Assessing Inpatient and Outpatient VA Healthcare Use

December 2, 2013

Presented by:
Denise M. Hynes, MPH, PhD, RN
What particular aspects of healthcare use are you interested in measuring?
Topics for Today

- How has healthcare utilization been measured in VA studies?
- Overview of Medical SAS datasets
- Finding information in the Medical SAS datasets
- Examples of VA studies that have assessed healthcare use
- Where to go for more help

VIReC

Researchers' Guide to VA Data
Topics for Today

How has healthcare utilization been measured in VA studies?

Overview of Medical SAS datasets

Finding information in the Medical SAS datasets

Examples of VA studies that have assessed healthcare use

Where to go for more help
Objective: Examined how algorithm choice affected conclusions about mental illness-related disparities in length of stay

Study Design: Using a 2002 cohort of patients, tracked inpatient use in 2003

Data Sources: VA Inpatient MedSAS datasets, others

Healthcare Use Construct: Inpatient events and Length of stay
Research Example II:

- **Objective:** To conduct stage-adjusted analyses of the utilization rates of breast-conserving surgery

- **Study Design:** Retrospective cohort study of women Veterans diagnosed or receiving their initial treatment for breast cancer in 2000-2006 at VHA facilities

- **Data Sources:** VA Inpatient and Outpatient MedSAS Datasets, VA Cancer Registry, among others

- **Healthcare Use Construct:** Surgical procedures
Topics for Today

How has healthcare utilization been measured in VA studies?

Overview of Medical SAS datasets

Finding information in the Medical SAS datasets

Examples of VA studies that have assessed healthcare use

Where to go for more help
Audience Poll
(Heidi to convert using poll function)

How would you rate your overall knowledge of the VA MedSAS datasets?

1 (Never Used);
2;
3;
4;
5 (Used Frequently, Very familiar)
### Overview of Medical SAS Datasets

**Medical SAS (MedSAS) Inpatient and Outpatient Datasets**

- Comprehensive datasets for national VHA healthcare delivery

- Hosted on mainframe computer at Austin Information Technology Center (AITC)

- Inpatient and outpatient datasets
Overview of Medical SAS Datasets

- Available on a quarterly basis
- Researchers advised to use annual, closed-out datasets
- Common element: patient identifier (scrambled SSN)
- After the NPCD shutdown (end of FY14), FY15 outpatient utilization data will only be available in SQL tables in the Corporate Data Warehouse
VA Data Flow to the Medical SAS Datasets

*4 datasets within each category:  Main, Bed Section, Procedure, Surgery
VA Medical SAS Inpatient Datasets
4 datasets within each category of care

<table>
<thead>
<tr>
<th>File</th>
<th>Information Provided</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main</td>
<td>Summary of entire stay (episode of care) and demographic information</td>
</tr>
<tr>
<td>Bed Section</td>
<td>Data for segment of stay defined by specialty of physician managing patient’s care</td>
</tr>
<tr>
<td>Procedure</td>
<td>Information on up to 5 procedures on a given day</td>
</tr>
<tr>
<td>Surgery</td>
<td>Information on up to 5 surgeries on a given day</td>
</tr>
</tbody>
</table>
VA Medical SAS Inpatient Datasets: Acute Care

- **Datasets at AITC are named:** MDPPRD.MDP.SAS.XXyy
  - **XX** = two letter reference code below;
  - **yy** = two digit FY

<table>
<thead>
<tr>
<th>File</th>
<th>Reference</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main</td>
<td>PM</td>
<td>1970 - present</td>
</tr>
<tr>
<td>Bed Section</td>
<td>PB</td>
<td>1984 – present</td>
</tr>
<tr>
<td>Procedure</td>
<td>PP</td>
<td>1988 - present</td>
</tr>
<tr>
<td>Surgery</td>
<td>PS</td>
<td>1984 - present</td>
</tr>
</tbody>
</table>
# VA Medical SAS Outpatient Datasets

<table>
<thead>
<tr>
<th>File</th>
<th>Information Provided</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visit</td>
<td>Reports services provided to a patient in a 24-hour period at a single facility</td>
</tr>
<tr>
<td>Event</td>
<td>Provides information about individual outpatient encounters</td>
</tr>
<tr>
<td>Inpatient Encounters</td>
<td>Provides information about professional services received during inpatient stay</td>
</tr>
</tbody>
</table>
**VA Medical SAS Outpatient Datasets**

Datasets at AITC are named: MDPPRD.MDP.SAS.XXyy

**XX** = two letter reference code below; **yy** = two digit FY

<table>
<thead>
<tr>
<th>File</th>
<th>Reference</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visit</td>
<td>SF</td>
<td>1980 - present</td>
</tr>
<tr>
<td>Event</td>
<td>SE</td>
<td>1998 – present</td>
</tr>
<tr>
<td>Inpatient Encounters</td>
<td>IE</td>
<td>2005 - present</td>
</tr>
</tbody>
</table>
Visit vs. Event File

Patient’s Outpatient Clinic Stops

During One Day at One Facility

Visit

Primary Care Clinic Stop

Event

Ophthalmology Clinic Stop

Event

Physical Therapy Clinic Stop

Event
Clinics are identified using Clinic Stop Codes (equivalent to DSS Identifiers)

- **Primary Clinic Stop Code (CL)**
  - Identifies production units or revenue centers for outpatient care

- **Secondary Clinic Stop Code (CLC)**
  - Further specifies team, service, funding
VA Medical SAS Outpatient Datasets
Clinic Stop Examples

- **216203** Telephone Audiology Rehab Support Service
- **216204** Telephone Speech Rehab Support Service
- **216210** Spinal Cord Injury Telephone Support

- **116329** Respiratory Therapy Procedures
- **116714** Respiratory Therapy Education
Outpatient Visit File (SF)

- One record per visit
- One VA facility per visit
- Up to 15 primary clinic stops per visit at the given facility
- No diagnosis or procedure information

Top 5 Primary Clinic Stops in FY2012 Visit File (from first 3 million records)

<table>
<thead>
<tr>
<th>Primary Clinic Stop Code</th>
<th>Name</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>108</td>
<td>LABORATORY</td>
<td>20</td>
</tr>
<tr>
<td>323</td>
<td>PRIMARY CARE MEDICINE</td>
<td>12</td>
</tr>
<tr>
<td>338</td>
<td>TELEPHONE PRIMARY CARE</td>
<td>5</td>
</tr>
<tr>
<td>502</td>
<td>MENTAL HEALTH CLINIC- INDIVIDUAL</td>
<td>4</td>
</tr>
<tr>
<td>105</td>
<td>X-RAY</td>
<td>3</td>
</tr>
</tbody>
</table>
Outpatient Event File (SE)

- One record per clinic stop
- One secondary clinic stop per record
- No limit on # records/day
- Combines diagnostic and procedural information in one dataset

Top 5 Secondary Clinic Stops in FY2012 in Event File (from first 3 million records)

<table>
<thead>
<tr>
<th>Secondary Clinic Stop Code</th>
<th>Name</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>(None)</td>
<td></td>
<td>63</td>
</tr>
<tr>
<td>117</td>
<td>NURSING</td>
<td>8</td>
</tr>
<tr>
<td>125</td>
<td>SOCIAL WORK SERVICE</td>
<td>4</td>
</tr>
<tr>
<td>185</td>
<td>PHYSICIAN EXTENDER (NP)</td>
<td>2</td>
</tr>
<tr>
<td>323</td>
<td>PRIMARY CARE MEDICINE</td>
<td>2</td>
</tr>
</tbody>
</table>
Outpatient Event (SE) File

- **ICD-9 Codes:** Up to 10 diagnoses per record

- **CPT-4 Codes:**
  - Until FY2004: 15 procedures, no repeats allowed
  - Since FY2005: 20 procedures, repetition allowed

- **Since FY2003, Encounter ID**
  - Links Event dataset with HERC Outpatient Average Cost Dataset
Inpatient Encounters File (IE)

- Encounter in clinic during inpatient stay
- Excludes services in outpatient SE file
- Data available beginning FY2005

Top 5 Primary Clinic Stops in FY2012
Inpatient Encounters File (from first 3 million records)

<table>
<thead>
<tr>
<th>Primary Clinic Stop Code</th>
<th>Name</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>105</td>
<td>X-RAY</td>
<td>9</td>
</tr>
<tr>
<td>202</td>
<td>RECREATION THERAPY SERVICE</td>
<td>8</td>
</tr>
<tr>
<td>205</td>
<td>PHYSICAL THERAPY</td>
<td>7</td>
</tr>
<tr>
<td>166</td>
<td>CHAPLAIN SERVICE-INDIVIDUAL</td>
<td>6</td>
</tr>
<tr>
<td>116</td>
<td>RESPIRATORY THERAPY</td>
<td>6</td>
</tr>
</tbody>
</table>
Topics for Today

- How has healthcare utilization been measured in VA studies?
- Overview of Medical SAS datasets
- Finding information in the Medical SAS datasets
- Examples of VA studies that have assessed healthcare use
- Where to go for more help
Finding Information in the Medical SAS Datasets

At a Glance

Introduction to VIReC and VA data: Learn about VIReC's role in VA research and how to navigate our website.

Data Issues Brief: VIReC's monthly newsletter provides researchers current news and updates.

HSRDatalist: Join our virtual community of VA researchers.

Resources for Researchers

Data Sources and Data Topics: Select a specific data source or data topic described by VIReC.

Research User Guides (RUGs): Detailed descriptions of select VA data sources, including variable descriptions.

Data Reports: A complete list of technical reports, data...
Where do you usually go to find information about VA data?

Write your answer on the white board!
Finding Information in the Medical SAS Datasets

Note: Information in each Research User Guide is current and accurate for the fiscal years noted in the publication or as of the date released. While previous issues of these guides may be of use to researchers, it is important to remember archived information may no longer be accurate.

Research User Guides

Assistant Deputy for the Undersecretary of Health (ADUSH) Enrollment File

Released: December 2006

- Abstract

Decision Support System (DSS)

**VIREC Research User Guide VHA DSS Clinical National Data Extracts 2nd Edition**
Released: September 2009

- Abstract
- Archive

Medical SAS Datasets

**VIREC Research User Guide: Fiscal Year 2009 VHA Medical SAS® Inpatient Datasets**
Released: February 2011

- Abstract

**VIREC Research User Guide: Fiscal Year 2009 VHA Medical SAS® Outpatient Datasets & Inpatient Encounters Dataset**
Released: April 2011

- Abstract
- Archive
Finding Information in the Medical SAS Datasets

VIReC Research User Guide:
Fiscal Year 2009 VHA Medical SAS® Inpatient Datasets
### List of Variables and their Dataset Locations

This section lists variables and their dataset locations for the fiscal year (FY) 2009 VHA Medical SAS® Inpatient Acute Care Main, Bed Section, Procedure and Surgery datasets. An X in the frequency column indicates VIReC provides additional summary information for this variable in VIReC Select Variable Frequencies: Medical SAS® Datasets [18].

**Table 5. FY09 VHA Medical SAS® Inpatient Variables and their Dataset Locations**

<table>
<thead>
<tr>
<th>Name</th>
<th>Definition</th>
<th>Main</th>
<th>Bed Section</th>
<th>Surgery</th>
<th>Procedure</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABO</td>
<td>Number of days a patient was out of the hospital on pass during an inpatient stay</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADMIIDAY</td>
<td>Date of admission of the inpatient stay</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADMITMO</td>
<td>Month of admission of the inpatient stay</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADMITYR</td>
<td>Year of admission of the inpatient stay</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADTIME</td>
<td>Time of admission of the inpatient stay</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AFINX</td>
<td>Indication of whether the admission was to a substitution of the parent hospital</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AG15Y</td>
<td>Categorical recoding of AGE (Age In Years) into 15 groupings</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AG8R</td>
<td>Categorical recoding of AGE (Patient age in years at discharge) into 8 groupings</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AG9R (Note 1)</td>
<td>Categorical recoding of AGE (patient age in years at the time of visit) into 9 groupings</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Variable Name:** DXLSF

**Definition:** Primary ICD-9-CM diagnostic code responsible for the patient’s full length of stay in the hospital.

**Remarks:** DXLSF is the “primary” diagnosis, rather than the “principal” diagnosis (DXPRIME, the diagnosis determined to be the reason for admission) used in many other facilities (for a domiciliary, it is the diagnosis of “greatest clinical significance”). Until FY1981, ICD-8-A was used, and only the first four digits were defined except in special cases. Until FY1986, admitting diagnosis, DXAFULL, was also in the SAS® datasets. DXAFULL was eliminated since it was usually identical to primary diagnosis at discharge. In FY1997, the admitting diagnosis was reestablished as DXPRIME. Currently, DRG codes (see DRG) are based on DXPRIME. This is consistent with coding recommended by the Department of Health and Human Services (DHHS) through its SAS® dataset subcommittee definitions.

<table>
<thead>
<tr>
<th>Data Type</th>
<th>Character</th>
</tr>
</thead>
<tbody>
<tr>
<td>Print Format</td>
<td>None</td>
</tr>
<tr>
<td>Label</td>
<td>DX LOS-FULL STAY (ICD9) (6-digit) FY1999-FY2005 PRIMARY DX LOS – FULL STAY (ICD9) (6-DIGIT), FY06-to date</td>
</tr>
</tbody>
</table>
Finding Information in the Inpatient Medical SAS Datasets to assess Admission and Discharge

All inpatient datasets include:

- Admission date and time
- VISN and station number (facility)
- Discharge date and time
- Discharge status
- Discharge type
What if you are only interested in veterans’ healthcare use?
Can I identify non-veterans for exclusion?

- **Small number of patients (1-2%) receiving healthcare in VHA are not Veterans**
  - VA employees
  - Veterans’ family members

- **In the MEDSAS Datasets**
  - Indicates if a particular stay or visit is covered because the patient is a Veteran
Excluding non-Veterans from MEDSAS Data: HERC Methods, 2006

- Used the variables: Means Test, Period of Service, Compensation & Pension Status (Inpatient), & Eligibility (Outpatient)

- **Results:**
  - Overall, non-Vets made up 0.97% of Inpatient records and 2.17% of Outpatient records
  - For females, non-Vets made up 11.77% of Inpatient records and 22.09% of Outpatient records
To identify non-veterans
Use the VSF

**VA Vital Status File**
- Created for best source of death dates
- Also contains a VET FLAG
- Two VSF that comprise info from multiple sources, including MEDSAS, DSS, enrollment files, others:
  - **Master File**: 17.3 million any VHA individuals
  - **Mini File**: 15.4 million only those with “proof of veteran status” in one source
  - Difference in Files (about 2 million) indicates those using VHA who may not be veterans
Finding Information in the Inpatient Medical SAS Datasets to assess Physician Specialty

- **BEDSECN** variable identifies specialty of physician managing patient's care
  - Found in Bed Section and Procedure datasets
  - Contains treating specialty code
  - One inpatient stay may have many bedsection stays
Finding Information in the Inpatient Medical SAS Datasets to assess Diagnoses

**DXLSF: Primary Diagnosis for Admission**
- Diagnosis initially assigned at admission
- May be different than DXPRIME if diagnosis changes after study/test results
- Not coded by HIM

**DXPRIME: Principal Diagnosis**
- Condition which, after study, is determined chiefly responsible for the admission to the hospital.
- Codes assigned by professional coders (HIM)
- Leads to the calculation of the DRG
Finding Information in the Inpatient Medical SAS Datasets to assess Diagnoses

**DXF2 – DXF13***
- Secondary ICD-9-CM diagnosis codes for full hospital stay
- MAIN data set only

**DXLSB, DXB2-DXB5**
- Diagnoses related to the Bed Section stay

*Number of secondary diagnoses codes changed from 9 to 12 in FY2005*
Finding Information in the Inpatient Medical SAS Datasets to assess Procedures

- Procedure datasets contain:
  - Procedures not performed in an operating room
  - Dialysis type & number of dialysis treatments

- Surgery datasets contain:
  - Surgeries performed in operating room

A “procedure” in one facility may be considered “surgery” in another facility. Check both datasets.

- Inpatient MedSAS datasets use ICD-9 procedure codes
Finding Information in the Inpatient Medical SAS Datasets to assess Length of Stay

- **Records are created at discharge for the full stay, even if the admission was in a prior year**
  - **Exception:** Claims for Non-VA Care included in dataset for year paid, not for year of care

- **Inpatient dataset includes length of stay**
  - **LS=[(DISDAY – ADMITDAY) – (ABO + PASS)]**
  - with minimum value of 1
Finding Information in the Outpatient Medical SAS Datasets to assess Use by Diagnoses

- **Outpatient Event (SE)**
  - 1997 to present

- **Inpatient Encounters (IE)**
  - 2005 to present

- **DXLSF**
  - Primary diagnosis

- **DXF2-DXF10**
  - Secondary diagnoses

### Top 5 DXLSF in FY2012 SE File (from first 3 million records)

<table>
<thead>
<tr>
<th>DXLSF</th>
<th>Values</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>30981</td>
<td>Posttraumatic stress disorder</td>
<td>5</td>
</tr>
<tr>
<td>V6540</td>
<td>Other counseling NOS</td>
<td>4</td>
</tr>
<tr>
<td>V6549</td>
<td>Other specified counseling</td>
<td>4</td>
</tr>
<tr>
<td>4019</td>
<td>Unspecified essential hypertension</td>
<td>4</td>
</tr>
<tr>
<td>25000</td>
<td>Diabetes mellitus without mention of complication</td>
<td>4</td>
</tr>
</tbody>
</table>
Finding Information in the Outpatient Medical SAS Datasets to assess Use of Procedures

- Outpatient Event (SE)
- Inpatient Encounters (IE)
- CPT1-CPT20*
- CPT-4 Codes

*Number of CPT codes changed from 15 to 20 in FY2005

Top 5 CPT1 Codes in FY2012 SE File (from first 3 million records)

<table>
<thead>
<tr>
<th>CPT1</th>
<th>Values</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>98966</td>
<td>Telephone assessment by non-physician</td>
<td>8</td>
</tr>
<tr>
<td>99213</td>
<td>Moderate severity OP visit for established patient</td>
<td>5</td>
</tr>
<tr>
<td>99211</td>
<td>Minimal severity OP visit for established patient</td>
<td>4</td>
</tr>
<tr>
<td>99214</td>
<td>High severity OP visit for established patient</td>
<td>4</td>
</tr>
<tr>
<td>85025</td>
<td>CBC</td>
<td>3</td>
</tr>
</tbody>
</table>
Finding Information in the Outpatient Medical SAS Datasets to assess Use by Provider Types

- **Physician specialty recorded using CMS provider class**
  - PROV1-PROV10

- **Outpatient Event (SE)**

- **Inpatient Encounters (IE)**

<table>
<thead>
<tr>
<th>Provider Types</th>
<th>Values</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>181000</td>
<td>INTERNAL MEDICINE</td>
<td>11</td>
</tr>
<tr>
<td>182402</td>
<td>PATHOLOGY</td>
<td>9</td>
</tr>
<tr>
<td>070900</td>
<td>REGISTERED NURSE</td>
<td>8</td>
</tr>
<tr>
<td>115500</td>
<td>RESIDENT ALLOPATHIC</td>
<td>4</td>
</tr>
<tr>
<td>070804</td>
<td>LICENSED PRACTICAL NURSE</td>
<td>4</td>
</tr>
</tbody>
</table>
Topics for Today

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Objective: To assess frequency of diagnosis of pulmonary malignancy, after hospitalization for pneumonia

Study Design: Retrospective cohort, VA inpatients from FY2002-2007, age ≥ 65 years

Data Sources: VA Inpatient and Outpatient MedSAS Datasets, among others

Use Construct: Events after hospitalization
Inclusion/exclusion criteria

- Were age 65 years or older on the date of admission
- Had at least one outpatient clinic visit in the year preceding the index admission
- Received at least one active and filled outpatient medication within 90 days of admission
- Hospitalized during FY 2002-2007
- Had a previously validated discharge diagnosis of pneumonia/influenza
### Research Example I


<table>
<thead>
<tr>
<th>Variables</th>
<th>Post Hospitalization w/Pulmonary Malignancy (N=3760)</th>
<th>No Pulmonary Malignancy (N=36,984)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospitalization-ICU</td>
<td>285 (8)</td>
<td>5471 (15)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Hospitalization-mechanical ventilation</td>
<td>105 (3)</td>
<td>2627 (7)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Mortality at 30d</td>
<td>48 (1)</td>
<td>5222 (14)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Mortality at 90d</td>
<td>267 (7)</td>
<td>8184 (22)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Length of Stay</td>
<td>6.21 (7.4)</td>
<td>8.1 (13.3)</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>
Objective: To conduct stage-adjusted analyses of the utilization rates of breast-conserving surgery

Study Design: Retrospective cohort study of women Veterans diagnosed or receiving their initial treatment for breast cancer in 2000-2006 at VHA facilities

Data Sources: VA Inpatient and Outpatient MedSAS Datasets, among others

Use Construct: Surgical procedures
Research Example II:
Luther, Neumayer, Henderson, et al., *Am J Surg*
2013;206:72-79

Figure 1. The use of BCS and mastectomy in the VHA, 2000 to 2006.
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Obtaining Help

**VIReC Website**
- [http://www.virec.research.va.gov](http://www.virec.research.va.gov)
  - Research User Guides (RUGs)
    - Variable-level information
  - Technical Reports
  - Web-site “Toolkit for New Users of VA Data”
  - Monthly Data Issue Briefs

**Help Desk**
- virec@va.gov
- (708) 202-2413
Obtaining Help

**HSRData Listserv**

- Join at VIReC’s Intranet Web site
- Exchange of current information, ideas, questions, and answers about data and informatics issues affecting VA research
- Discussion among close to 700 VA only researchers, data stewards, managers, and other users
- Searchable archive of past discussions
Questions?
Next session:

January 6, 2014

Measuring Veterans Health Services Use in VA and Medicare

Kristin de Groot, MPH