

Identifying Diabetes and Comorbid Conditions in Residents of Long-Term Care Facilities from Two Population-Based Data Sources

Lisa M. Lix^{1,2,3}, Lin Yan^{2,3}, David Blackburn², Nianping Hu³, Verena Schneider-Lindner^{2,4}, Yvonne Shevchuk², Gary F. Teare^{2,3}

¹University of Manitoba; ²University of Saskatchewan; ³Health Quality Council, Saskatchewan; ⁴Heidelberg University

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Background

- Many long-term care facility (LTCF) residents have one or more chronic diseases, such as diabetes
 - Chronic diseases can place a heavy demand on facility resources
- Chronic disease data for LTCF residents are used to:
 - define study cohorts
 - develop measures of quality of care and health outcomes
 - develop risk adjustment models



Background

- Population-based data sources to ascertain chronic disease in LTCF residents include:
 - **Administrative data:** hospital records, physician billing claims
 - **RAI-MDS:** clinical assessment data
- **Research question:** Do these data sources provide comparable information about chronic diseases?



Study Objectives

- To measure agreement between RAI-MDS and administrative data for **diabetes diagnoses** in LTCF residents
- To measure agreement between RAI-MDS and administrative data for selected **comorbid condition diagnoses** in LTCF residents with a diabetes diagnosis
 - Alzheimer's disease/dementia, arthritis, cardiac dysrhythmia, congestive heart failure, chronic obstructive pulmonary disease, glaucoma, hip fracture, hypertension, multiple sclerosis, osteoporosis, Parkinson's disease, stroke



Methods

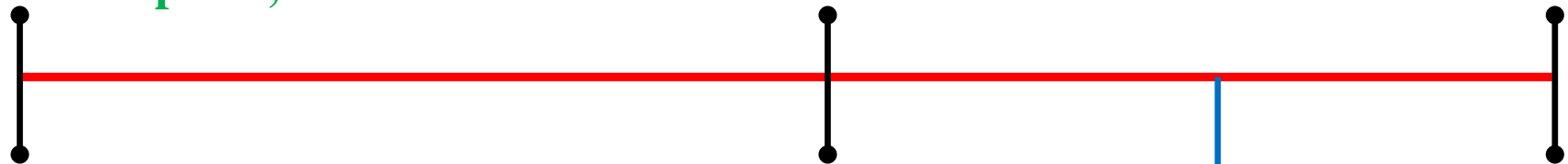
- Saskatchewan data
 - RAI-MDS version 2.0, hospital records, physician billing claims, person registry system
- Study characteristics
 - Retrospective cohort design
 - Inclusion criteria:
 - LTCF resident with an RAI-MDS admission or annual assessment between April 1, 2005 and March 31, 2011
 - Continuous health insurance coverage between April 1, 1997 and study index date (for diabetes case ascertainment) **OR** between April 1, 1997 and 365 days after study index date (for comorbid condition case ascertainment)



Study Observation Period for Diabetes Case Ascertainment

**Start of Observation
Period: April 1, 1997**

**End of Observation
Period: March 31, 2011**



Administrative Data
Available
April 1, 1997

RAI-MDS Data
Available
April 1, 2005

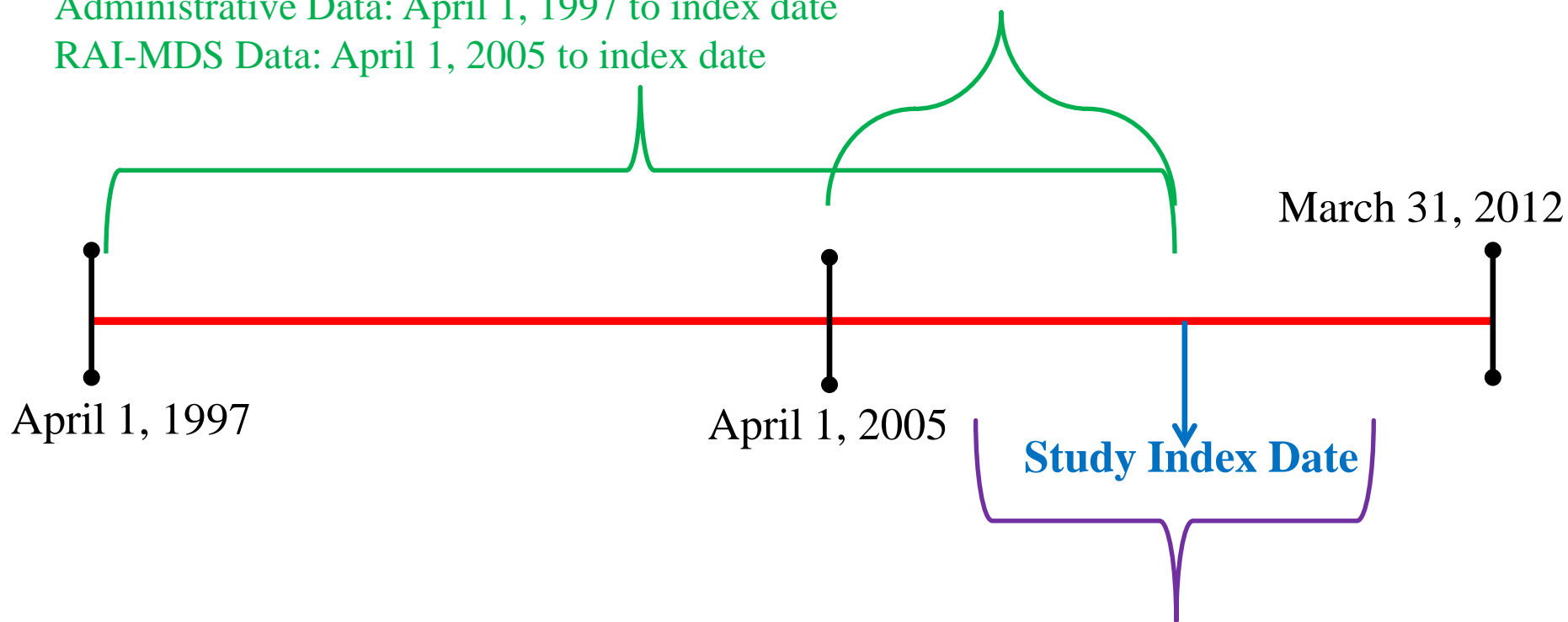
Study Index Date
First diagnosis for diabetes
in RAI-MDS or
If no diabetes diagnosis, then first
RAI-MDS admission or annual
assessment on or after April 1,
2005

Study Observation Period for Comorbidity Case Ascertainment

Observation Window #1

Administrative Data: April 1, 1997 to index date

RAI-MDS Data: April 1, 2005 to index date



Observation Window #2

Index Date ± 365 days for both
Administrative and RAI-MDS data

Study Variables

- Diabetes diagnosis: case definition used by the Canadian Chronic Disease Surveillance System (CCDSS)
- Comorbid condition diagnoses: case definitions from previous validation studies; we adopted the CCDSS case definitions wherever possible
- For describing LTCF residents (defined at study index date)
 - Socio-demographic variables
 - Region of residence: urban, rural
 - Charlson comorbidity index
- For describing facility of residence (defined at study index date from RAI-MDS)
 - Type: special care home, other
 - Affiliation: amalgamate, affiliate, contract



Statistical Analyses

- Crude prevalence estimates (%)
- Cohen's κ and 95% confidence intervals
 - Stratified by age group, sex, and type of RAI-MDS assessment



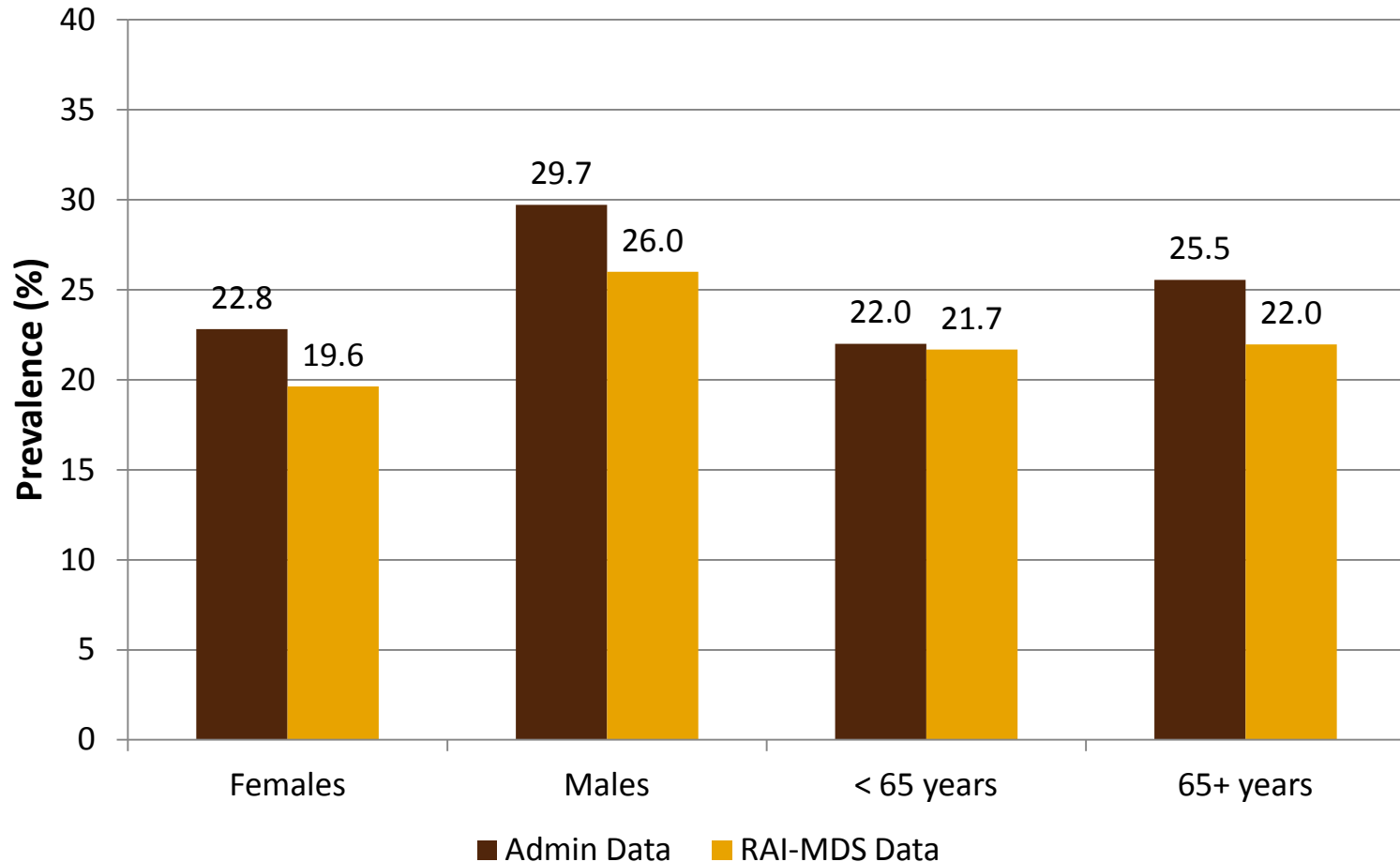
Characteristics of LTCF Residents

Variable	Diabetes Case Ascertainment Cohort (<i>N</i> = 23,121) <i>n</i> (%)	Comorbidity Case Ascertainment Cohort (<i>N</i> = 4,183) <i>n</i> (%)
Age Group		
< 65 years	1518 (6.5)	300 (7.2)
65 – 74 years	2090 (9.0)	554 (13.2)
75 – 84 years	7187 (31.0)	1517 (36.3)
85+ years	12422 (53.5)	1812 (43.3)
Sex		
Female	14795 (63.7)	2547 (60.9)
Male	8422 (36.3)	1636 (39.1)
Index Assessment		
Admission	17117 (74.0)	3123 (74.7)
Annual	6004 (26.0)	1060 (25.3)

Characteristics of LTCF Residents

Variable	Diabetes Case Ascertainment Cohort (<i>N</i> = 23,112) <i>n</i> (%)	Comorbidity Case Ascertainment Cohort (<i>N</i> = 4,183) <i>n</i> (%)
Facility Affiliation		
Affiliated	6834 (29.4)	1160 (27.7)
Amalgamated	14412 (62.1)	2686 (64.2)
Contract	1968 (8.5)	334 (8.1)
Facility Type		
Special Care Home	20002 (90.5)	3787 (90.5)
Other Facility	2215 (9.5)	396 (9.5)

Diabetes Prevalence in LTCF Residents



Note: A total of 6298 resident had a diabetes diagnosis in either data source

Agreement for Diabetes Case Ascertainment

	Cohen's κ (95% CI)
Overall	0.81 (0.80, 0.82)
Females	0.80 (0.79, 0.82)
Males	0.81 (0.79, 0.82)
< 65 Years	0.83 (0.79, 0.86)
65+ Years	0.80 (0.80, 0.81)
Admission RAI-MDS Assessment	0.81 (0.80, 0.82)
Annual RAI-MDS Assessment	0.78 (0.76, 0.80)



Agreement for Comorbidity Case Ascertainment Observation Window #1

Condition	RAI-MDS Prevalence (%)	Admin Prevalence (%)	Cohen's κ (95% CI)
Hypertension	51.4	87.2	0.20 (0.17, 0.22)
Alzheimer's Disease/Dementia	39.2	37.7	0.44 (0.41, 0.46)
Arthritis	38.4	87.4	0.09 (0.08, 0.11)
Stroke/Transient Ischemic Attack	28.6	45.0	0.47 (0.44, 0.50)
Congestive Heart Failure	16.4	49.4	0.25 (0.23, 0.27)
Osteoporosis	11.8	63.4	0.07 (0.06, 0.09)
Cardiac Dysrhythmia	9.6	41.9	0.20 (0.17, 0.22)
Hip Fracture	8.5	13.9	0.55 (0.51, 0.59)
COPD	8.4	24.3	0.33 (0.30, 0.36)
Glaucoma	6.5	18.4	0.37 (0.34, 0.41)
Parkinson's Disease	4.7	8.1	0.60 (0.55, 0.65)
Multiple Sclerosis	1.6	1.8	0.87 (0.81, 0.93)

Agreement for Comorbidity Case Ascertainment Observation Window #2

Condition	RAI-MDS Prevalence (%)	Admin Prevalence (%)	Cohen's κ (95% CI)
Hypertension	55.8	57.3	0.29 (0.26, 0.32)
Alzheimer's Disease/Dementia	44.2	31.9	0.36 (0.34, 0.39)
Arthritis	42.5	53.0	0.17 (0.14, 0.20)
Stroke/Transient Ischemic Attack	30.6	25.1	0.42 (0.46, 0.51)
Congestive Heart Failure	18.7	31.8	0.33 (0.30, 0.37)
Osteoporosis	13.5	31.4	0.13 (0.10, 0.16)
Cardiac Dysrhythmia	11.1	26.7	0.27 (0.24, 0.30)
Hip Fracture	10.2	8.9	0.53 (0.49, 0.58)
COPD	9.6	13.8	0.45 (0.41, 0.49)
Glaucoma	7.6	7.2	0.48 (0.43, 0.53)
Parkinson's Disease	5.0	5.9	0.64 (0.59, 0.69)
Multiple Sclerosis	2.0	1.4	0.76 (0.68, 0.84)

Key Findings

- **Diabetes:** Very good agreement between administrative and RAI-MDS data
- **Comorbid conditions:** Agreement between administrative and RAI-MDS data varied from poor to very good
 - The size of the study observation window affected the magnitude of agreement and prevalence estimates
 - However, the size of the observation window did not result in substantial changes in conclusions about the diseases for which agreement was highest and lowest
 - Highest: Parkinson's disease and multiple sclerosis
 - Lowest: for osteoporosis and arthritis



Discussion

- Administrative data captures diagnoses that arise in acute and primary care settings
- RAI-MDS data capture diagnoses that affect activities of daily living, cognition, mood, or behavior in LTCF settings
- The choice of a data source to ascertain diabetes in LTCF residents may depend on the study purpose and ease of data linkage
 - for example: to define a chronic disease cohort for quality of care studies
 - to investigate the association between disease exposure and health outcomes
- However, for risk adjustment, we recommend using administrative data because they appear to provide more comprehensive information
 - However, the observation period to measure comorbidity might affect the risk-adjusted estimate



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Contact Information

Lisa M. Lix, University of Manitoba

lisa.lix@med.umanitoba.ca

