2012 VIReC Database and Methods Cyber Seminar Series

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Applying Comorbidity Measures Using VA and Medicare data

April 2, 2012

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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.,
  - *Assessing VA Health Care Use: Inpatient*
  - *Assessing VA Health Care Use: Outpatient*
  - *Measuring Health Services Use in VA and Medicare*
  - *Measuring Outpatient Pharmacy use in VA*

Roadmap

This session will not

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

Session Outline

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

Session Outline

- **Overview**
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- **Where to Go for More Help**

Comorbidity

- **A concomitant but unrelated pathological or disease process**[1]

[1] American Heritage Medical Dictionary

Comorbidities

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

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 Comorbidity Information in Administrative Data

- **Workload (VA) or claims (Medicare, Medicaid) 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)

Administrative Data Sources for Comorbidity Information (cont'd)

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

- **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**[1]
  - 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

[1] http://www.cdc.gov/nchs/icd.htm

Types of Procedure Codes

- **ICD-9-CM procedure codes**
  - Used for inpatient services in VA and institutional inpatient Medicare claims

- **CPT® procedure codes**[1]
  - Current Procedural Terminology
  - Used for outpatient services in VA

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

Types of Procedure Codes (cont'd)

- **HCPCS (Healthcare Common Procedure Coding System) Codes**[1]
  - Used in Medicare billing
  - Level 1: CPT® 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)

[1] http://www.cms.hhs.gov/MedHCPCSGeninfo/

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		X	
Inpatient Surgery	X	X		X	
Outpatient Visit					
Outpatient Event		X	X		X
Inpatient Encounters		X	X		X

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VA Fee Basis Diagnosis and Procedure Codes

	Discharge Diagnosis Codes	Secondary Diagnosis Codes	ICD-9 Procedure Codes	CPT Procedure Codes
Inpatient	X	X	X	
Inpatient Ancillary	X*			X
Outpatient	X			X

***Beginning FY2009**

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
Hospice		X	X	X	X
Home Health		X	X		X
Carrier		X	X		X
DME		X	X		X

Pharmacy Data

- **Potential value in using pharmacy-based measure versus ICD-based measures**
  - When diagnosis information is not available
  - Stable chronic conditions not occasioning a provider visit (e.g., hypertension, epilepsy)
  - Conditions for which the treatment regimen is set and time-limited (e.g., TB)

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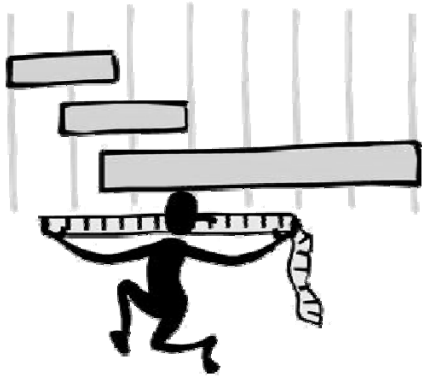
Important Measurement Considerations

- **Comorbidities vs. comorbidity burden or summary risk measure**
  - Are specific conditions of interest?
  - Summary measures
    - Provide one number—the score, simplifying the analysis
    - Allows for parsimony in statistical regression models
  - Influences data that can be used and conditions to be identified

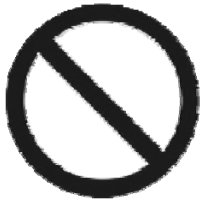


Important Measurement Considerations

- **<u>What conditions or condition groups to capture</u>**
  - Depends on
    - Population
    - Objective (e.g., case-mix adjustment)
    - Outcome (e.g., mortality? post-stroke rehab? expenditures?)
  - Data availability - inpatient, outpatient, or both
    - (e.g., See Klabunde 2000; Wang, 2000)

Important Measurement Considerations

- **What conditions to capture**
- **<u>Exclude 'rule-out' diagnoses</u>**



  - Operational definition: Any diagnosis that *does not* meet the following criteria[1]
    - 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.

[1] 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 Considerations

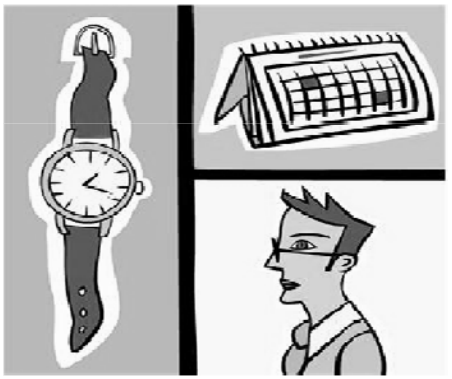
- **What conditions to capture**
- **Exclude 'rule-out' diagnoses**
- **Identify *clinician-assigned* diagnoses**
  - Avoid lab, diagnostic imaging, and other ancillary test events; DME/prosthetics; telephone encounters
  - VA – stop codes
  - Medicare – DME File, Physician Specialty codes, Claim type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

Important Measurement Considerations 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 Considerations

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



Important Measurement Considerations Special Challenges

- Measuring functional status
- Measuring severity of disease
- Undiagnosed conditions

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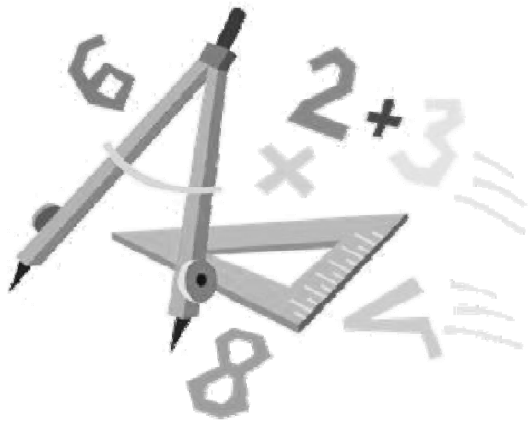
Important Measurement Considerations

- **Comorbidity measurement using administrative (i.e., electronic health record) data is tied to healthcare use**
  - Without a healthcare encounter, there is no record generated, diagnosis recorded.
  - Health services obtained outside the VA will generate procedure and diagnosis codes not available in VA data (except in the case of fee-basis care).
  - More frequent users of care will have more opportunities for diagnoses made and recorded.

Analytic Strategies in Comorbidity Measurement Using Administrative Data[1]

- **Ordinal**
- **Weighting**
- **Categorical**



[1] 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

- **ACG**
- **Charlson**
  - Deyo-Charlson
  - Romano adaptation
- **Elixhauser**
- **HCC/DCG**
- **Functional Comorbidity Index**
- **RxRisk**
- **Others**

Charlson Comorbidity Index

- Developed to predict mortality
- 19 chronic conditions
- Each has a weight
- Score = sum of weights
- Extended/adapted by Deyo, Romano

HCC / DCG Method

- **Developed to predict costs**
- **15,000 ICD-9 diagnosis codes put into**
  - 185 buckets of homogeneous conditions
- **Homogeneous condition categories (buckets) arranged hierarchically**
  - Within single organ system
  - Patients falling into more than one bucket in organ system assigned to one with highest resource use
- **HCC/DCG risk scores calculated**

Pharmacy Data

- **Example: VA-based version of RxRisk (Chronic Disease Score)**
  - Includes 45 chronic disease categories identified through prescription data
  - 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

Combining VA and CMS Data to Measure Comorbidities

- **Pitfall #1: Not using both data sources**
- **Differing incentives to record complete information**
- **Dates-of-service issues may impact measurement time period**
  - VA and Medicare inpatient care: exact diagnosis date usually not captured
  - Medicare: some services billed periodically, e.g., home health
- **Multiple types of codes**

Importance of Complete Data

- **Incomplete health status information**
  - **Byrne**, et al. 2006[1]
    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

[1] 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 captured one-third of the total illness burden.**
- **The ratio of RRSs 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[1] adaptation of the Charlson Comorbidity Index[2]
    - 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
    - ≥4 = Severe comorbidity
  - Additional measure:
    - Homebound (enrollment in VA Home-Based Primary Care at start of 2001)

[1] 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

[2] 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%
    - **≥4 (worst health)** 12%
  - **Adjusted Cumulative Incidence of Screening**
    - **0** 47.1 (47.0-47.2)
    - **1-3** 45.9 (45.8-46.0)
    - **≥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 Web site**
  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, DSS Clinical National Data Extracts

VIReC Help (cont'd)

- **HSRData Listserv**
  - Join at the VIReC Web site
  - Discussion among >650 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

Questions?

Upcoming Seminar

- **May 7**

- **Assessing Race and Ethnicity**