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
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+
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
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

<table>
<thead>
<tr>
<th>Production</th>
<th>RAW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allergies</td>
<td>Compensation &amp; Pension Exam</td>
</tr>
<tr>
<td>Appointment</td>
<td>Emergency Dept. Int. Software (EDIS)</td>
</tr>
<tr>
<td>BCMA (Bar Code Medication Admin) - Inpatient</td>
<td>Echocardiogram</td>
</tr>
<tr>
<td>Consult</td>
<td>Equipment Inventory</td>
</tr>
<tr>
<td>Fee (Purchased Care)</td>
<td>Inpatient Pharmacy, IV</td>
</tr>
<tr>
<td>Health Factors</td>
<td>Inpatient Pharmacy, Unit Dose</td>
</tr>
<tr>
<td>Immunization</td>
<td>NonVA Meds</td>
</tr>
<tr>
<td>Inpatient</td>
<td>Oncology</td>
</tr>
<tr>
<td>Mental Health Assessment</td>
<td>Prosthetics</td>
</tr>
<tr>
<td>Orders (CPRS)</td>
<td>Radiology</td>
</tr>
<tr>
<td>Outpatient Pharmacy</td>
<td>Surgery</td>
</tr>
<tr>
<td>Outpatient Visits</td>
<td></td>
</tr>
<tr>
<td>Patient, SPatient</td>
<td></td>
</tr>
<tr>
<td>Staff, Sstaff</td>
<td></td>
</tr>
<tr>
<td>Surgery (Pre-surgery)</td>
<td></td>
</tr>
<tr>
<td>Vital Signs</td>
<td></td>
</tr>
</tbody>
</table>
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 (vsssc.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
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
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 many 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/National Formulary & 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”)
Outline

• What do I need to know? MedSAS and CDW
• Outpatient healthcare utilization – Questions & Data
• **Inpatient healthcare utilization – Questions & Data**
• Developing measurement constructs from inpatient/outpatient data
• Bonus Slides:
  ▫ SAS code examples from research projects
  ▫ Note: There are many other ways to code utilization
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)?
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**
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...
Outline

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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:
  ▫ vinci@va.gov

• DART (Data Access Request Tracker)

• Data Architecture Repository (DAR)
VIReC Resources

- Website
  - [http://vaww.virec.research.va.gov/Index.htm](http://vaww.virec.research.va.gov/Index.htm)

- Helpdesk
  - [VIReC@va.gov](VIReC@va.gov)

- Data LISTSERV Archive

- Factbooks & Research User Guides
  - [http://vaww.virec.research.va.gov/RUGs/RUGs-Index.htm](http://vaww.virec.research.va.gov/RUGs/RUGs-Index.htm)
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 'xxxxxxxxxx'
    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 pmxnmnm06;
SET pm06.pm06( KEEP=scrssn VISN sex age dxprime dxf2-dxf13
    WHERE = ( PUT(scrssn, COH_.) = 'xxxxxxxxxx' ) );
xm06.xm06( KEEP=scrssn VISN sex age dxprime dxf2-dxf13
    WHERE = ( PUT(scrssn, COH_.) = 'xxxxxxxxxx' ) );
nm06.nm06( KEEP=scrssn VISN sex age dxprime dxf2-dxf13
    WHERE = ( PUT(scrssn, COH_.) = 'xxxxxxxxxx' ) );
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 pmxnmnm06
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 VISON 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>1 ) 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_.) = 'xxxxxxxxxxx'))
     se11.se11 (WHERE = (PUT(SCRSSN,COH_.) = 'xxxxxxxxxxx'))
  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=vhacdwdb03.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;

```sas
data stoppfinal(COMPRESS=YES);
set stopp.stoppfinal;
yrendered = YEAR(fqualdt);
fyentered = yrendered;
if month(fqualdt) in (10,11,12) then fyentered=fyentered+1;
* year of entry into study;
yrendered = YEAR(fqualdt);
fyentered = yrendered;
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

```sas
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

```sas
   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( scrsn,$coh_.) = "xxxxxxxxxx") );
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;

```plaintext
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_. ) = "xxxxxxxxxx" ) ) ;
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";
PsyccCare=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