

# 2009-2010 VIReC Database and Methods Cyber Seminar Series



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# Applying Comorbidity Measures Using VA and Medicare data

Session 9  
January 4, 2010

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# Session Objectives

**At the end of this session, the participant will be able to:**

- **Name 4 sources of comorbidity information in VA administrative data**
- **Identify 3 common data elements used in measuring comorbidities**
- **Recognize important measurement issues encountered when using administrative data to assess comorbidities**
- **Avoid common pitfalls in using Medicare and VA data together to assess comorbidities**



# Roadmap

## This session will

- **Focus on use of VA and Medicare data to obtain information for comorbidity measurement**
- **Build on previous seminars, e.g.,**
  - Sessions 2 & 3  
*Assessing VA Healthcare Use*
  - Session 4 Measuring  
*Outpatient Pharmacy use in VA*
  - Sessions 7 & 8  
*Measuring Health Services Use in VA and Medicare*



# Roadmap

**This session will not**

- **Discuss theoretical issues related to accounting for comorbidities in health research**
- **Examine specific comorbidity indices or scales**



# Session Outline

- **Overview**
- **Finding Comorbidity Information in VA and Medicare Data**
- **Using Administrative Data to Assess Comorbidities: Important Measurement Issues**
- **Case Study: Example of VA Study that Used VA and/or Medicare Data to Assess Comorbidities**
- **Where to Go for More Help**



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# Comorbidity

- **A concomitant but unrelated pathological or disease process<sup>1</sup>**

<sup>1</sup> American Heritage Medical Dictionary



# Comorbidities

- **Important component in evaluating**
  - Clinical outcomes
  - Resource use (e.g., costs)
  - Quality of care
- **May be conceptualized/operationalized as**
  - Covariate/confounder
  - Predictor
  - Outcome



# Examples of research questions requiring information on comorbidities

- **Comparative effectiveness studies**
  - *Is chemotherapy more effective than radiotherapy in the treatment of endometrial cancer?*
- **Healthcare disparities**
  - *Do comorbidities explain race/ethnic disparities in kidney transplants?*
- **Healthcare quality**
  - *Are VA patients more likely than those in FFS Medicare to receive recommended screening tests?*
- **Healthcare costs / Provider productivity**
  - *Who provides more cost-effective care for diabetes – endocrinologists, nephrologists or general internists?*



# Sources of Health Status Information in Administrative Data

- **Workload (VA) or claims (Medicare) data** for diagnosis and procedure codes
- **Pharmacy data** for medications specific to a disease/condition
- **Lab data** for laboratory results indicating a condition
- **Other**, e.g., program enrollment records

# Audience Poll

- **Rate your experience with using administrative data to capture comorbidities.**
  - Novice
  - Some experience
  - Expert



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# Administrative Data Sources for Comorbidity Information

## ■ Diagnosis and Procedure Codes

### VA workload data

- Medical SAS Datasets
- Fee Basis Files

### Medicare claims

- Institutional Standard Analytic Files
- Non-institutional Standard Analytic Files
- Institutional Stay Level File (MedPAR)

## ■ Medications

### – Pharmacy data

- e.g., oral hypoglycemics, insulin indicate diabetes
- VA PBM, DSS
- In future, Medicare Part D claims



# Administrative Data Sources for Comorbidity Information (cont'd)

## ■ **Laboratory Results**

- DSS Laboratory Results NDE
- e.g., elevated glycohemoglobin indicates diabetes
- Not available in Medicare data

## ■ **Other**

- e.g., condition-focused program enrollment



# Types of Diagnosis Codes

## ■ ICD-9-CM Diagnosis Codes<sup>1</sup>

- International Classification of Diseases, Ninth Revision, Clinical Modification
- Admitting code - patient's initial diagnosis at the time of admission
- Primary code-conditions chiefly responsible for the visit
- Secondary codes - conditions affecting services provided

<sup>1</sup> <http://www.cdc.gov/nchs/icd.htm>



# Types of Procedure Codes

- **ICD-9-CM procedure codes<sup>1</sup>**

- Used for inpatient services in VA and institutional Medicare claims

- **CPT<sup>®</sup> procedure codes<sup>2</sup>**

- Current Procedural Terminology
- Used for outpatient services in VA

<sup>1</sup> <http://www.ama-assn.org/ama/pub/physician-resources/solutions-managing-your-practice/coding-billing-insurance/cpt.shtml>

<sup>2</sup> <http://www.cms.hhs.gov/MedHCPCSGeninfo/>



# Types of Procedure Codes (cont'd)

- **HCPPCS (Healthcare Common Procedure Coding System) Codes**
  - Used in Medicare billing
  - Level 1: CPT<sup>®</sup> codes (services & procedures)
  - Level 2: Used to identify products, supplies, and services not included in the CPT codes (e.g., ambulance service & durable medical equipment)

## VA Diagnosis and Procedure Codes

	Admitting Diagnosis Code	Primary Diagnosis Code	Secondary Diagnosis Codes	ICD-9 Procedure Codes	CPT Procedure Codes
Inpatient Main	X	X	X		
Inpatient Bedsection	X	X	X		
Inpatient Procedure	X			X	
Inpatient Surgery	X			X	
Outpatient Visit					
Outpatient Event		X	X		X



In the VA Inpatient Main Dataset the Diagnosis and Procedures Codes are Admitting Diagnosis, Primary Diagnosis Code and Secondary Diagnosis Codes.

In the VA Inpatient Bedsection Dataset the Diagnosis and Procedure Codes are Admitting Diagnosis, Primary Diagnosis Code and Secondary Diagnosis Codes.

In the VA Inpatient Procedure Dataset the Diagnosis and Procedure Codes are Admitting Diagnosis Code and ICD-9 Procedure Codes.

In the VA Inpatient Surgery Dataset the Diagnosis and Procedure Codes are Admitting Diagnosis Code and ICD-9 Procedure Codes.

The VA Outpatient Visit Dataset does not contain the Admitting Diagnosis Code, Primary Diagnosis Code, Secondary Diagnosis Codes, ICD-9 Diagnosis Codes or CPT Procedure Codes.

In the VA Outpatient Event Dataset the Diagnosis and Procedure Codes are the Primary Diagnosis Code, the Secondary Diagnosis Code and the CPT Procedure Codes.

## Medicare Diagnosis and Procedure Codes

	Admitting Diagnosis Code	Primary Diagnosis Code	Secondary Diagnosis Codes	ICD-9 Procedure Codes	HCPCS Codes
MedPAR	X		X	X	
Inpatient	X		X	X	X
SNF	X		X	X	X
Outpatient		X	X	X	X
Hospice		X	X	X	X
Home Health		X	X		X
Carrier		X	X		X
DME		X	X		X



20

The Diagnosis and Procedure codes in the Medicare MedPAR dataset are the Admitting Diagnosis Code, the Secondary Diagnosis Codes and the ICD9 Procedure Codes.

The Diagnosis and Procedure codes in the Medicare Inpatient dataset are the Admitting Diagnosis Code, the Secondary Diagnosis Codes the ICD9 Procedure Codes and the HCPCS Codes.

The Diagnosis and Procedure codes in the Medicare SNF dataset are the Admitting Diagnosis Code, the Secondary Diagnosis Codes the ICD9 Procedure Codes and the HCPCS Codes.

The Diagnosis and Procedure codes in the Medicare Outpatient dataset and the Medicare Hospice Dataset are the Primary Diagnosis Code, the Secondary Diagnosis Codes the ICD9 Procedure Codes and the HCPCS Codes.

The Diagnosis and Procedure codes in the Medicare Home Health dataset, the Medicare Carrier Dataset and the Medicare DME Dataset are the Primary Diagnosis Code, the Secondary Diagnosis Codes and the HCPCS Codes.

# Pharmacy Data

- **For example, a VA-based version of RxRisk (Chronic Disease Score)**
  - See Sloan KL, et al. Construction and characteristics of RxRisk-V: a VA-adapted pharmacy-based case-mix instrument. *Med Care* 2003; 41(6): 761-74
  - Includes 45 chronic disease categories identified through prescription data
- **Potential value in using pharmacy-based measure versus ICD-based measures**



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# Important Measurement Issues

- **What conditions or condition groups to capture**
  - Depends on population and
  - Research question / outcome
  - Inpatient, outpatient, or both



# Important Measurement Issues

- **What conditions to capture**
- **Exclude 'rule-out' diagnoses**
  - Operational definition: Any diagnosis that *does not* meet the following criteria<sup>1</sup>
    - Appears at least once on a record/claim for inpatient care, or
    - Appears on at least two records/claims for outpatient care with visit/claim dates at least 30 days apart.

<sup>1</sup> Klabunde CN, Harlan LC, Warren JL. Data sources for measuring comorbidity: a comparison of hospital records and Medicare claims for cancer patients. *Med Care* 2006; 44: 921-28



# Important Measurement Issues

- **What conditions to capture**
- **Exclude 'rule-out' diagnoses**
- **Identify *clinician-assigned* diagnoses**
  - Avoid lab, diagnostic imaging, and other ancillary test events; DME/prosthetics; telephone encounters
  - VA – stop codes
  - Medicare – DME File, Physician Specialty codes, Claim type code, BETOS, Place of Service codes

# Identifying Non-clinician-assigned Diagnoses

- **Examples of VA Clinic Stop codes used to identify claims for exclusion**
  - X-ray 105
  - Laboratory 108
  - Telephone 103, 147, 178 (and others)
- **Examples of Medicare Physician Specialty codes used to identify claims for exclusion**
  - Diagnostic radiology 30
  - Mammography screening center 45
  - Diagnostic Lab 72

# Important Measurement Issues

- **What conditions to capture**
- **Exclude 'rule-out' diagnoses**
- **Identify clinician-assigned diagnoses**
- **Measurement time period –**
  - Active diagnoses
  - Temporal relationship between comorbidity measurement and outcome measurement
  - Anchor
    - Date
    - Event



# Analytic Strategies in Comorbidity Measurement Using Administrative Data<sup>1</sup>

- Ordinal
- Weighting
- Categorical

<sup>1</sup> Lash TL, Mor V, Wieland D, Ferrucci L, Satariano W, Silliman RA. Methodology, design, and analytic techniques to address measurement of comorbid disease. *J Gerontol A Biol Sci Med Sci*. 2007;62(3):281-285.



# Commonly Used Comorbidity Measures Using Administrative Data

- **Charlson**
  - Deyo-Charlson
  - Romano adaptation
- **Elixhauser**
- **HCC/DCG**
- **RxRisk**
- **Others**

# Combining VA and Medicare Data to Measure Comorbidities

- **Pitfall #1: Not using both data sources**
- **Differing incentives to record complete information**
- **Dates-of-service issues**
- **Multiple types of codes**



# Importance of Complete Data

## ■ Incomplete health status information

– **Byrne**, et al. 2006<sup>1</sup>

*Effect of using information from only one system for dually eligible health care users*

– **Objective:** Determine whether all diagnoses and total illness burden of patients who use both the VA and Medicare health care systems can be obtained from examination of data from only one of these systems

– **Calculated risk scores** using VA only, Medicare only, and both VA and Medicare data

<sup>1</sup> Byrne MM, Kuebeler M, Pietz K, Petersen LA. Effect of using information from only one system for dually eligible health care users. *Med Care*. 2006;44(8):768-773



# Importance of Complete Data

Byrne, et al., 2006

- On average for a given patient who used both VA and Medicare services, more diagnoses were recorded in Medicare (~13–15) than in the VA system (~8) for dual users.
- On average only 2 diagnoses were common to both the VA and Medicare.
- Medicare data alone accounted for approximately 80% of individuals' total illness burden, and VA data alone lead to RRSs that capture one-third of the total illness burden.
- The ratio of RRS when calculated using Medicare and VA separately was approximately 2.4.



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# Case Study

**Walter LC, Lindquist K, Nugent S, et al.  
Impact of age and comorbidity on colorectal  
cancer screening among older veterans. *Ann  
Intern Med.* 2009;150(7):465-473.**



# Case Study: Impact of comorbidities on cancer screening

Walter, et al. (2009)

**Background:** Older adults who are unlikely to live 5 years or have significant comorbidities that would preclude treatment are unlikely to benefit from colorectal cancer screening.

**Objective:** Determine whether colorectal cancer screening is targeted to healthy older patients and is avoided in older patients with severe comorbidity

**Note:** Comorbidity as a predictor variable

**Sample:** VA patients  $\geq 70$  years old



# Case Study: Impact of comorbidities on cancer screening

Walter, et al. (2009)

- **Comorbidity data**

- VA and Medicare
- Inpatient and outpatient

- **Comorbidity measurement**

- Measurement period: 12 months
- Anchor: Start of outcome observation period (1/1/2001)
- Deyo<sup>1</sup> adaptation of the Charlson Comorbidity Index<sup>2</sup>
  - Developed to predict mortality
  - 19 chronic diseases, weighted for strength of association with mortality



# Case Study: Impact of comorbidities on cancer screening

Walter, et al. (2009)

## ■ Comorbidity measurement (cont'd)

- Categorized scores
  - 0 = No significant comorbidity
  - 1-3 = Average comorbidity
  - $\geq 4$  = Severe comorbidity
- Additional measure:
  - Homebound (enrollment in VA Home-Based Primary Care at start of 2001)

- <sup>1</sup> Deyo RA, Cherkin DC, Ciol MA. Adapting a clinical comorbidity index for use with ICD-9-CM administrative databases. J Clin Epidemiol. 1992;45(6):613-619
- <sup>2</sup> Charlson ME, Pompei P, Ales KL, MacKenzie CR. A new method of classifying prognostic comorbidity in longitudinal studies: development and validation. J Chronic Dis. 1987; 40(5): 373-383



# Case Study: Impact of comorbidities on cancer screening

Walter, et al. (2009)

## ■ Results

### – Charlson-Deyo Score

- 0 (best health) 36%
- 1-3 (average health) 52%
- $\geq 4$  (worst health) 12%

### – Adjusted Cumulative Incidence of Screening

- 0 47.1 (47.0-47.2)
- 1-3 45.9 (45.8-46.0)
- $\geq 4$  40.5 (40.3-40.7)

## ■ Limitation

- Comorbidity index cannot account for all factors that may impact likelihood of screening, e.g., functional status



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# 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.,



# VIReC Help (cont'd)

## ■ HSRData Listserv

- Join at the VIReC Web site
- Discussion among >500 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



Questions?

