
Quality of Hospital Discharge Abstract Databases over Time

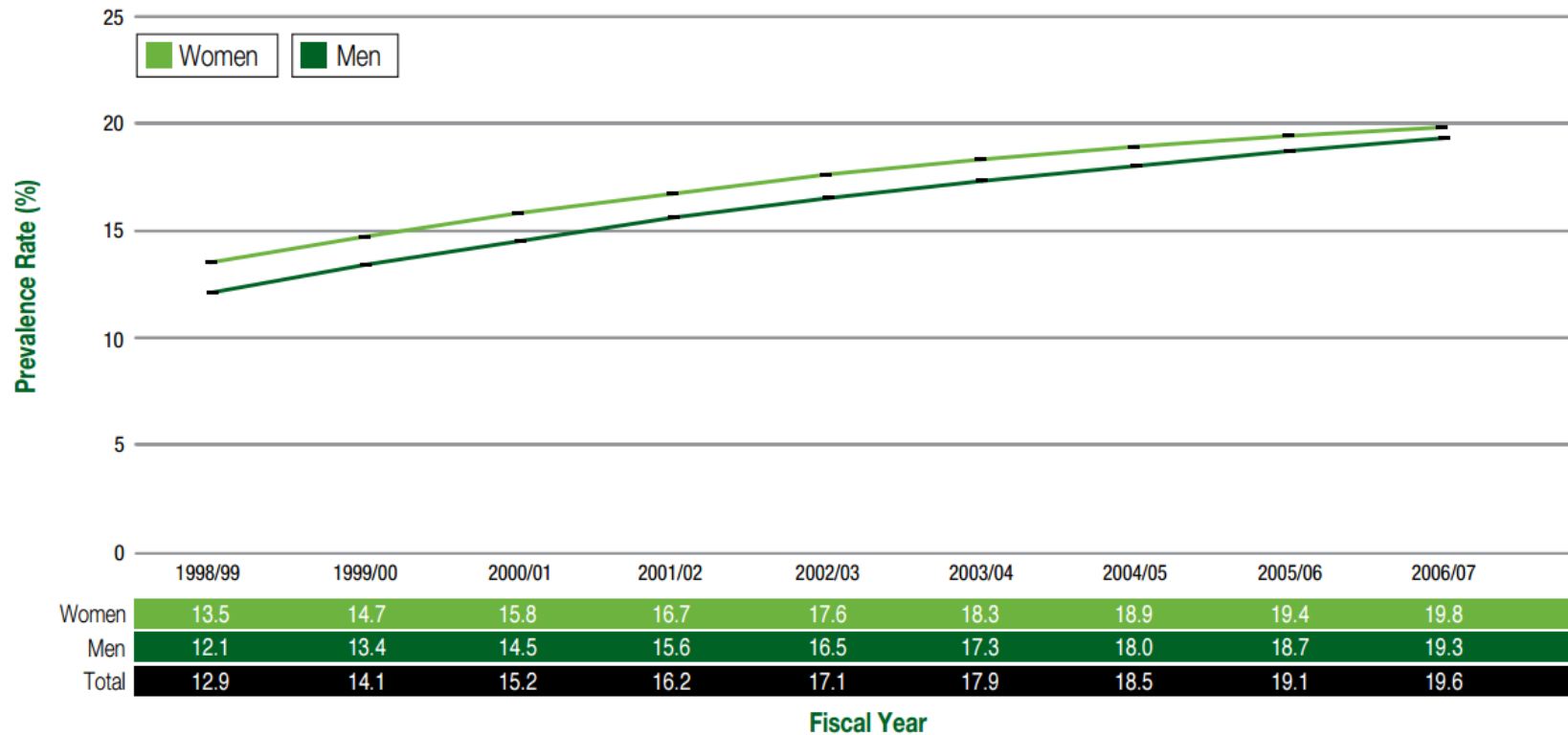
Jason Jiang
May 27, 2015

BACKGROUND

- Discharge data and administrative data as a whole is increasingly popular in health care research
- Research on data validity is increasing
- However, little research considering consistency of data validity over time
- Why should we care about whether validity is consistent over time?

BACKGROUND

Figure 1. Age-Standardized Prevalence Rates* of Diagnosed Hypertension among People Aged 20 Years and Older, by Sex, Canada,† 1998/99 to 2006/07



Source: Public Health Agency of Canada, using CCDSS data files contributed by provinces and territories as of September, 2009.

* Age-standardized to the 1991 Canadian population.

† Data for Nunavut and Québec were unavailable.

BACKGROUND

- Public Health Agency of Canada (PHAC) calculated disease prevalence using Canadian Chronic Disease Surveillance System (CCDSS)
 - Uses administrative data
 - Discharge Abstract Database (DAD)
 - Physician Claims
- Are these trends to true?
 - Consistency of data validity over time must be considered

METHODS

- Discharge abstract database (DAD)
 - Information on all inpatient hospitalizations from acute care facilities
 - Includes information on patient diagnoses/comorbidities
 - Data collected after discharge
 - Physician – Medical Charts – ICD coders
- Alberta Provincial Project for Outcome Assessment in Coronary Heart Disease (APPROACH)
 - Since 1995, contains clinical data on all patients undergoing cardiac catheterization in Alberta
 - Also contains data on patient comorbidities

OBJECTIVE

- Assess the validity of DAD in terms of 9 patient comorbidities from 2002 to 2013

METHODS

- Why APPROACH?
 - Large amount of data available over long time span
 - Allows long term time trend analysis
 - Accurate comorbidity information
 - Clinical data
 - Consistent data collection methods and training
 - Required form for comorbidities

METHODS

[Outcome Determinants (Foothills Medical Centre)]

File Catheterization Heartview CARAT Generate Reports Help

Patient
 Name: Approach Testing (RHRN)123456987
 Health Care Nr: _____
 Sex: Female
 Birth: Sep 17 1937

Set All To Unknown Set All To No

Hypertension	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> ?
Hyperlipidemia	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> ?
Diabetes Mellitus	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> ?
• Type I	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> ?
• Type II	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> ?
Renal Insufficiency	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> ?
• Chronic Renal Failure	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> ?
• Dialysis	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> ?
• Acute Renal Failure	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> ?
Family History	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> ?

Prior MI (prior to this hospitalization)	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> ?
Prior MI Date	<input type="text"/>
Prior PCI	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> ?
Prior CABG	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> ?
Congestive Heart Failure	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> ?
PAD	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> ?
DVT	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> ?
Thromboembolic History	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> ?
Pulmonary Embolism	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> ?

Comorbidity Factors	
Pulmonary	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> ?
Malignancy < 5 Yrs	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> ?
Liver Disease	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> ?
GI Disease	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> ?
Other	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> ?

Cerebrovascular Disease	
<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> ?	
<input type="text" value="RIND"/>	
Delirium	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> ?
Psychiatric History	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> ?

Infectious Endocarditis	
<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> ?	
Active	<input type="checkbox"/> Yes <input type="checkbox"/> No
Treated	<input type="checkbox"/> Yes <input type="checkbox"/> No

Smoking
 Status: Years: Pack per Day: PK yrs:
 Date Quit:

Alcohol Use
 History of Alcoholism: Y N ? Number of Drinks/Week:

Undo

Main Cath Indication Test ECG **OutDets** Meds Lab In Lab Meds Event Proc Data Valvular Event Post ECG/Save

southern Logged on at 7:34:13 AM Approach Alberta 2/5/2015 7:36 AM

7:36 AM 2/5/2015

May 27, 2015

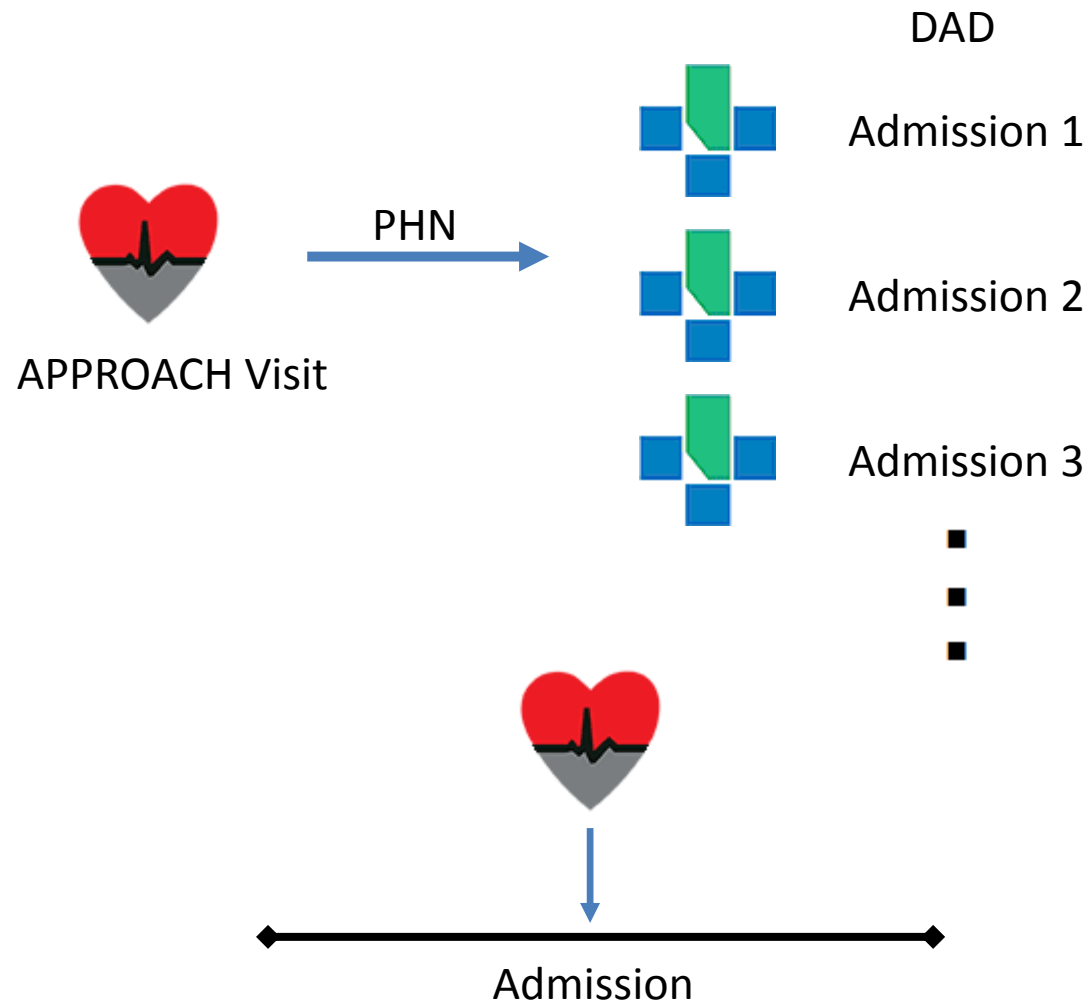


UNIVERSITY OF CALGARY

METHODS

- DAD validity was assessed for 9 patient comorbidities
 - Hypertension
 - Diabetes
 - Hyperlipidemia
 - Heart Failure
 - Peripheral Vascular Disease (PVD)
 - Cerebrovascular Disease (CEVD)
 - Chronic Obstructive Pulmonary Disease (COPD)
 - Malignancy
 - Liver Disease

METHODS - LINKAGE



METHODS

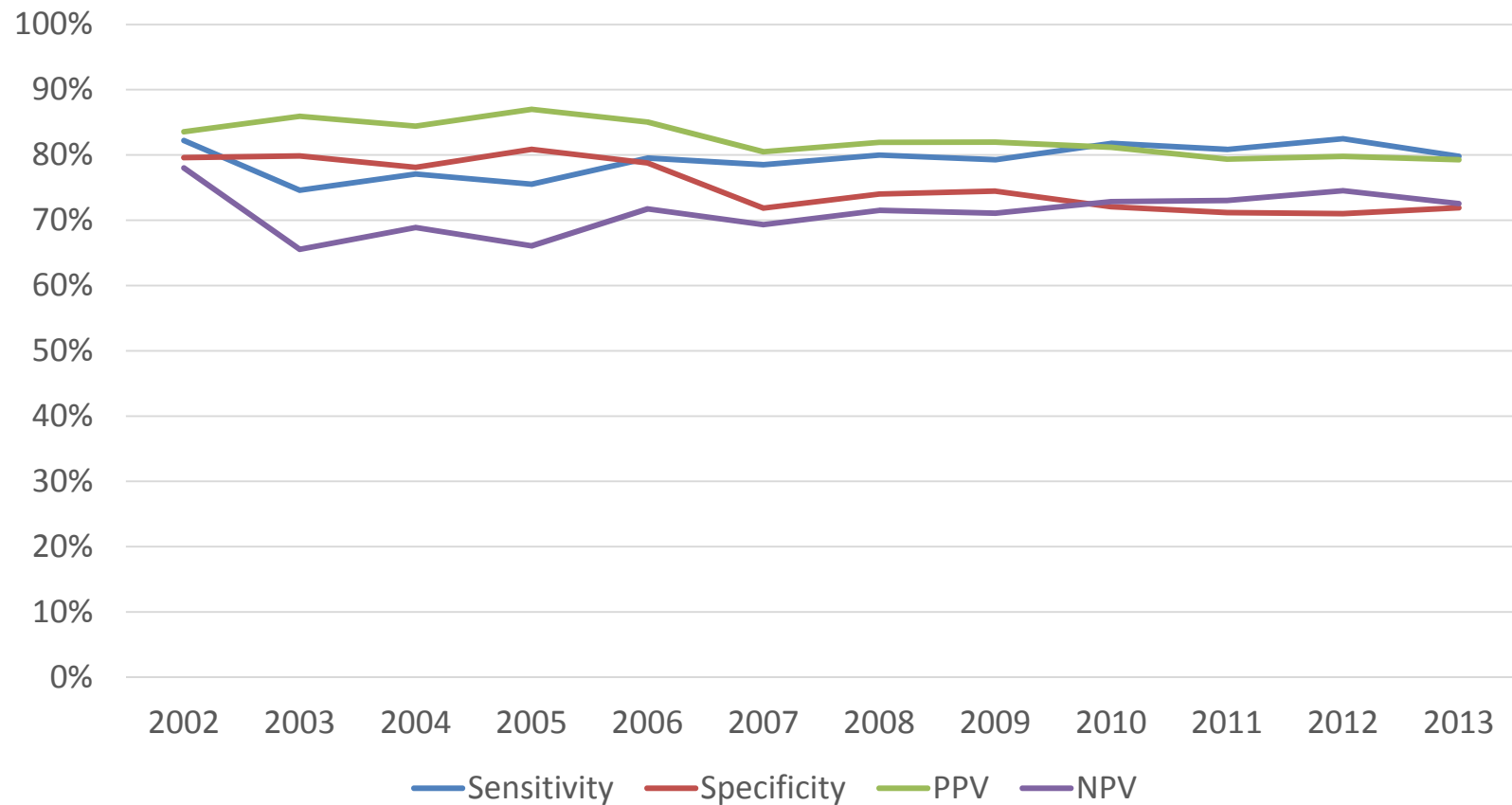
- Cluster linked APPROACH/DAD pair into individual years based on date of APPROACH visit
- Compare patient comorbidity between DAD and APPROACH and report
 - Sensitivity
 - Specificity
 - Positive Predictive Value (PPV)
 - Negative Predictive Value (NPV)
- Repeat for all 9 comorbidities
- Stratify results by age, sex and hospital location

RESULTS

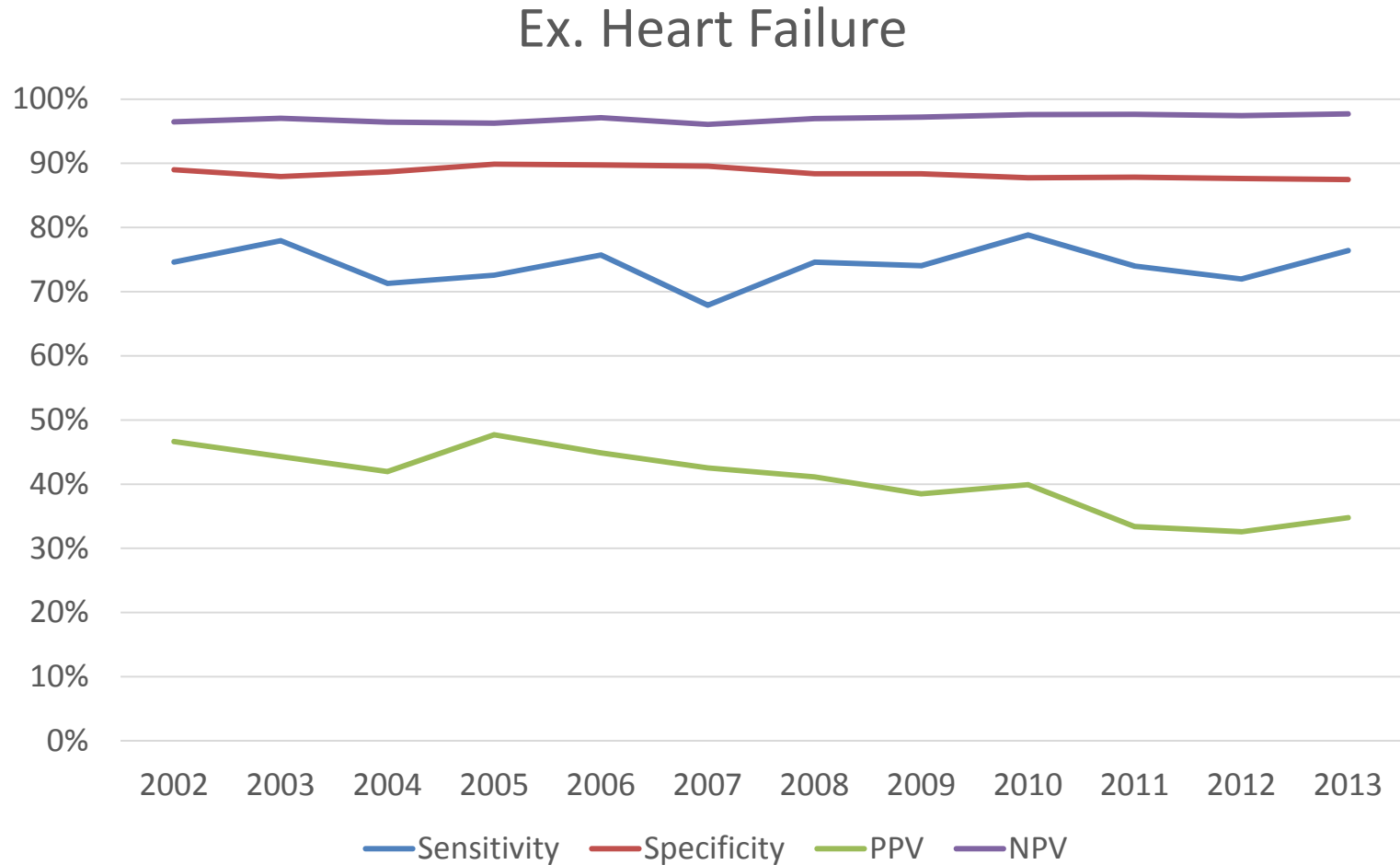
- 62 161 APPROACH visits linked with DAD
- Validation trend results for 9 comorbidities
 - Consistent, high validity
 - Consistent, low validity
 - Inconsistent, low validity
 - Inconclusive

CONSISTENT HIGH VALIDITY

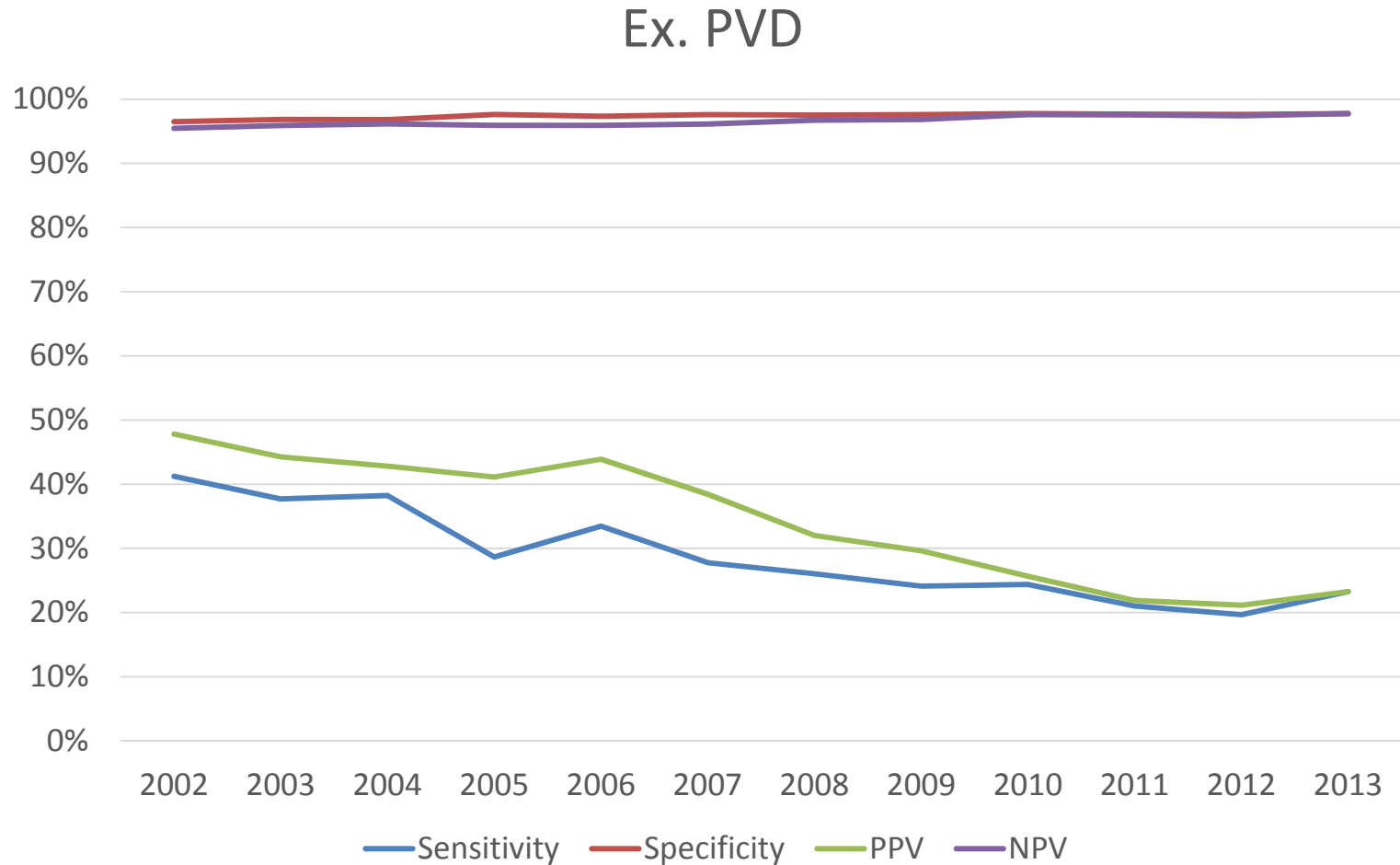
Ex. Hypertension



CONSISTENT LOW VALIDITY



INCONSISTENT LOW VALIDITY



INCONCLUSIVE

- Malignancy, liver disease
- Seems to have low validity
- Wide confidence intervals
 - Unable to form conclusion

STRATIFIED ANALYSIS

- Stratified by
 - Age
 - Sex
 - Hospital locations
- Validation trends are unaffected by any of these factors

CONCLUSION/LIMITATION

- Consistency of DAD validity differs greatly depending on condition
- Limitations
 - Is APPROACH a good reference standard?
 - Generalizability
 - Only Cardiac patients
 - Only patients in Alberta

ACKNOWLEDGEMENTS

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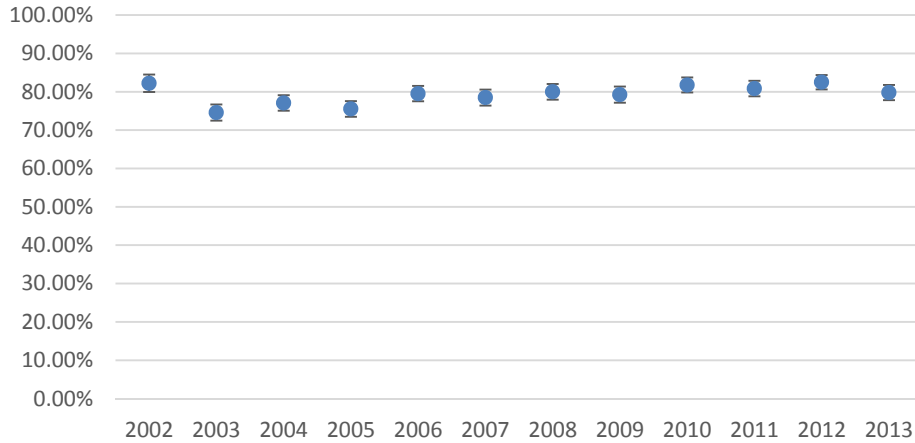
THANK YOU!



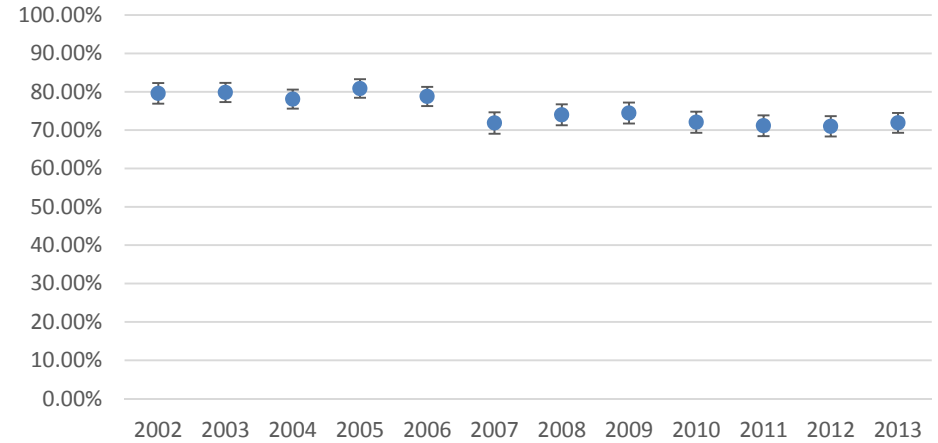
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HYPERTENSION

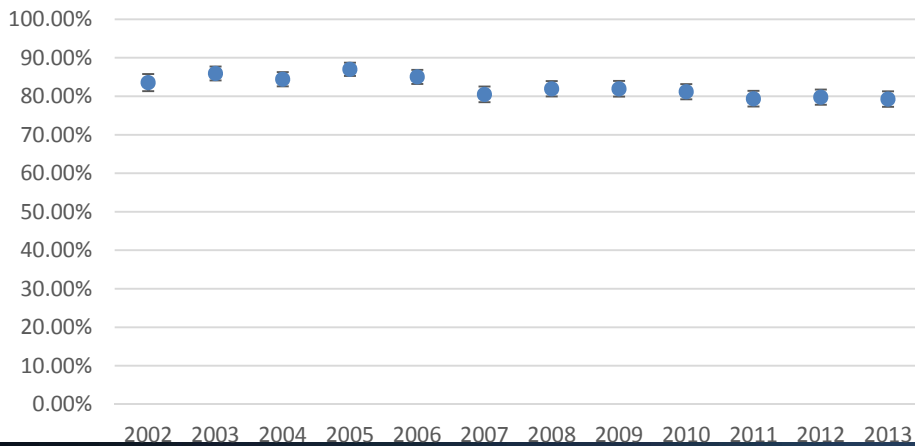
Sensitivity



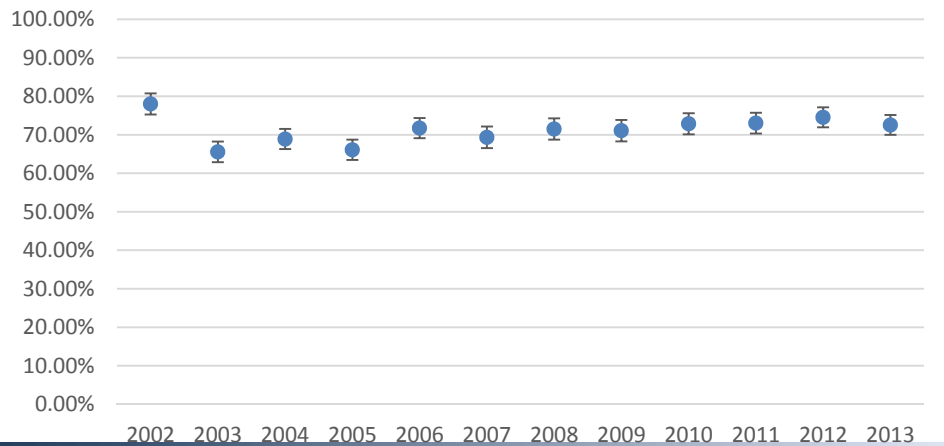
Specificity



PPV

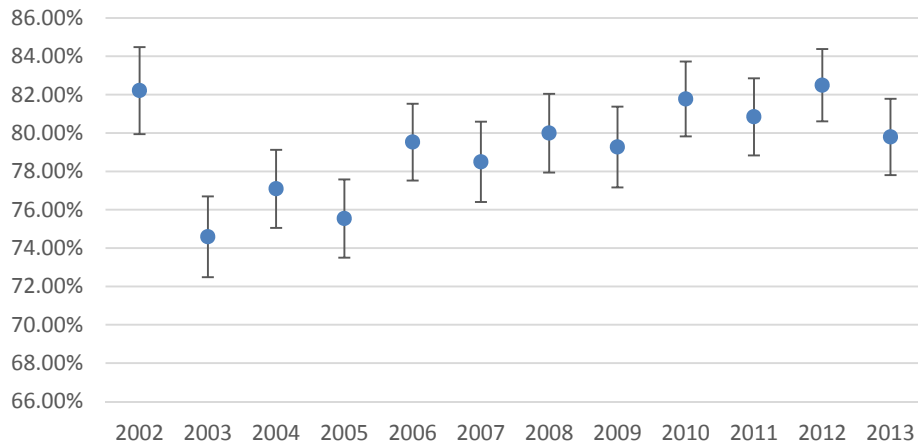


NPV

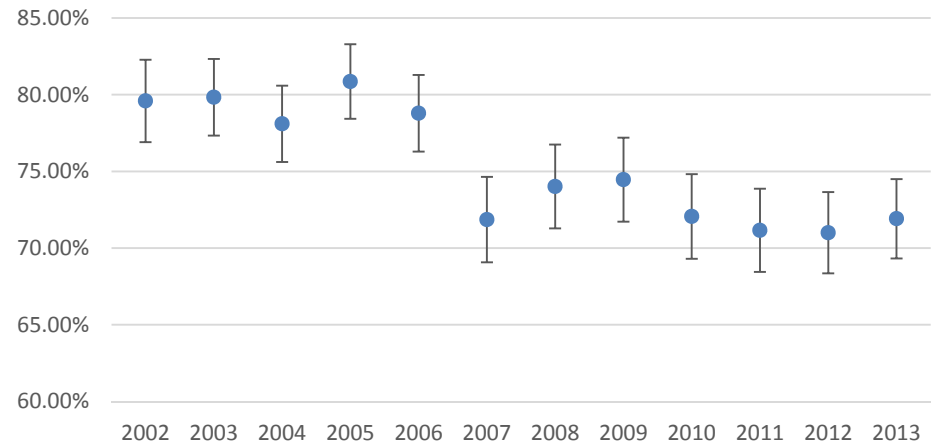


HYPERTENSION

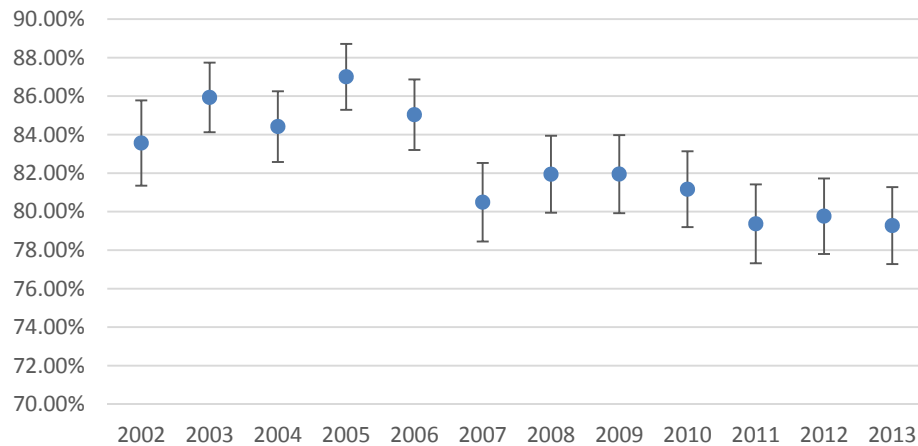
Sensitivity



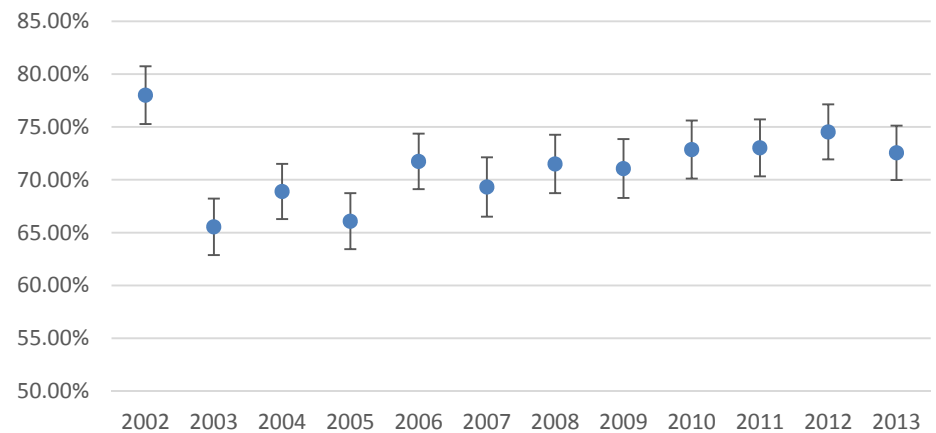
Specificity



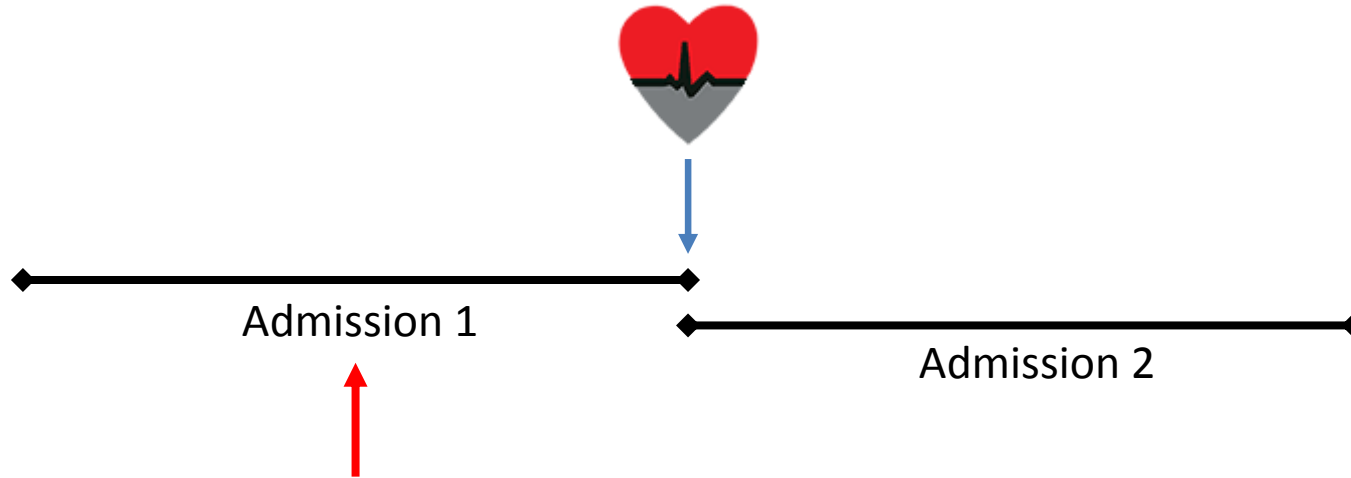
PPV



NPV



METHODS



CODING ALGORITHM

CONDITION	ICD-10 CODE
CEREBROVASCULAR DISEASE	G45.x, G46.x, H34.0, I60.x-I69.x
PULMONARY (COPD)	I27.8, I27.9, J40.x-J47.x, J60.x-J67,x, J68.4, J70.1, J70.3
HEART FAILURE	I09.9, I11.0, I13.0, I13.2, I25.5, I42.0, I42.5-I42.9, I43.x, I50.x, P29.0
PVD	I70.x-I71.x, I73.1-I73.9, I77.1, I79.0, I79.2, K55.1, K55.8, K55.9, Z95.8, Z95.9
LIVER DISEASE	B18.x, K70.0-K70.3, K70.9, K71.3-K71.5, K71.7, K73.x, K74.x, K76.0, K76.2-K76.4, K76.8, K76.9, Z94.4, I85.0, I85.9, I86.4, I98.2, K70.4, K71.1, K72.1, K72.9, K76.5-K76.7
MALIGNANCY	C00.x-C26.x, C30.x-C34.x, C37.x-C41.x, C43.x, C45.x-C58.x, C60.x-C76.x, C77.x-C80.x, C81.x-C85.x, C88.x, C90.x-C97.x
HYPERTENSION	I10.x, I11.x-I13.x, I15.x
HYPERLIPIDEMIA	E78.0-E78.5
DIABETES	E10.x, E13.10, E13.12, E14.10, E14.12, E11.x, E13.0, E14.0

RESULTS

- 62 161 APPROACH visits linked with DAD
 - 70.2% male
 - Mean age 63.3
 - 45.2% Calgary area hospitals
 - 44.7% Edmonton area hospitals
 - 10.1% elsewhere