2011 VIReC Database and Methods Cyber Seminar Series

Session Objectives

- **How has healthcare utilization been measured in VA studies?**
- **Overview of Medical SAS inpatient databases**
- **Finding information in the Inpatient Medical SAS databases**
- **Examples of VA studies that have measured VA healthcare utilization**
- **Where to go for more help**

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How has healthcare utilization been measured in VA studies?

- **Cully, J. A., Zimmer, M., Khan, M. M., & Petersen, L. A. (2008). Quality of depression care and its impact on health service use and mortality among veterans. *Psychiatr Serv., 59*, 1399-1405.**

Quality of Depression Care and Its Impact on Health Service Use and Mortality Among Veterans

Jeffrey A. Cully, Ph.D.
Meghan Zimmer, B.A.
Myrna M. Khan, Ph.D., M.B.A.
Laura A. Petersen, M.D., M.P.H.

Objective: Little is known about the effects of quality of depression care on patient outcomes other than depression status. This study examined Veterans Health Administration (VHA) data over a six-year period to determine whether quality of depression care was related to patients' health service use and mortality. *Methods:* Using a national VHA database, the authors identified 205,165 veterans with a new-onset depressive disorder and at least one filled prescription for an antidepressant medication between October 1, 1999, and September 30, 2005. Quality of depression care was assessed with antidepressant medication possession ratios and adequacy of follow-up care (three or more depression-related visits during the 84 days after a depression diagnosis). Logistic regression modeling was used to predict inpatient service use and all-cause mortality. *Results:* Of the cohort 48% received an adequate supply of antidepressant medication and 31% had three or more follow-up visits during the 84-day profiling period. Rates of adequate medication supply did not change over the six-year period, but there were improvements in adequate follow-up care over the study period (p=.03). Adequate follow-up depression care was associated with increased health service use and decreased likelihood of 12-month all-cause mortality. *Conclusions:* According to the quality indicators, less than half of patients with newly diagnosed depression received high-quality care. Notably, adequate follow-up care for depression was significantly related to reduction in odds of patient mortality at the 12-month follow-up. These findings suggest that quality of depression care may significantly affect patient outcomes, including mortality, and that further efforts to improve quality appear warranted. (*Psychiatric Services* 59:1399–1405, 2008)

Depression affects nearly 30% of veterans, making it one of the most common chronic conditions treated in the Veterans Health Administration (VHA) (1). Its impact on patient and system-level outcomes is substantial and well documented in the literature. Depression doubles the risk of mortality (2–7) and is associated with poor emotional and physical outcomes, as well as increased health service use and cost (8).

Although clinical trials for depression show that antidepressant medications and psychotherapy are generally effective, less than half of patients with a depression diagnosis receive adequate treatment (9–11). Numerous initiatives to improve the quality of depression care are either underway or have already been completed (12–14). As part of these efforts, the VHA, along with other health care administrations, has endorsed clinical practice guidelines for depression treatment and established procedures and methods to measure quality of depression care (15,16).

Guideline-adherent care improves depression-related outcomes (17–20), yet few studies have examined health service use, cost (21), and outcomes other than depression status (such as mortality and functional abilities). In studies that examined the relationship between quality of depression care and outcomes, antidepressant drug adherence was associated with increased medication adherence for comorbid conditions, decreased medical and psychiatric hospitalizations, and reduced total medical costs (21,22). Recent evidence suggests that practice-based depression interventions in primary care significantly decrease mortality over a five-year period (2). However, little evidence exists about whether depression care practices at the system level equate to changes in outcomes outside research-based interventions for patients.

The authors are affiliated with the Houston Veterans Affairs (VA) Health Services Research and Development Center of Excellence and the Michael E. DeBakey VA Medical Center, Houston. Dr. Cully is also affiliated with the Menninger Department of Psychiatry and Behavioral Sciences, Baylor College of Medicine, Houston. Dr. Petersen is also affiliated with the Department of Medicine, Baylor College of Medicine. Send correspondence to Dr. Cully at VAMC, 2002 Holcombe Blvd. (152), Houston, TX 77030 (e-mail: jcully@bcm.edu).

How has healthcare utilization been measured in VA studies?

Gender and Use of Care: Planning for Tomorrow's Veterans Health Administration

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ABSTRACT

Background: Historically, men have been the predominant users of Veterans Health Administration (VHA) care. With more women entering the system, a systematic assessment of their healthcare use and costs of care is needed. We examined how utilization and costs of VHA care differ in women veterans compared with men veterans.

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1188

- Frayne, S. M., Yu, W., Yano, E. M., Ananth, L., Iqbal, S., Thrailkill, A. et al. (2007). Gender and use of care: planning for tomorrow's Veterans Health Administration. *J Womens Health (Larchmt.)., 16,* 1188-1199.

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How has healthcare utilization been measured in VA studies?

- Romano, P. S., Mull, H. J., Rivard, P. E., Zhao, S., Henderson, W. G., Loveland, S. et al. (2009). Validity of selected AHRQ patient safety indicators based on VA National Surgical Quality Improvement Program data. *Health Serv Res., 44*, 182-204.

Patient Safety

Validity of Selected AHRQ Patient Safety Indicators Based on VA National Surgical Quality Improvement Program Data

Patrick S. Romano, Hillary J. Mull, Peter E. Rivard, Shibei Zhao, William G. Henderson, Susan Loveland, Dennis Tsilimingras, Cindy L. Christiansen, and Amy K. Rosen

Objectives. To examine the criterion validity of the Agency for Health Care Research and Quality (AHRQ) Patient Safety Indicators (PSIs) using clinical data from the Veterans Health Administration (VA) National Surgical Quality Improvement Program (NSQIP).

Data Sources. Fifty five thousand seven hundred and fifty two matched hospitalizations from 2001 VA inpatient surgical discharge data and NSQIP chart-abstracted data.

Study Design. We examined the sensitivities, specificities, positive predictive values (PPVs), and positive likelihood ratios of five surgical PSIs that corresponded to NSQIP adverse events. We created and tested alternative definitions of each PSI.

Data Collection. FY01 inpatient discharge data were merged with 2001 NSQIP data abstracted from medical records for major noncardiac surgeries.

Principal Findings. Sensitivities were 19–56 percent for original PSI definitions; and 37–63 percent using alternative PSI definitions. PPVs were 22–74 percent and did not improve with modifications. Positive likelihood ratios were 65–524 using original definitions, and 64–744 using alternative definitions. "Postoperative respiratory failure" and "postoperative wound dehiscence" exhibited significant increases in sensitivity after modifications.

Conclusions. PSI sensitivities and PPVs were moderate. For three of the five PSIs, AHRQ has incorporated our alternative, higher sensitivity definitions into current PSI algorithms. Further validation should be considered before most of the PSIs evaluated herein are used to publicly compare or reward hospital performance.

Key Words. Patient safety indicators, criterion validity, administrative data, medical errors

How has healthcare utilization been measured in VA studies?

- **Stineman, M. G., Kwong, P. L., Kurichi, J. E., Prvu-Bettger, J. A., Vogel, W. B., Maislin, G. et al. (2008). The effectiveness of inpatient rehabilitation in the acute postoperative phase of care after transtibial or transfemoral amputation: study of an integrated health care delivery system. *Arch Phys Med Rehabil., 89*, 1863-1872.**

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How has healthcare utilization been measured in VA studies?

- **Medical SAS (MedSAS) Inpatient and Outpatient Datasets**
  - Most comprehensive datasets for VA healthcare utilization information
  - National VHA health care delivery data
  - SAS datasets housed on mainframe computer at Austin Information Technology Center (AITC)
    - Divided into inpatient and outpatient datasets
    - Datasets available on a quarterly basis
    - In general, researchers are advised to use the annual, closed-out datasets
    - Common element: patient identifier (scrambled SSN)

General Description

- Services provided to inpatients are recorded in the MedSAS Inpatient datasets and Inpatient Encounters Dataset.
- Also known as PTF (Patient Treatment File)
- Common dataset structure, generally stable over time
- Broken out by fiscal year of discharge date
  - Admission may have occurred in a previous fiscal year

Inpatient Data Flow

Data Progression from the VHA Medical Centers to the AITC to the Medical SAS®

Medical SAS® Inpatient Care Setting and Datasets

VHA Medical Centers (Local VistA system)

NPCD data at AITC monitored by NDS

Acute Care: Main, Procedure, Bed Section, Surgery Datasets

Extended Care: Main, Procedure, Bed Section, Surgery Datasets

Observation Care: Main, Procedure, Bed Section Datasets

Non-VA Care: Main, Procedure, Bed Section, Surgery Datasets
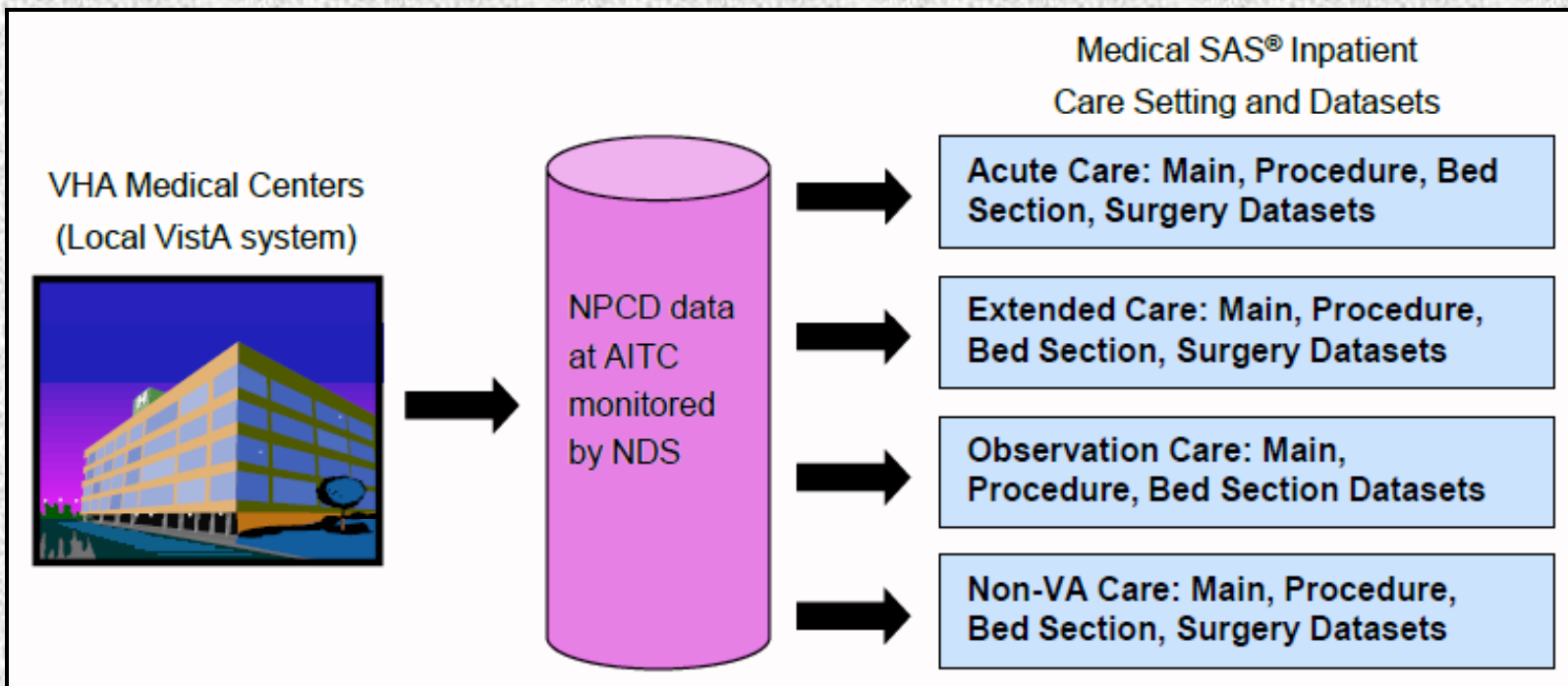
Four datasets within each category of care

- For each care setting, NDS generates and maintains a set of "detail" SAS Datasets, each providing different types of information on patient stays:
  - **Main**
    - Summary of entire stay (episode of care) and demographic information
  - **Bedsection**
    - Data on a segment of the inpatient stay defined by the specialty of the physician who managed the patient's care
  - **Procedures**
    - Contains information on up to five procedures performed at a given time on a given day
  - **Surgery**
    - Information on up to five surgeries

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Four datasets within each category of care

File	Reference (Acute Dataset)	Dates
Main	**PMyy**	**1970 - present**
Bedsection	**PByy**	**1984 – present**
Procedure	**PPyy**	**1988 – present**
Surgery	**PSyy**	**1984 - present**

Where yy= last 2-digits fiscal year

Data element examples

- Patient demographics
- Primary/secondary diagnoses
- Length of stay
- ICD-9 procedure codes
- Patient identifier (SCRSSN)
- Facility & VISN identifiers
- Admission & discharge date & time
- Discharge Type (e.g., Regular, Death-Autopsy, Non-bed Care)
- **For a complete list:**
  - http://www.virec.research.va.gov/DataSourcesName/Medical-SAS-Datasets/MedSAS-Inpt-RUG/MedSAS-RUG-Inpt.htm

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Data Access Information

- **Data Steward:**
  - National Data Systems (NDS) (John Quinn, Director)
- **Website/Where to go to find more:**
  - http://vaww.va.gov/nds/

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Strengths of Medical SAS Datasets

- **Centralized data source**

- **Large number of patients**

- **Unique identifier (SCRSSN: Scrambled Social Security Number) allows linking records across files/years**

- **Quality assessments/audits are conducted on datasets**

Limitations of Medical SAS Datasets

- **They don't capture all care paid for by VA**
  - e.g., some contract care
- **Coding may be more complete and accurate for some diagnoses or procedures than others, depending on VA needs and incentives**
  - Some conditions may be under/over-reported in VA data compared to other settings

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Where do I find information about admissions and discharges?

All inpatient datasets include:
- admission date and time
- station # (facility)
- VISN
- principal diagnosis code
- discharge date and time
- discharge status (in Main dataset only)
- discharge type (e.g., Regular, Death-Autopsy, Non-bed Care)

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- **Where can I find information on a patient's diagnosis?**
  - **DXPRIME: Principal Diagnosis**
    - The condition which, after study, is determined to be chiefly responsible for the admission of the patient to the hospital.
    - Codes assigned by professional coders (HIM)
    - Leads to the calculation of the DRG
  - **DXLSF: Primary diagnosis for Admission**
    - Diagnosis initially assigned at admission.
    - This could be different than the DXPRIME as the diagnosis could change after study/tests results come back.
    - Not coded by HIM

- **Where can I find information on a patient's diagnosis (cont.)?**

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

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

- **Where do I find information about inpatient procedures?**
  - Inpatient procedure datasets contain:
    - Procedures <u>not</u> performed in an operating room
    - Dialysis type & number of dialysis treatments
  - Inpatient surgery datasets contain:
    - Surgeries performed in operating room
  - A "procedure" in one facility may be considered "surgery" in another facility. Check both datasets.

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- **How do I identify the specialty of the physician managing the patient's care?**
  - Use **BEDSECN** to identify physician specialty
    - Found in Bedsection and Procedure datasets
    - Contains the treating specialty code
    - Most common acute bedsections
      - General (acute) medicine
      - High Intensity General Psychiatry
      - Medical ICU
      - General Surgery
      - Surgical ICU

How is Bedsection defined?

- Bed section is the treating specialty of the provider who manages the patients care during the full or a portion of the inpatient stay.
- One inpatient stay may have as many as 25 bed section stays

- **How do I identify care for a defined period of time?**
  - Records are created at discharge for the full stay, even if the admission was in a prior year
  - **Exception:** Claims for Non-VA Care are included in the dataset for the fiscal year they were paid, not the year for which care was provided

How do I compute **acute length of stay**?

– Inpatient Main dataset includes LS, which includes acute and non acute information, for the entire episode of care

- Since 2006, calculated as: $LS = [(DISDAY - ADMITDAY) - (ABO + PASS)]$ w/minimum value of 1.
- Recalculate if any info missing

– For bed section LS, use bed section specific data

- Date & time of transfer into & out of bed section (BSINDAY & BSOUTDAY)

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Research Example I:
Validity of Selected AHRQ Patient Safety Indicators Based on VA National Surgical Quality Improvement Program Data
Patrick S. Romano, et al. (2008 Sept) *Health Services Research*. 44(1): 182 - 204

METHODS ARTICLE

Patient Safety

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Key Words. Patient safety indicators, criterion validity, administrative data, medical errors

- **Study Objectives.** To examine the criterion validity of the AHRQ Patient Safety Indicators (PSIs) using VA National Surgical Quality Improvement Program (NSQIP).

- **Study Design**. Examined the sensitivities, specificities, positive predictive values (PPVs), and positive likelihood ratios of five surgical PSIs that corresponded to NSQIP adverse events.

- **Data Sources**. 55,752 matched hospitalizations from *2001 VA inpatient MedSAS datasets* and NSQIP chart-abstracted data for major noncardiac surgeries.

Research Example I:
Validity of Selected AHRQ Patient Safety Indicators Based on VA National Surgical Quality Improvement Program Data
Patrick S. Romano, et al. (2008 Sept) *Health Services Research*. 44(1): 182 - 204

Figure 1: Matching 2001 VA National Surgical Quality Improvement Program (NSQIP) Records to FY01 Veteran's Inpatient Data
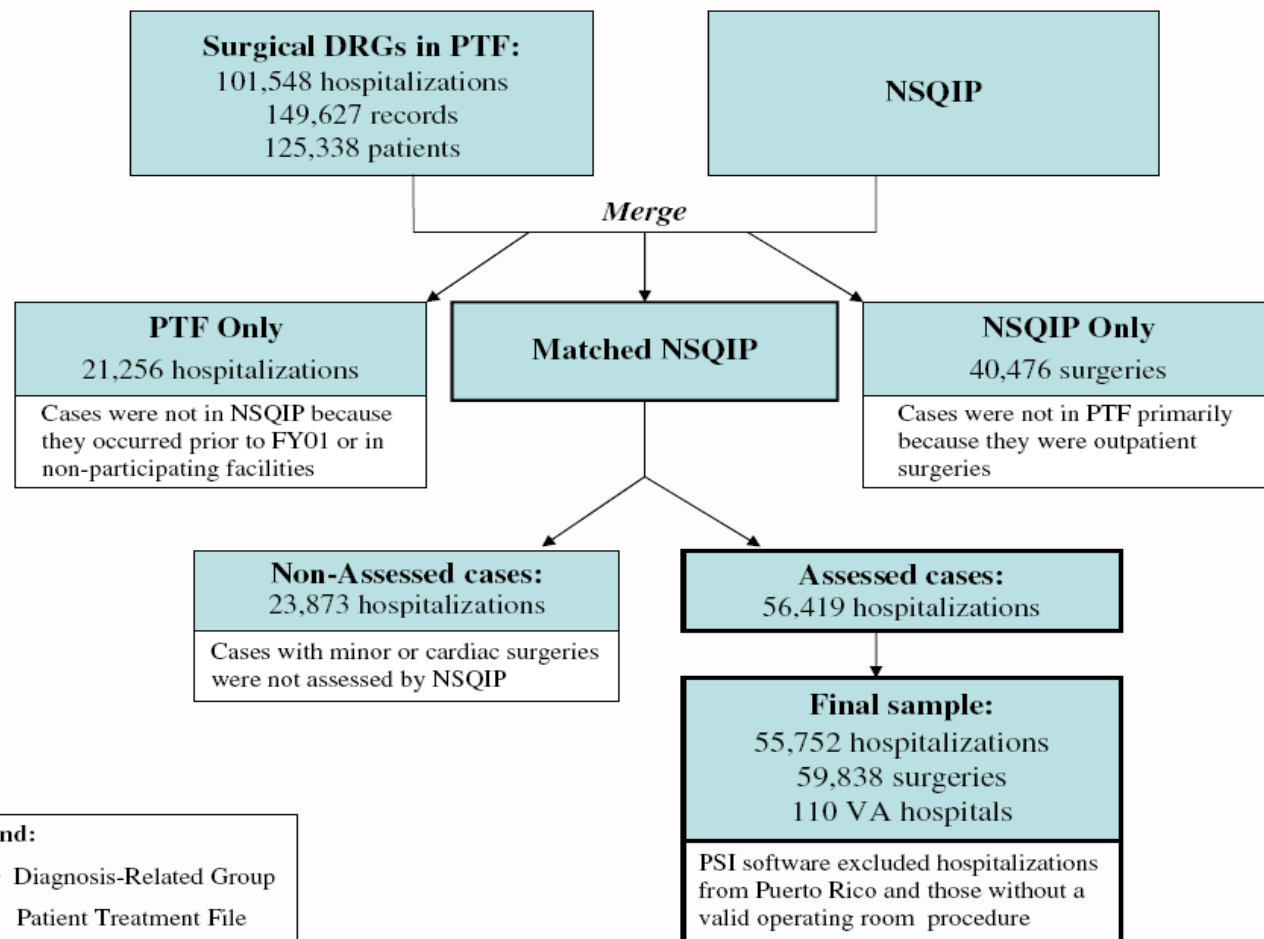
Research Example II:
Diagnosis of pulmonary malignancy after hospitalization for pneumonia.
Mortensen EM, et al (2010 Jan) *Am J Med*, 123(1):66-71.

Objective: To assess the frequency of diagnosis of pulmonary malignancy, & identify risk factors for pulmonary malignancy following hospitalization for pneumonia.

Study Design: Retrospective cohort study of VA inpatients during FY2002-7, age 65 years or older.

Data Sources:
- *VA Inpatient and Outpatient MedSAS datasets* (aka, National Patient Care Database)
- VA prescription data from the VA DSS-NDE & Pharmacy Benefits Management
- VA Vital Status file

CLINICAL RESEARCH STUDY

THE AMERICAN JOURNAL *of* MEDICINE ®

Diagnosis of Pulmonary Malignancy after Hospitalization for Pneumonia

Eric M. Mortensen, MD, MSc,[a,b] Laurel A. Copeland, PhD,[a,c] Mary Jo Pugh, PhD,[a,d] Michael J. Fine, MD, MSc,[a,f] Brandy Nakashima, MA,[a] Marcos I. Restrepo, MD, MSc,[a,g] Rosa Malo de Molina, MD,[a,g] Antonio Anzueto, MD[a,g]

[a]VERDICT Research Program and South Texas Veterans Health Care System, Audie L. Murphy Division, San Antonio; [b]Department of Medicine, [c]Department of Psychiatry, and [d]Department of Epidemiology and Biostatistics, University of Texas Health Science Center at San Antonio; [e]VA Center for Health Equity Research and Promotion, VA Pittsburgh Healthcare System, Pittsburgh, Pa; [f]Division of General Internal Medicine, Department of Medicine, University of Pittsburgh, Pa; [g]Division of Pulmonary/Critical Care Medicine, University of Texas Health Science Center at San Antonio.

ABSTRACT

BACKGROUND: Many physicians recommend that patients receive follow-up chest imaging after the diagnosis of pneumonia to ensure that a pulmonary malignancy is not missed. However, there is little research evidence to support this practice. Our aims were to assess the frequency of the diagnosis of pulmonary malignancy, and to identify risk factors for pulmonary malignancy following hospitalization for pneumonia.

METHODS: By excluding patients with a prior diagnosis of pulmonary malignancy, we examined the incidence of a new pulmonary malignancy diagnosis in inpatients aged ≥65 years with a discharge diagnosis of pneumonia in fiscal years 2002-2007, and at least 1 year of Department of Veterans Affairs outpatient care before the index admission.

RESULTS: Of 40,744 patients hospitalized with pneumonia, 3760 (9.2%) patients were diagnosed with pulmonary malignancy after their index pneumonia admission. Median time to diagnosis was 297 days, with only 27% diagnosed within 90 days of admission. Factors significantly associated with a new diagnosis of pulmonary malignancy included history of chronic pulmonary disease, any prior malignancy, white race, being married, and tobacco use. Increasing age, Hispanic ethnicity, need for intensive care unit admission, and a history of congestive heart failure, stroke, dementia, or diabetes with complications were associated with a lower incidence of pulmonary malignancy.

CONCLUSION: A small, but clinically important, proportion of patients are diagnosed with pulmonary malignancy posthospitalization for pneumonia. Additional research is needed to examine whether previously undiagnosed pulmonary malignancies might be detected at admission, or soon after, for those hospitalized with pneumonia.

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KEYWORDS: Cancer; Incidence; Pneumonia

Research Example II:
Diagnosis of pulmonary malignancy after hospitalization for pneumonia.
Mortensen EM, et al (2010 Jan) *Am J Med*, 123(1):66-71.

Inclusion/exclusion criteria

– Were age 65 years or older on the <u>date of admission</u>

– Had at least one outpatient clinic visit in the year preceding the <u>index admission</u>

– Received at least one active and filled outpatient medication within 90d of adm

– <u>Hospitalized</u> during FY 2002-7

– Had a previously validated <u>discharge diagnosis</u> of pneumonia/influenza (International Classification of Diseases, 9th Revision codes 480.0-483.99 or 485-487)

32

Research Example II:
Diagnosis of pulmonary malignancy after hospitalization for pneumonia. Mortensen EM, et al (2010 Jan) *Am J Med*, 123(1):66-71.

| Variables	Posthospitalization w/Pulmonary Malignancy (N=3760)	No Pulmonary Malignancy (N=36,984)
Age (mean, SD)	76.5 (6.3)	77.8 (6.8)
Characteristics of Hospitalization-ICU	285 (8)	5471 (15)
Outcomes		
Mortality at 30d	48 (1)	5222 (14)
Mortality at 90d	267 (7)	8184 (22)
Length of Stay	6.21 (7.4)	8.1 (13.3)

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Research Example III
Mental illness-related disparities in length of stay: Algorithm choice influences results
Frayne S, et al (2010/Nov) JRRD, 47 (8): 709-718

I. Contiguous records, *n* = 65,102

   a

   b
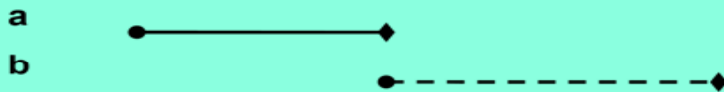
II. Record within another record, *n* = 11,711

   a

   b
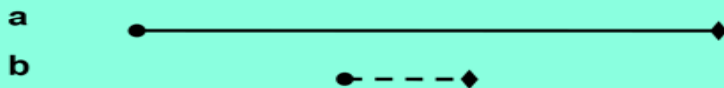
III. Overlapping discharge dates, *n* = 2,887

   a

   b
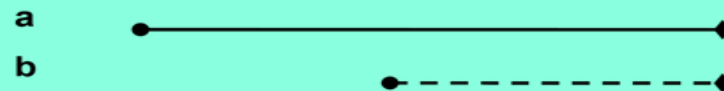
IV. Overlapping admission dates, *n* = 1,569

   a

   b
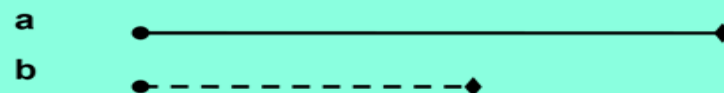
V. Partial overlap across records, *n* = 1,575

   a

   b

- **Objective:** Examined how algorithm choice affects conclusions about mental health condition (MHC)-related differences in LOS for VHA patients with diabetes.

- **Study Design:** Using a 2002 cohort of diabetes patients and tracked inpatient use in 2003.

- **Data Sources:**
  - Bedsection
  - Extended care
  - Observation
  - Census files for above
  - Fee Basis
  - Non VHA

34

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- ➤ **Where to go for more help**

VIReC Help

■ **VIReC Webpage**

http://www.virec.research.va.gov

– Information on VA data sources and how to access data

– Documentation on some VA datasets, i.e., Medical SAS datasets:

- http://www.virec.research.va.gov/DataSourcesName/Medical-SAS-Datasets/SAS.htm

- Includes lists of variables and their dataset locations

- Descriptions of each of the variables

- Values for selected variables

VIReC Help (cont'd)

- **HSRData Listserv**
  - Join at VIReC Web site
  - Discussion among > 550 data stewards, managers, and users
  - Past messages in archive (on intranet)
- **VIReC Help Desk**
  - VIReC staff will answer your question and/or direct you to available resources on topics
  - VIReC@va.gov
  - (708) 202-2413

Suggested other resources: Medical SAS Datasets: Data Quality Information

- Quality assessments performed by the Office of Inspector General, the Medical Care Cost Recovery program, and special workgroups
- Data Quality, Information Assurance, Office of Information
    - http://vaww.vhaco.va.gov/dataquality/default.htm
- VHA Coding Council - VHA Coding Handbook
    - http://vaww1.va.gov/health/him/VHACC/VA_HIM_P/coding_council1.htm

Sample Bibliography

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Questions?