

# **2010 VIReC Database and Methods Cyber Seminar Series**



2010 VIREC Database and Methods Cyber Seminar Series

# Assessing VA Health Care Use: Inpatient

Session 13

May 3, 2010

Presented by:

Denise M. Hynes, PhD, RN

Center Director and Principal Investigator, VIREC



## 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**



# Session Objectives

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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 under way 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, 2802 Holcombe Blvd., 152, Houston, TX 77030 (e-mail: jcully@bcm.edu).

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# How has healthcare utilization been measured in VA studies?

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

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LAKSHMI ANANTH, M.S.,<sup>1,3</sup> SAMINA IQBAL, M.D.,<sup>2,4</sup>  
ANN THRAILKILL, R.N.P., M.S.N., C.N.S.,<sup>1</sup> and CLARAN S. PHIBBS, Ph.D.,<sup>1,3,5,8</sup>

### 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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The views expressed in this paper are those of the authors and do not necessarily reflect the position or policy of the Department of Veterans Affairs.  
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Portions of this work (in earlier versions) were presented in the following national and regional meetings:  
S. Frayne. What do we know about women veterans' health and health care? Invited plenary presentation at Toward a VA Women's Health Research Agenda: Setting Evidence-Based Research Priorities for Improving the Health and Care of Women Veterans, Alexandria, VA, November 2004.  
C.S. Phibbs, W. Yu, L. Ananth, S. Iqbal, A. Thrailkill, E. Yano, S. Frayne. Women in the Veterans Health Administration: Medical conditions, utilization and costs of care (poster presentation). AcademyHealth National Meeting, Boston, MA, June 2005.  
C. Phibbs, S. Frayne, W. Yu, L. Ananth, S. Iqbal, A. Thrailkill, E. Yano. Women in the Veterans Health Administration: Medical conditions, utilization and costs of care. Poster presentation at VA HSR&D National Meeting, Washington DC, February 2006.  
S. Frayne et al. Accounting for veteran status changes conclusions about gender disparities. Oral presentation, Society of General Internal Medicine Regional Meeting, Stanford CA, March 2006.  
S. Frayne et al. Accounting for veteran status changes conclusions about gender disparities. Oral presentation, Society of General Internal Medicine National Meeting, Los Angeles CA, April 27, 2006 (presentation abstracts published in *Journal of General Internal Medicine*).  
The funding agency was not involved in the design and conduct of the study; collection, management, analysis, and interpretation of the data; or preparation, review, or approval of the manuscript.  
SMF had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

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- 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.



# 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.

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DOI: 10.1111/j.1475-6773.2008.00905.x

METHODS ARTICLE

## 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, Shibe 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

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# How has healthcare utilization been measured in VA studies?

ORIGINAL ARTICLE

## 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

Margaret G. Stineman, MD, Pai L. Kwong, MPH, Jibby E. Kurichi, MPH, Janet A. Prvu-Bettger, ScD, W. Bruce Vogel, PhD, Greg Maislin, MS, MA, Barbara E. Bates, MD, Dean M. Reker, PhD

**ABSTRACT:** Stineman MG, Kwong PL, Kurichi JE, Prvu-Bettger JA, Vogel WB, Maislin G, Bates BE, Reker DM. 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* 2008;89:1863-72.

**Objective:** To compare outcomes between lower-extremity amputees who receive and do not receive acute postoperative inpatient rehabilitation within a large integrated health care delivery system.

**Design:** An observational study using multivariable propensity score risk adjustment to reduce treatment selection bias.

**Setting:** Data compiled from 9 administrative databases from Veterans Affairs Medical Centers.

**Participants:** A national cohort of veterans (N=2673) who underwent transtibial or transfemoral amputation between October 1, 2002, and September 30, 2004.

**Interventions:** Not applicable.

**Main Outcome Measures:** One-year cumulative survival, home discharge from the hospital, and prosthetic limb procurement within the first postoperative year.

**Results:** After reducing selection bias, patients who received acute postoperative inpatient rehabilitation compared to those with no evidence of inpatient rehabilitation had an increased likelihood of 1-year survival (odds ratio [OR]=1.51; 95% confidence interval [CI], 1.26-1.80) and home discharge (OR=2.58; 95% CI, 2.17-3.06). Prosthetic limb procurement did not differ significantly between groups.

**Conclusions:** The receipt of rehabilitation in the acute postoperative inpatient period was associated with a greater likelihood of 1-year survival and home discharge from the hospital.

From the Department of Physical Medicine and Rehabilitation (Stineman, Kwong, Kurichi, Prvu-Bettger) and Center for Clinical Epidemiology and Biostatistics (Stineman), University of Pennsylvania, Philadelphia, PA; Veterans Affairs Medical Center (VAMC), Gainesville, FL (Vogel); Department of Epidemiology and Health Policy Research, Health Science Center, Gainesville, FL (Vogel); Division of Sleep Medicine, Department of General Medicine, University of Pennsylvania, Philadelphia, PA (Maislin); Biomedical Statistical Consulting, Wyomond, PA (Maislin); VAMC Albany, NY (Bates); Albany Medical College, Albany, NY (Bates); VAMC, Kansas City, MO (Reker).

Supported by the National Center for Medical Rehabilitation Research National Institutes of Health (grant no. R01-HD027290), and resources and the use of facilities at the James S. Stinson Department of Veterans Affairs Medical Center in Albany, NY, and the Kansas City Department of Veterans Affairs Medical Center in Kansas City, MO.

No commercial party having a direct financial interest in the results of the research supporting this article has or will confer a benefit on the authors or on any organization with which the authors are associated.

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Results support early postoperative inpatient rehabilitation following amputation.  
**Key Words:** Amputation; Continuity of patient care; Delivery of health care, integrated; Lower-extremity; Outcome and process assessment (health care); Rehabilitation; Selection bias.  
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**STUDYING THE NEEDS** and outcomes of people after transtibial or transfemoral amputation is critical at this time. In the United States, more than 60,000 major lower-extremity amputations were recorded in VHA facilities between 1989 and 1998<sup>1</sup> and more than 83,000 in Medicare facilities between 1969 and 1997.<sup>2</sup> Changes in both VHA and Medicare policies are stimulating shifts from inpatient to outpatient services without empirical evidence either supporting or not supporting those services.

Despite the expected growth of the population of patients with lower-extremity amputation, their complex functional needs have been greatly understudied, and studies of rehabilitation interventions after amputation are urgently needed.<sup>3</sup> A search of the Cochrane and Medline databases (November 2007) for studies related to either dysvascular or traumatic amputation failed to identify any experimental or quasi-experimental trials that addressed the effects of rehabilitation services on outcomes. One study<sup>4</sup> applied multivariable techniques to adjust for patients' propensity to receive rehabilitation. Results showed significantly higher likelihoods of community discharge from nursing homes among patients who received rehabilitation across 5 diagnostic categories, but there were too few amputees to conduct the analysis for this sixth diagnostic group. A second study<sup>5</sup> found that longer periods of inpatient rehabilitation were associated with improved physical functioning among a cohort of 146 patients after traumatic amputation at a single trauma center. This study did not include dysvascular amputees. Previous studies of the effects of rehabilitation after amputation have largely been descriptive.<sup>6,7</sup>

Although only prospective RCTs can assign a causal effect of treatment to outcome differences, issues of clinical equipoise and

### List of Abbreviations

CI	confidence interval
IRF	inpatient rehabilitation facility
OR	odds ratio
PTF	Patient Treatment File
RCT	randomized controlled trial
VAMC	Veterans Affairs Medical Center
VHA	Veterans Health Administration

*Arch Phys Med Rehabil* Vol 89, October 2008

- 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 Inpatient and Outpatient Datasets

- Most important 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)



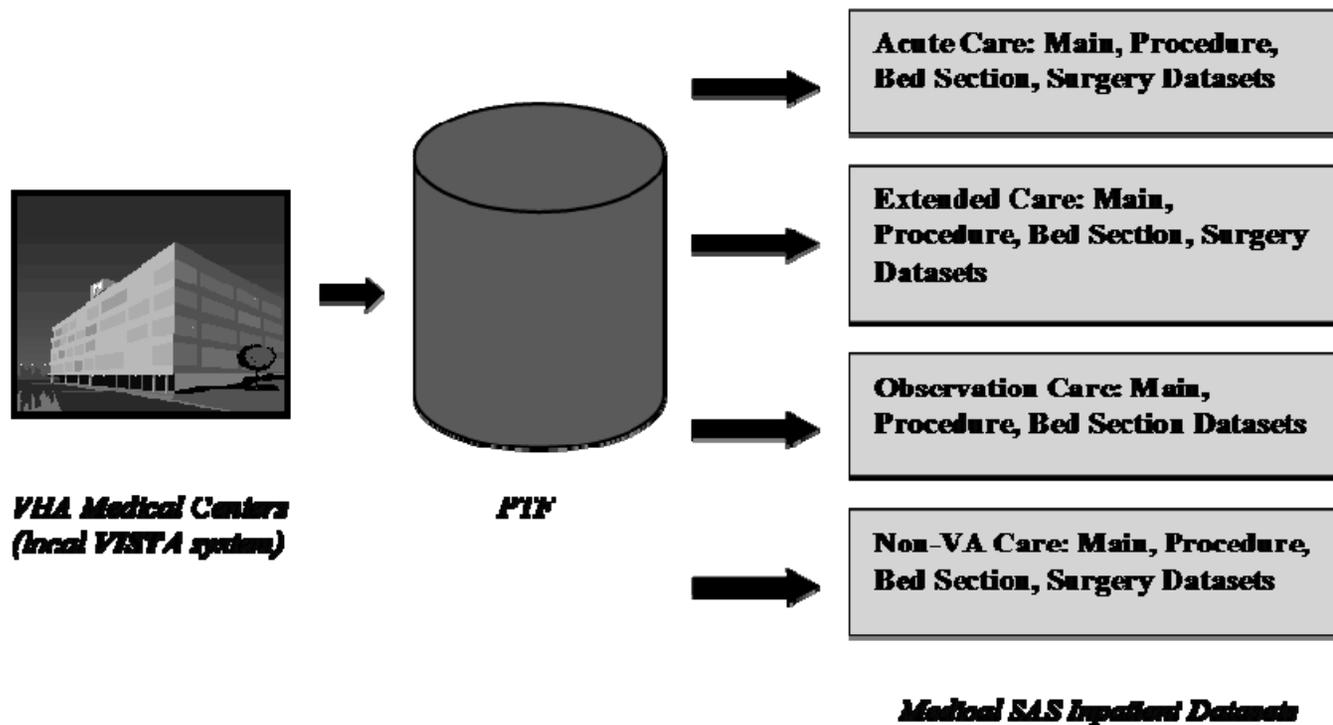
# General Description

- Inpatient services are recorded in the Medical SAS (MedSAS) Inpatient datasets
- 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 Flow from the VHA Medical Centers to the Austin Information Technology Center (AITC) to the Medical SAS Inpatient Datasets



**Four datasets within each category of care**

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

Where yy= last 2-digits fiscal year



# Data element examples



- Patient demographics
- Primary/Secondary Diagnosis
- Length of Stay
- ICD-9 Procedure and Surgery Codes
- Patient identifier (SCRSSN)
- Facility & VISN identifiers of where care provided
- Admission & Discharge Date & Time
- Discharge Type (e.g., Regular, Death-Autopsy, Non-bed Care)
- **For a complete list:**
  - <http://vaww.virec.research.va.gov/References/RUG/RUG-Inpatient06.pdf>

# Data Access Information

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



# 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 are conducted on datasets



# Limitations of Medical SAS Datasets

- **Not all care dimensions**
  - VA databases contain limited information on the use of non-VA services
- **Coding may not seem complete for areas where the reason is not clinically relevant**
  - Some conditions may be under/over-reported in administrative data compared with medical records



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## Assessing Inpatient Healthcare Use: Finding info in Inpatient Medical SAS Datasets

- Where do I find information about admissions and discharges?

All inpatient datasets include:

- admission date and time
- station the patient is admitted to
- principal diagnosis code for admission
- discharge date and time
- discharge status (in Main dataset only)
- discharge type (e.g., Regular, Death-Autopsy, Non-bed Care)



## Assessing Inpatient Healthcare Use: Finding info in Inpatient Medical SAS Datasets

- Where can I find information on a patient's diagnosis?
  
- There are three sets of diagnosis codes:
  - **Diagnosis responsible for Admission**
    - Principal “Admitting” Diagnosis (**DXPRIME**)
    - Condition determined to be chiefly responsible for the admission
  
  - **Diagnosis related to Full Hospital Stay**
    - Primary “Discharge” Diagnosis (**DXLSF**)
    - Diagnosis responsible for the major part of the full stay
  
  - **Diagnosis related to Bed Section**
    - **DXLSB, DXF2-DXF13**



## Assessing Inpatient Healthcare Use: Finding info in Inpatient Medical SAS Datasets

- How are DRG codes applied in VHA?
- Before FY2008, DRG codes were based on DXPRIME (Admitting Diagnosis)
- FY2008-present, DRG codes based on MS-DRGs (Medical Severity Adjusted DRGs).
- See recent HSR&D listserv discussions about this topic.

## Assessing Inpatient Healthcare Use: Finding info in Inpatient Medical SAS Datasets

- **Where do I find information about inpatient procedures?**
  - Inpatient procedure datasets contain:
    - Procedures not occurring in an operating room (coded in ICD-9-CM)
    - Dialysis type & number of dialysis treatments
  - Inpatient surgery datasets contain:
    - Surgeries performed in operating room (coded in ICD-9-CM)
  - A “procedure” in one facility may be considered “surgery” in another facility. Check both datasets.



## Assessing Inpatient Healthcare Use: Finding info in Inpatient Medical SAS Datasets

- **How do I identify the specialty of the physician managing the patient's care?**
  - Use **bed section** to identify physician specialty
    - Found in Bedsection and Procedure datasets
    - Up to 25 bedsections per inpatient stay
    - Most common acute bedsections
      - General (acute) medicine
      - High Intensity General Psychiatry
      - Medical ICU
      - General Surgery
      - Surgical ICU



## Assessing Inpatient Healthcare Use: Finding info in Inpatient Medical SAS Datasets

- How is Bedsection defined?
- Bed Section is care provided by a treating specialty for inpatient stay (not physical location of bed).
- Bed section is the name of the treating specialty for physician who manages the patients care during the inpatient stay.



## Assessing Inpatient Healthcare Use: Finding info in Inpatient Medical SAS Datasets

### ■ 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 submitted, not the year for which care was provided



## Assessing Inpatient Healthcare Use: Finding info in Inpatient Medical SAS Datasets

- How do I compute acute length of stay (LS)?
  - Inpatient Main dataset includes information on care characteristics, including LOS, which may include extended care stay
  - Use bed section data in Inpatient dataset
    - Date & time of transfer into & out of bed section (BSINDAY & BSOUTDAY) to compute acute care LOS



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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

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DOI: 10.1111/j.1475-6773.2008.00905.x  
METHODS ARTICLE

### Patient Safety

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**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.

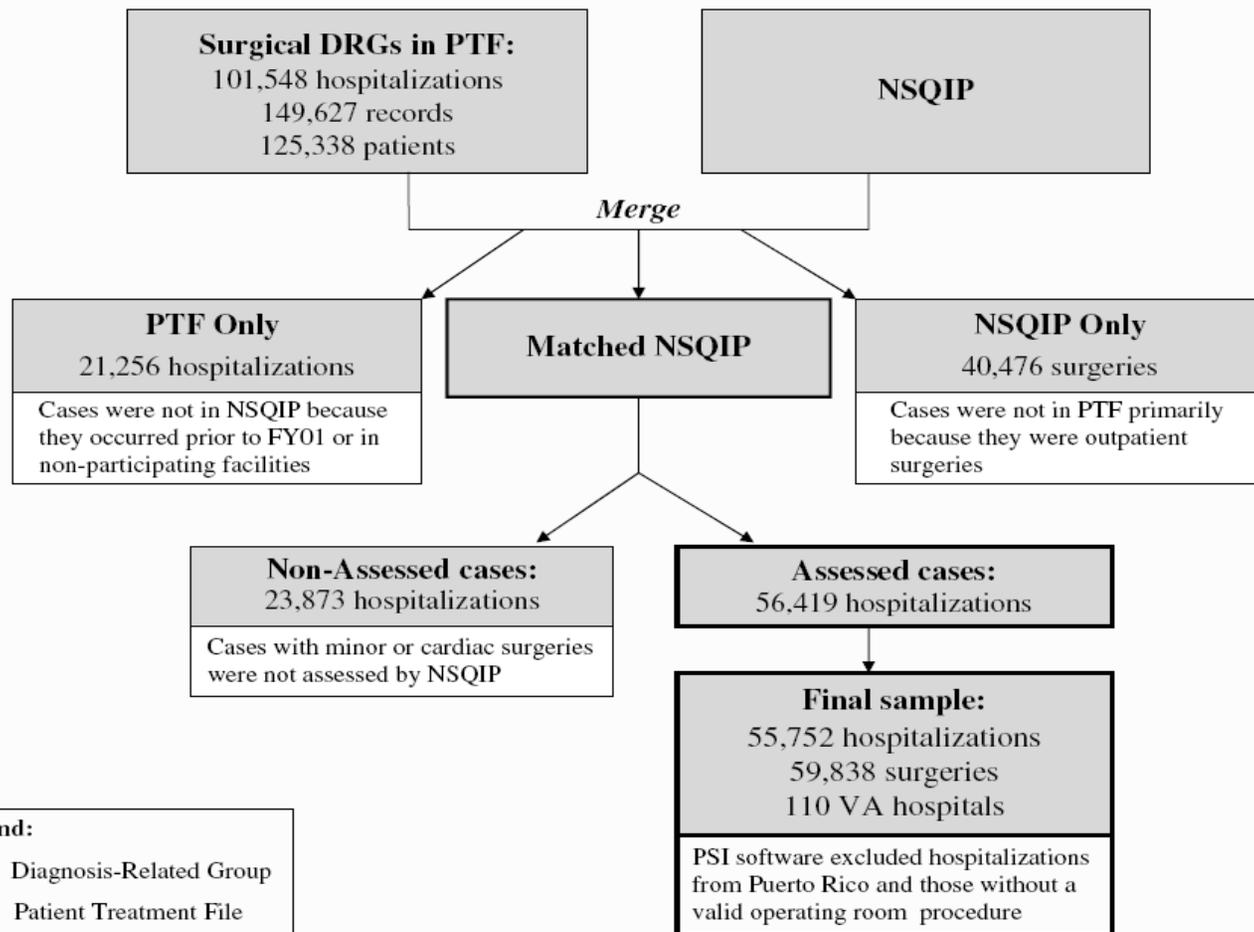
**Key Words.** Patient safety indicators, criterion validity, administrative data, medical errors

- **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

### Diagnosis of Pulmonary Malignancy after Hospitalization for Pneumonia

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<sup>a</sup>VERDICT Research Program and South Texas Veterans Health Care System, Audie L. Murphy Division, San Antonio; <sup>b</sup>Department of Medicine, <sup>c</sup>Department of Psychiatry, and <sup>d</sup>Department of Epidemiology and Biostatistics, University of Texas Health Science Center at San Antonio; <sup>e</sup>VA Center for Health Equity Research and Promotion, VA Pittsburgh Healthcare System, Pittsburgh, Pa; <sup>f</sup>Division of General Internal Medicine, Department of Medicine, University of Pittsburgh, Pa; <sup>g</sup>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  $\geq 65$  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

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**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 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 90d of adm
- Hospitalized during FY 2002-7
- Had a previously validated discharge diagnosis of pneumonia/influenza (International Classification of Diseases, 9th Revision codes 480.0-483.99 or 485-487)



**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)

## Session Objectives

- How has healthcare utilization been measured in VA studies?
- Overview of Medical SAS inpatient and outpatient 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



# 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 > 350 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](mailto: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](http://vaww1.va.gov/health/him/VHACC/VA_HIM_P/coding_council1.htm)



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**Questions?**

