do not use “dxlsf” from inpatient files *;

data PM09;
    DO UNTIL (FIRST.SCRSSN);
         set PM09.PM09  ( where = (
            ( dxPRIME=:'820' or dxf2=:'820' or
            dxf3=:'820' or dxf4=:'820' or dxf5=:'820' or
            dxf6=:'820' or dxf7=:'820' or dxf8=:'820' or
            dxf9=:'820' or dxf10=:'820' or dxf11=:'820' or
            dxf12=:'820' or dxf13=:'820')
        ) ) ;
                by scrssn; if first.scrssn; END;
        keep scrssn; run;
```

Inpatient – Legacy MedSAS

```
* Cohort of Hip Fracture Patients:
* Repeat for inpatient Procedure and Surgery files – PP & PS, NP & NS, XP & XS
*;
* Inpatient procedures & surgeries use ICD9A procedure codes, not CPT codes *;
* Repeat for each fiscal year of interest *;

DATA PSXS0910;
        SET
             PS09.PS09 (WHERE=(
     Surg9cd1 in:('7855', '7905', '7925', '7935', '8151', '8152', '8153')
 OR  Surg9cd2 in:('7855', '7905', '7925', '7935', '8151', '8152', '8153')
 OR  Surg9cd3 in:('7855', '7905', '7925', '7935', '8151', '8152', '8153')
 OR  Surg9cd4 in:('7855', '7905', '7925', '7935', '8151', '8152', '8153')
 OR  Surg9cd5 in:('7855', '7905', '7925', '7935', '8151', '8152', '8153')
                       ))
             XS09.XS09 (WHERE=(
… and so on …
                       ))
   ;         KEEP SCRSSN; RUN;
```

Outpatient Utilization – Cohort to VINCI

```
* how to get cohort to vinci... 5/15/2015 ;
libname Dflt oledb
init_string="Provider=SQLOLEDB.1;
Integrated Security=SSPI;
Persist Security Info=True;
Initial Catalog=ORD_Stern_201409045D;
Data Source=vhacdwDBS03.vha.med.va.gov"
Schema=Dflt;

*PROC SQL;
INSERT INTO Dflt.CustomerCohort
SELECT RealSSN
FROM dog.partic;
QUIT; * done! 19may2015 Do not repeat. ;
```

Outpatient Utilization – Files at VINCI

VINCI Concierge Services can give you the code you need

```
* 21-MAY-2015: download the data from VINCI *;
*ALLEN FALER 5/20/2015 5:04PM WROTE: The data is ready for
download:
 1. Do not log into VINCI.
 2. Open your local copy of SAS.
 3. Run the following script to download all tables into the
same SAS Library:
 * ;

libname Src oledb
init_string="Provider=SQLOLEDB.1;
Integrated Security=SSPI;
Persist Security Info=True;
Initial Catalog=ORD_Stern_201409045D;
Data Source=vhacdwdbs03.vha.med.va.gov"
Schema=Src;
```

Data Source at VINCI, Local SAS

```
PROC SQL;
  CREATE TABLE ipcosts0 AS SELECT c.RealSSN
,c.ID
,b.*
FROM Src.CohortCrosswalk a
JOIN Src.DSS_lab b ON b.ScrSSN=a.ScrSSN
JOIN dog.partic c ON c.RealSSN=a.PatientSSN
WHERE c.enrdate182 LE b.admitday
  AND b.admitday LE c.intdatefu;
  * IPCOSTS0 has 3593 rows and 57 cols ;

PROC SQL;
CREATE TABLE opcosts0ctl AS SELECT c.RealSSN
,c.ID
,c.Group
,b.*
FROM Src.CohortCrosswalk a
JOIN Src.DSS_lab b ON b.ScrSSN=a.ScrSSN
JOIN dog.partic c ON c.RealSSN=a.PatientSSN
WHERE c.enrdate182 LE b.vizday
  AND b.admitday LE c.intdatefu
  AND c.group="B";
;QUIT;
```

Outcomes: Mortality

```
* Obtain Date of Death (DOD) from mini-vitals


DATA x2(COMPRESS=YES);
  SET x1;

       * indicate death in follow-up fiscal years ;
  diedyr2 = ( '01OCT2001'd LE dod LE '30SEP2002'd );
  diedyr3 = ( '01OCT2002'd LE dod LE '30SEP2003'd );
  diedyr4 = ( '01OCT2003'd LE dod LE '30SEP2004'd );
  diedyr5 = ( '01OCT2004'd LE dod LE '30SEP2005'd );
```

Outcomes: Mortality

```
                * recodes for DOD for surgery in VA ;
data stoppfinal(COMPRESS=YES);
  set stopp.stoppfinal ;
   yrentered = YEAR(fqualdt);
   fyentered = yrentered;
     if month(fqualdt) in (10,11,12) then fyentered=fyentered+1;
        *year of entry into study;
   yrentered = YEAR(fqualdt);
   fyentered = yrentered;
     if month(fqualdt) in (10,11,12) then fyentered=fyentered+1;
         died30d = ( 0 le dod-fqualdt le 30 );
         died90d = ( 0 le dod-fqualdt le 90 );
         died1yr = ( 0 le dod-fqualdt le 365 );
                   label died30d='died within 30 days of Index'
                         died90d='died within 90 days of Index'
                         died1yr='died within 1 year of Index'
   ;  run;
```

Outcomes: Admission for TB

```
data tb1013(COMPRESS=YES);
set admit1013( where = ( dxprime IN:("01","V1201") or
      dxf2 IN:("01","V1201") or dxf3 IN:("01","V1201") or
      dxf4 IN:("01","V1201") or dxf5 IN:("01","V1201") or
      dxf6 IN:("01","V1201") or dxf7 IN:("01","V1201") or
      dxf8 IN:("01","V1201") or dxf9 IN:("01","V1201") or
      dxf10 IN:("01","V1201") or dxf11 IN:("01","V1201") or
      dxf12 IN:("01","V1201") or dxf13 IN:("01","V1201")
                        ));
  AdmTBprimary = (dxprime=:"01");
  AdmTBsecondary = ( dxf2 IN:("01") or dxf3 IN:("01") or
      dxf4 IN:("01") or dxf5 IN:("01") or dxf6 IN:("01") or
      dxf7 IN:("01") or dxf8 IN:("01") or dxf9 IN:("01") or
      dxf10 IN:("01") or dxf11 IN:("01") or dxf12 IN:("01") or
      dxf13 IN:("01"));
  AdmTBprisec = (MAX(tbprimary, tbsecondary));
```

<continued on next slide>

Outcomes: Admission for TB, cont'd

```
        tbhx = (

dxprime=:"V1201" or dxf2 IN:("V1201") or dxf3 IN:("V1201") or
dxf4 IN:("V1201") or dxf5 IN:("V1201") or dxf6 IN:("V1201") or
dxf7 IN:("V1201") or dxf8 IN:("V1201") or dxf9 IN:("V1201") or
dxf10 IN:("V1201") or dxf11 IN:("V1201") or dxf12 IN:("V1201") or
dxf13 IN:("V1201")

                );


run;
```

Outcomes: Psychotherapy

```
DATA tx13a ( COMPRESS=YES   WHERE = ( PUT( scrssn,$coh_.) = "xxxxxxxxx" ) ) ;
 SET dx2013a;

       IF YEAR(from_date) = 2013 ;

 if px in:
              ('90804', '90805', '90806', '90807', '90808', '90810', '90811', '90812', '90813', '90814',
'90815', '90816', '90818', '90821', '90823', '90824', '90825', '90826', '90827', '90828', '90829',
'90832', '90834', '90839', '90840', '90847', '90845', '90846', '90847', '90849', '90853', '96152',
'96153', '96154', '96155', '97770')
              THEN psyther=1;

 if px in:    ( '90862')  THEN medmgt=1;   /* med mgnt no psy-therapy */

 if px in:    ( '90785', '90791', '90792', '96116', '96118', '96119' ) THEN assess=1;
...
; RUN;
```

Outcomes: Psychotherapy

- **What do the CPT codes mean? That's proprietary…but those used in VA are available or search the internet ;**

proc formats; **value $PSYCPTF**
"90804" = "90804 Individual psychotherapy, 20-30 min"
"90805" = "90805 Individual psychotherapy E/M, 20-30 min"
"90806" = "90806 Individual psychotherapy, 45-50 min"
"90807" = "90807 Individual psychotherapy E/M, 45-50 min"
"90808" = "90808 Individual psychotherapy, 75-80 mins "
"90809" = "90809 Individual psychotherapy E/M, 75-80 min"
"90810" = "90810 Interactive individual psychotherapy 20-30 mins"
"90811" = "90811 Interactive individual psychotherapy E/M 20-30 min"
"90812" = "90812 Interactive individual psychotherapy 45-50 min"
"90813" = "90813 Interactive individual psychotherapy E/M 45-50 min"
"90814" = "90814 Interactive individual psychotherapy 75-80 min"
"90815" = "90815 Interactive individual psychotherapy E/M 75-80 min"
"90832" = … <***and so on***>
;**quit**;

Outcomes: Psychotherapy

*** A format made on the fly can be used to define various groups ;**

```
DATA tx13a ( COMPRESS=YES   WHERE = (  PUT( SCRSSN, $coh_. ) = "xxxxxxxxx"
)  ) ;
 SET dx2013a;

       IF YEAR(from_date) = 2013 ;

 if  PUT( px, $CPTFMT.)          THEN psyther=1;
 if  px in: ( '90862')           THEN medmgt=1;   /* med mgnt no psy-therapy */
 if  px in: ( '90785', '90791', '90792', '96116', '96118', '96119' )
                                 THEN assess=1;
...
; RUN;
```

* next, a SQL step summarizes the data at your case level (e.g., person or admission) ;

Outcomes: Provider Type

*** A format made on the fly can be used to define various groups ;**

*** Sometimes you want to count event dates rather than every encounter the patient had ;**

```
PrimCare=PUT( provtype, $PROV_FMT.)="PRIMCARE";
SpecCare=PUT(provtype, $PROV_FMT.)="SPECCARE";
PsycCare=PUT(provtype, $PROV_FMT.)="PSYCCARE";

IF PTSD and (PsycCare) THEN PTSDdxByPsycPCP=1;  * 0 with PCP ;
IF PTSD and (PrimCare) THEN PTSDdxByPrimPCP=1; * 7481 with PCP ;
IF PTSD and (SpecCare) THEN PTSDdxBySpecPCP=1; * 0 with PCP ;
```

*** next, a SQL step would summarize the data at the DATE level ;**
*** then, a SQL step would summarize the data at your case level ;**

*** the extra step eliminates counting multiple visits on the same day ;**

Use with Specific Diagnosis

*** Define "has PTSD" as having at least 2 outpatient visits within a specified time frame such as 4 months or 1 year ;**

```
DATA pmdx_op (COMPRESS=YES);
 SET  prior12mos2 ( where=(vizday>0) );
      ARRAY dx dx:;
      DO OVER dx;
         IF  dx in  ('30981') THEN ptsd=1;
         IF  dx in: ('2962','2963','311') THEN mdd=1;
      END; RUN;

PROC SQL;
   CREATE TABLE ptsd(COMPRESS=YES) AS SELECT DISTINCT scrssn, vizday, ptsd
   FROM pmdx_op( WHERE = (ptsd=1) );

*limit to 2 or more visits;
   CREATE TABLE ptsd2(COMPRESS=YES) AS SELECT scrssn, 1 as op_ptsd
    FROM ptsd
    GROUP BY scrssn
        HAVING sum(ptsd) GE 2;  QUIT;
```

Data Access Requests through DART

REQUESTED DATA SETS:

Corporate Data Warehouse (CDW)

SQL Format
CDW Production Domains (Must complete CDW Production Domain Checklist)
CDW Raw Domains (Must complete CDW Raw Domain Checklist)
CDW DSS NDE
TIU Text Notes (Requires Real SSN Approval)
Vital Status

SAS Format
BIRLS
DSS NDE (legacy)
MedSAS Files including VetsNet Files
Vital Status Files with Scrambled SSN
Vital Status File Real SSN Crosswalk File

Mainframe - Access
BIRLS Real SSN (110JJ02)
MedSAS including VetsNet Files for National Level Real SSN (1100TT01)
MedSAS Files for VISN Level Real SSN (1100TT05)
Vital Status Files with Scrambled SSN (110NN06)
Vital Status File Real SSN Crosswalk File (110TT20)

Other Data
CAPRI/VistAWeb (Requires Real SSN Approval)
DSS Web Reports
Homeless Registry
Legacy Data Warehouses (i.e. VISN 21)
OEF/OIF Roster File **(DUA required for internal data distribution/use)**
VSSC Web Reports

Data Access Systems SAS Grid