The Impact of Chronic Condition List on Prevalence and the Relationship between MCCs and Disability, Social Participation, and Self-Rated Health: Data from the Canadian Longitudinal Study on Aging

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CAG Meeting
Vancouver, British Columbia
October 19, 2018

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Methodologic Issues

- Multimorbidity prevalence estimates vary widely (3.5%-98.5%)[1]

- Harrison et al.[2] if MM operationalization impacted prevalence estimates
  - Impact of which diseases are included in MM <u>list</u>
  - Impact of MM <u>definition</u>: 2+ or 3+ chronic conditions

→ Population-based <u>patient</u> cohort
→ Did not examine effect of sex
→ Only examined at prevalence

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Objectives

We aimed to build on this work using weighted data from all 51,338 CLSA participants

- Compare prevalence estimates of a larger group of MM lists/definition (by age and sex)

- Examine the association between MM list/definition and person-important outcomes:

  - Disability
  - Social Participation Restriction
  - Self-rated Health

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Methods

Self-Reported Chronic Conditions

- Lasting (or expecting to last) ≥ 6 months
- Diagnosed by health professional

Definitions:

- *Disability*: Needing help with or unable to do any of 7 ADLs or 7 IADLs

- *Social Participation Restriction*: Prevented from participating in social activity because of health condition/limitation

- *Self-rated health*: physical, mental, and healthy aging on 5 pt Likert scale (excellent →poor)

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Multimorbidity Lists

Disease System[5]	CLSA Chronic Conditions	Diederichs[3]	Fortin-20[4]	Fortin-Prev[1] [12 most prevalent]	Willadsen[5] Diseases	Risk Factor	Symptom
Musculoskeletal	Osteoarthritis	✓	✓	✓	✓		
	Rheumatoid arthritis						
	Osteoporosis		✓	✓		✓	
Respiratory	Asthma		✓	✓	✓		
	COPD	✓			✓		
Cardiac	Heart disease (including CHF)	✓	✓	✓	✓		
	Angina		✓		✓		
	Myocardial infarction	✓	✓				
Vascular	Hypertension	✓	✓	✓		✓	
	Peripheral vascular disease						
Endocrine-Metabolic	Diabetes	✓	✓	✓	✓		
	Hypo-/Hyperthyroidism		✓	✓			
Neurological	Stroke or CVA	✓	✓		✓		
	Transient ischemic attack						
	Parkinsonism/disease						
	Multiple Sclerosis						
	Epilepsy						
	Migraine headaches			✓			✓
Gastrointestinal (Upper and Lower)	Intestinal or stomach ulcer		✓				
	Bowel disorder		✓				
	Bowel incontinence						✓
Genitourinary	Urinary incontinence		✓				✓
Ophthalmologic	Cataracts, Glaucoma, Macular Degeneration			✓			✓
Psychiatric	Mood disorder (depression)	✓	✓	✓	✓		
	Anxiety		✓				
	Alzheimer's disease/Dementia		✓				
Renal	Kidney disease		✓		✓		
Cancer*	Cancer	✓	✓	✓	✓		
Other Risk Factors/Symptoms	Obesity		✓			✓	
	Overweight					✓	
	Back problems		✓				✓

Multimorbidity Lists

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Vascular	Hypertension	✓	✓	✓		✓	
	Peripheral vascular disease						
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Gastrointestinal (Upper and Lower)	Intestinal or stomach ulcer		✓				
	Bowel disorder		✓				
	Bowel incontinence						✓
Genitourinary	Urinary incontinence		✓				✓
Ophthalmologic	Cataracts, Glaucoma, Macular Degeneration			✓			✓
Psychiatric	Mood disorder (depression)	✓	✓	✓	✓		
	Anxiety		✓				
	Alzheimer's disease/Dementia		✓				
Renal	Kidney disease		✓		✓		
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	Angina		✔		✔		
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	Bowel incontinence						✔
Genitourinary	Urinary incontinence		✔				✔
Ophthalmologic	Cataracts, Glaucoma, Macular Degeneration			✔			✔
Psychiatric	Mood disorder (depression)	✔	✔	✔	✔		
	Anxiety		✔				
	Alzheimer's disease/Dementia		✔				
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Cancer*	Cancer	✔	✔	✔	✔		
Other Risk Factors/Symptoms	Obesity		✔			✔	
	Overweight					✔	
	Back problems		✔				✔

Multimorbidity Lists

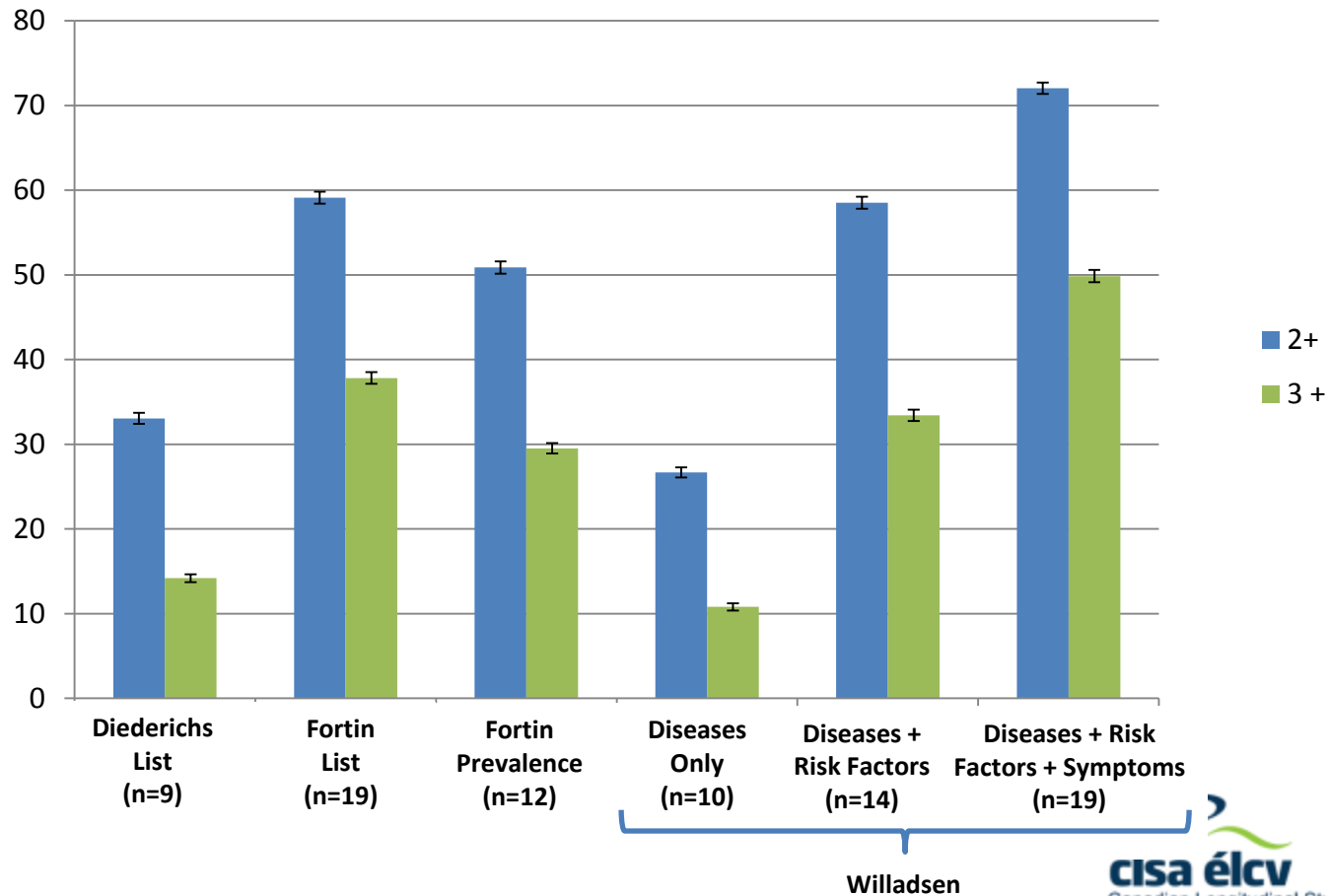| Disease System[5]	CLSA Chronic Conditions	Diederichs[3]	Fortin-20[4]	Fortin-Prev[1] [12 most prevalent]	Willadsen[5] Diseases	Willadsen[5] Risk Factor	Willadsen[5] Symptom
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	Overweight					✓	
	Back problems		✓				✓

Results

Proportion of Canadians with 2+ and 3+ CCs Using Different Disease Lists
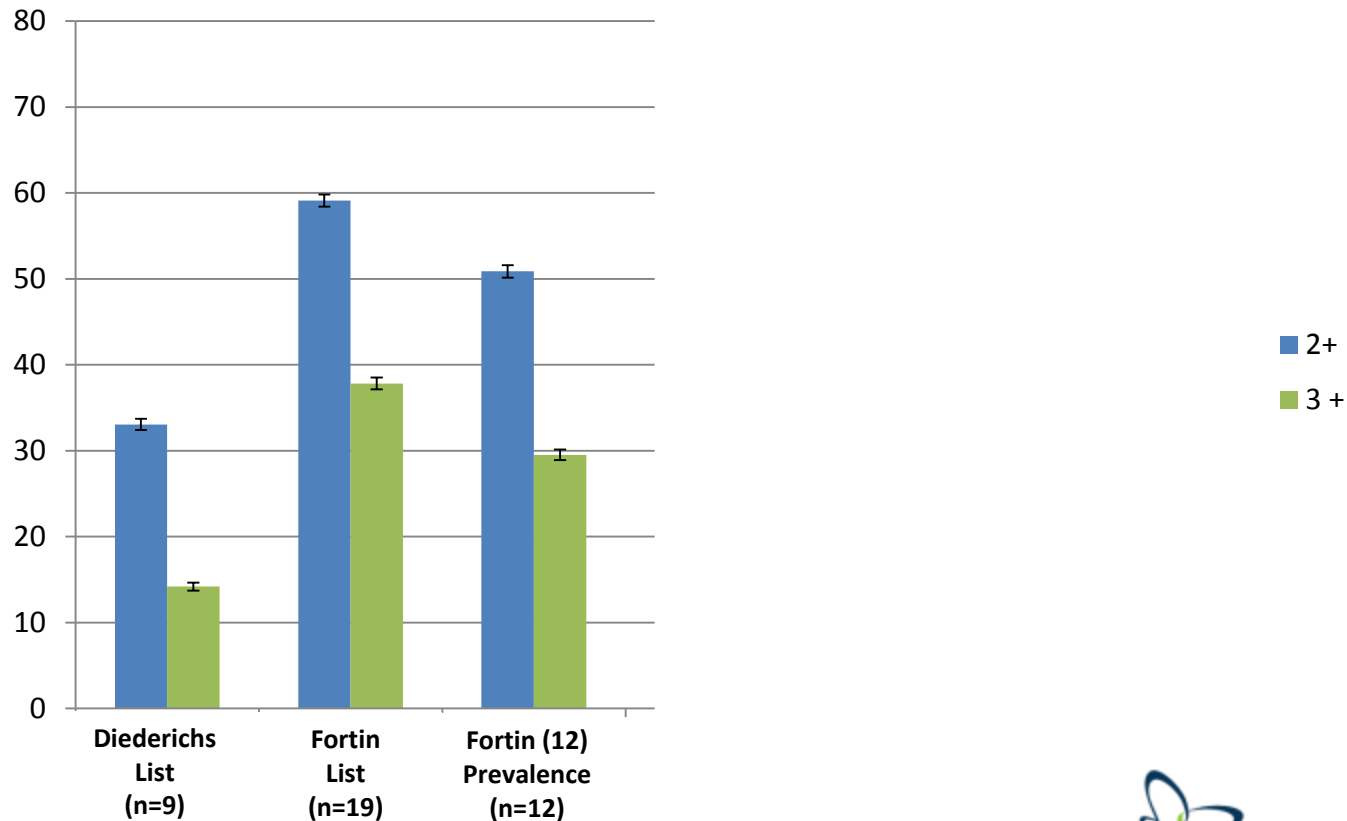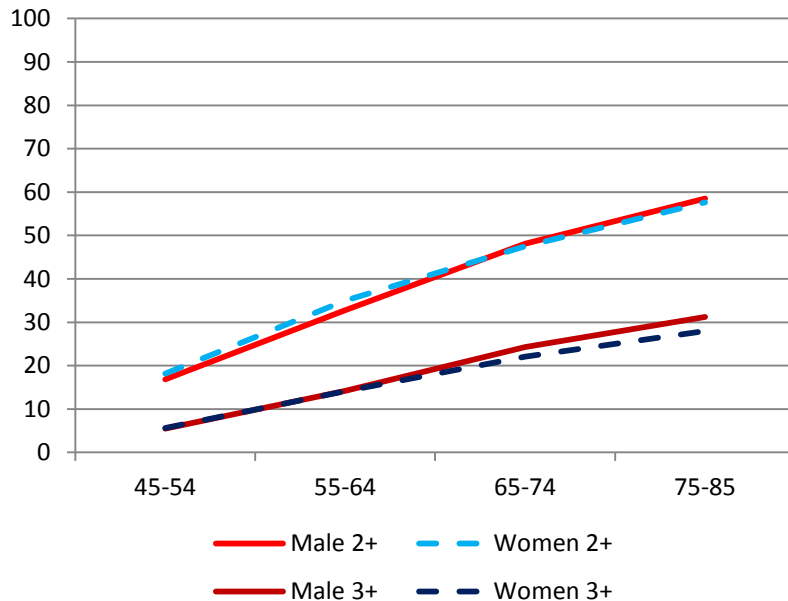
Results

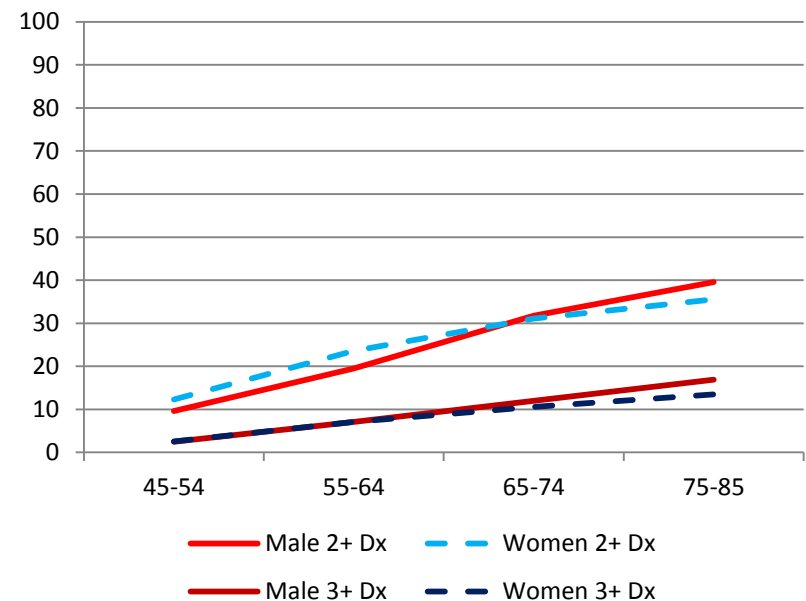Proportion of Canadians with 2+ and 3+ CCs Using Different Disease Lists

Results

Multimorbidity Prevalence (2+ and 3+ CCs) by Age Group and Sex
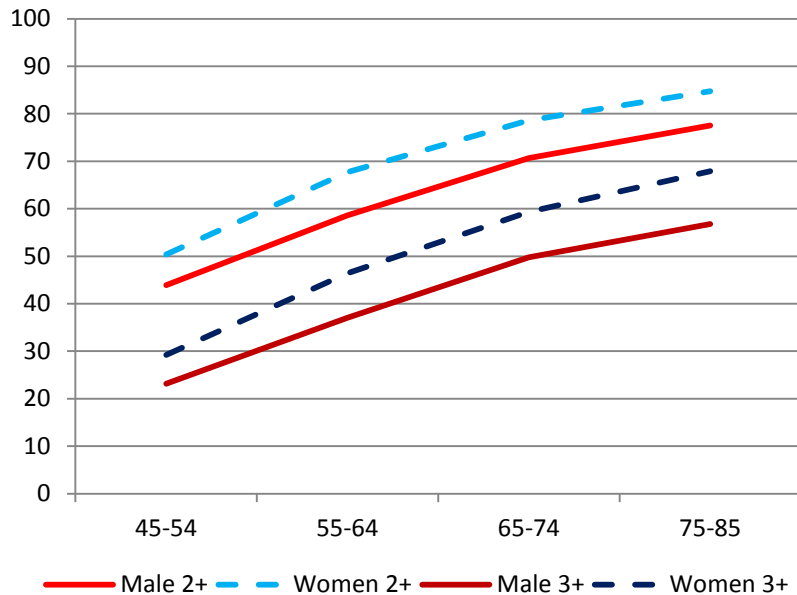

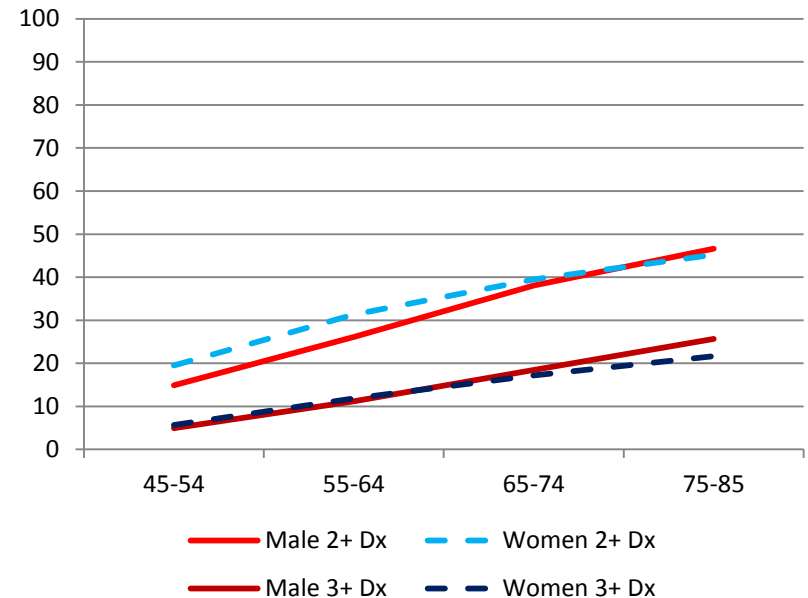**Diederichs any chronic conditions**

Diederichs any diseases

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Results

Multimorbidity Prevalence (2+ and 3+ CCs) by Age Group and Sex

Fortin-20 any chronic conditions

Fortin-20 any diseases

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Results

Multimorbidity Prevalence (2+ and 3+ CCs) by Age Group and Sex

Fortin-Prev any chron conditions

Male 2+ — Women 2+ -- Male 3+ — Women 3+ --
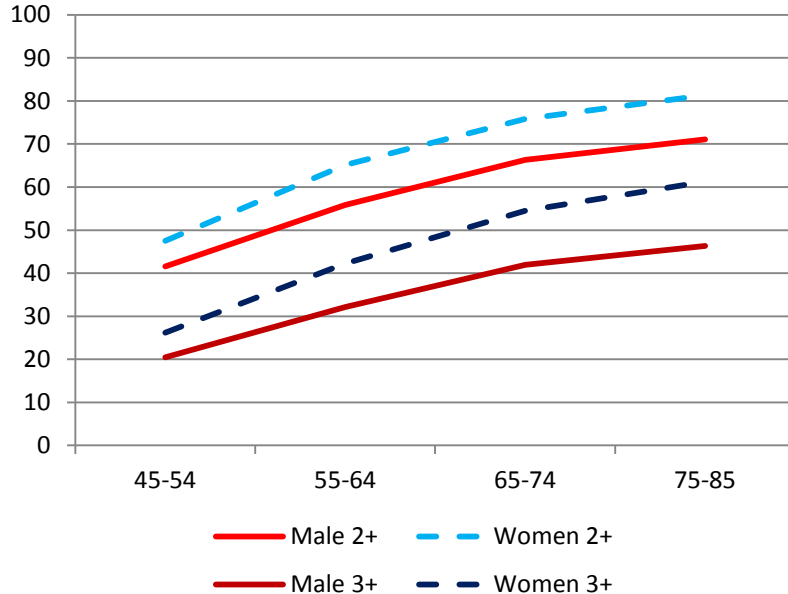
Fortin-Prev any diseases

Male 2+ Dx — Women 2+ Dx -- Male 3+ Dx — Women 3+ Dx --

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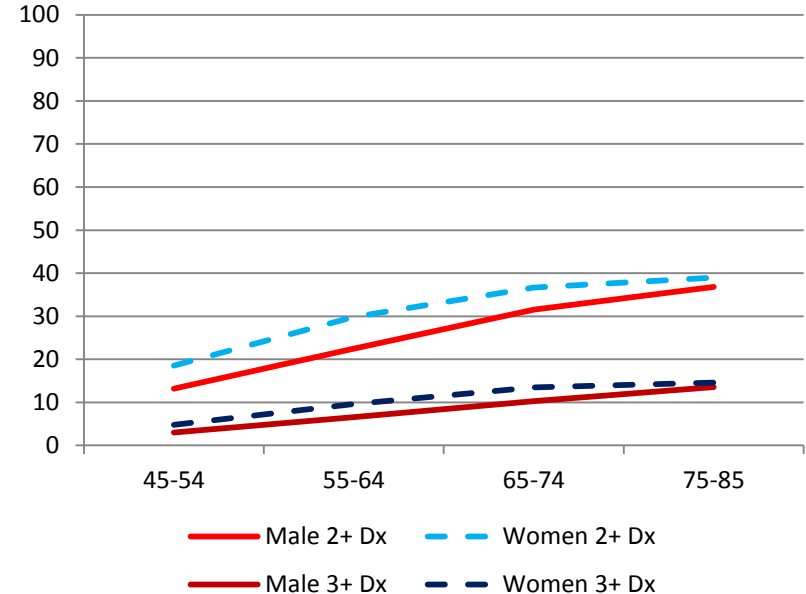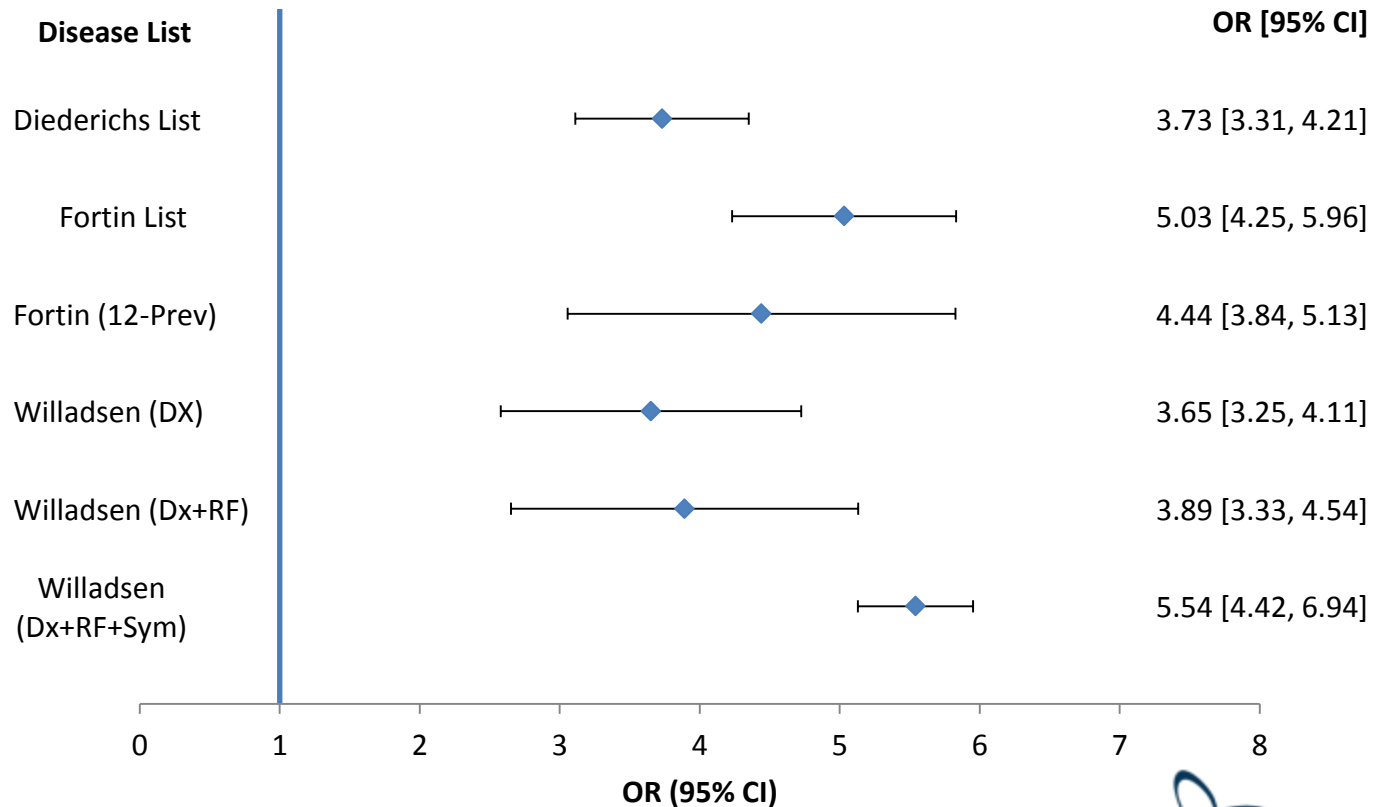
Results

ORs for Disability for People with MM (2+ CCs) Compared to those without MM Using Different Disease Lists

Disease List	OR [95% CI]
Diederichs List	3.73 [3.31, 4.21]
Fortin List	5.03 [4.25, 5.96]
Fortin (12-Prev)	4.44 [3.84, 5.13]
Willadsen (DX)	3.65 [3.25, 4.11]
Willadsen (Dx+RF)	3.89 [3.33, 4.54]
Willadsen (Dx+RF+Sym)	5.54 [4.42, 6.94]

OR (95% CI)

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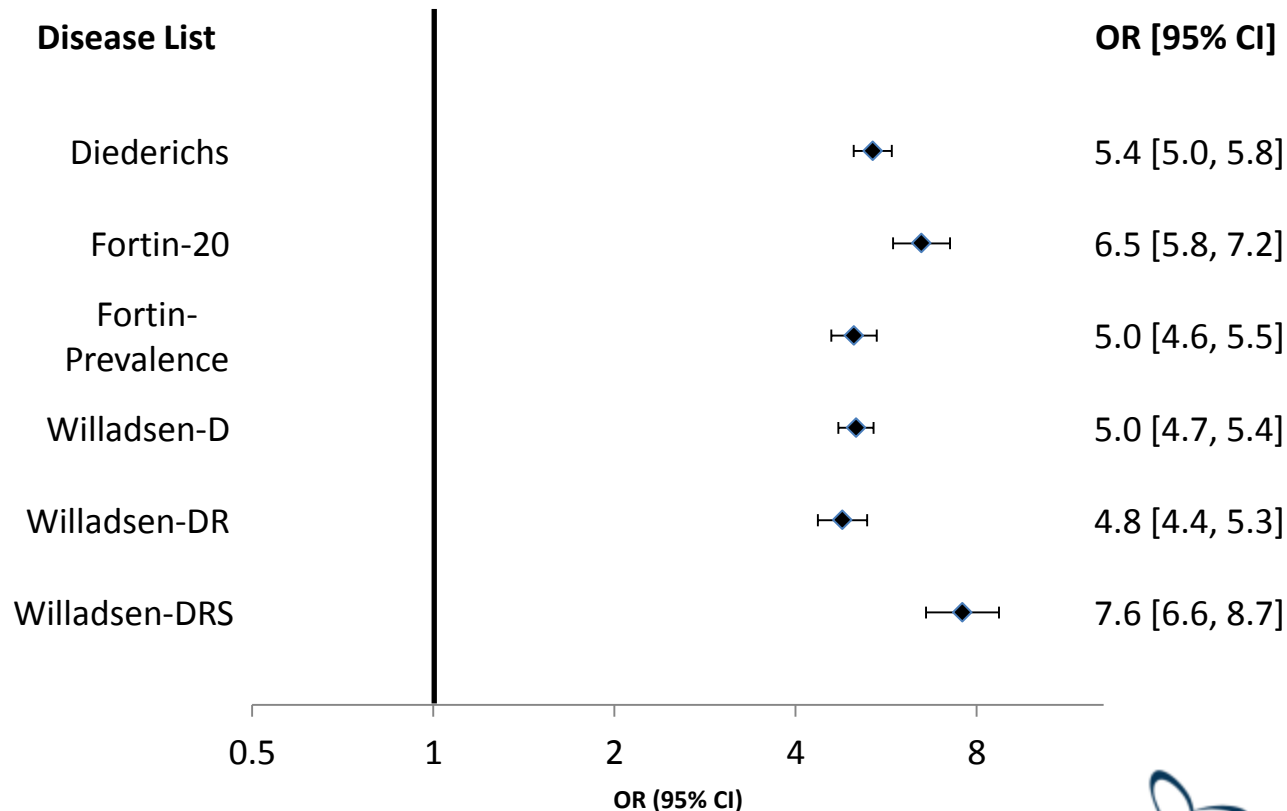Étude longitudinale canadienne sur le vieillissement

Results

ORs for Participation Restriction for People with MM (2+ CCs) Compared to those without MM Using Different Disease Lists

Disease List	OR [95% CI]
Diederichs List	3.42 [2.89, 3.64]
Fortin List	4.46 [3.80, 5.23]
Fortin (12-Prev)	3.31 [2.88, 3.80]
Willadsen (DX)	3.38 [3.01, 3.78]
Willadsen (Dx+RF)	3.33 [2.85, 3.87]
Willadsen (Dx+RF+Sym)	4.62 [3.71, 5.75]

OR (95% CI)

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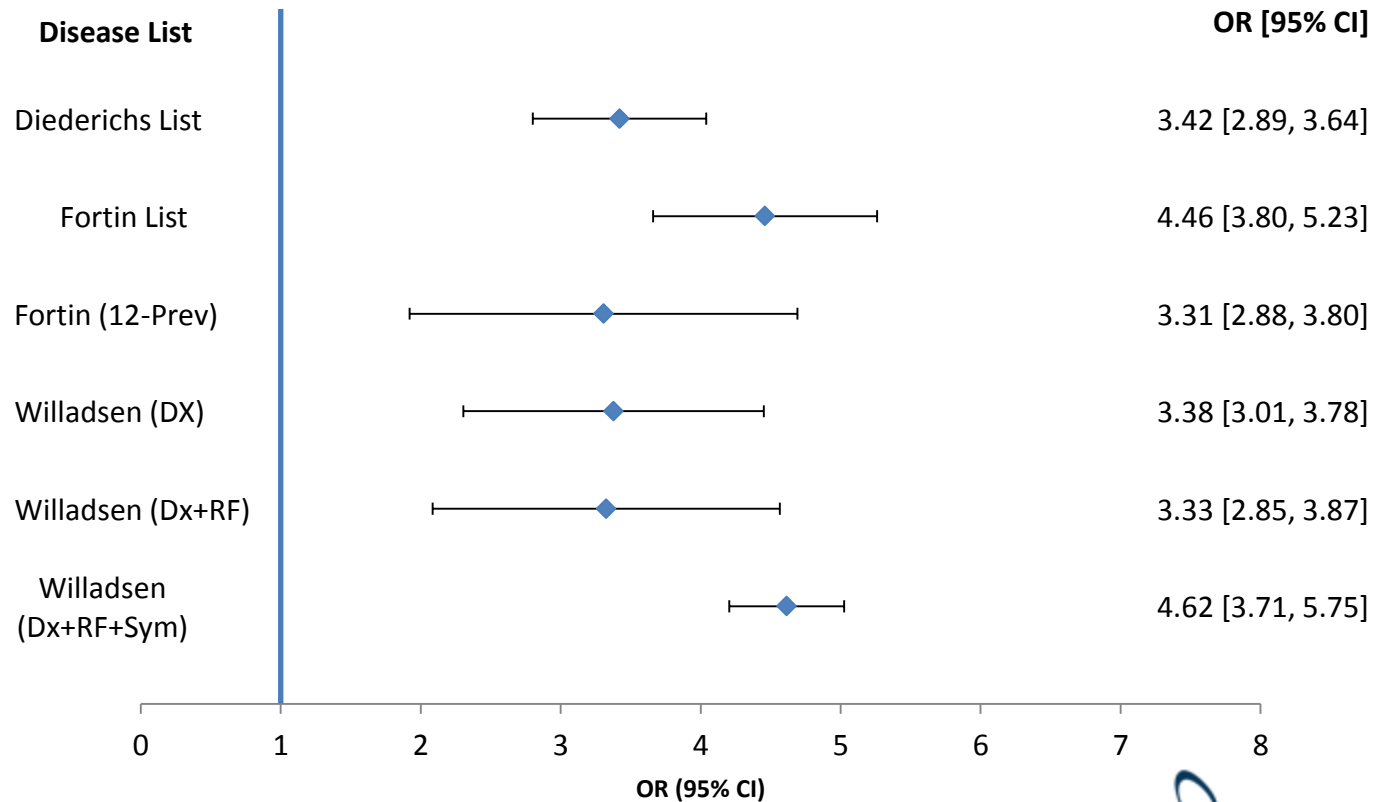
Results

ORs for Self-Reported Physical Health (poor or fair vs. good-excellent) for People with MM (2+ CCs) Compared to those without MM Using Different Disease Lists

Disease List	OR [95% CI]
Diederichs	5.4 [5.0, 5.8]
Fortin-20	6.5 [5.8, 7.2]
Fortin-Prevalence	5.0 [4.6, 5.5]
Willadsen-D	5.0 [4.7, 5.4]
Willadsen-DR	4.8 [4.4, 5.3]
Willadsen-DRS	7.6 [6.6, 8.7]

OR (95% CI)

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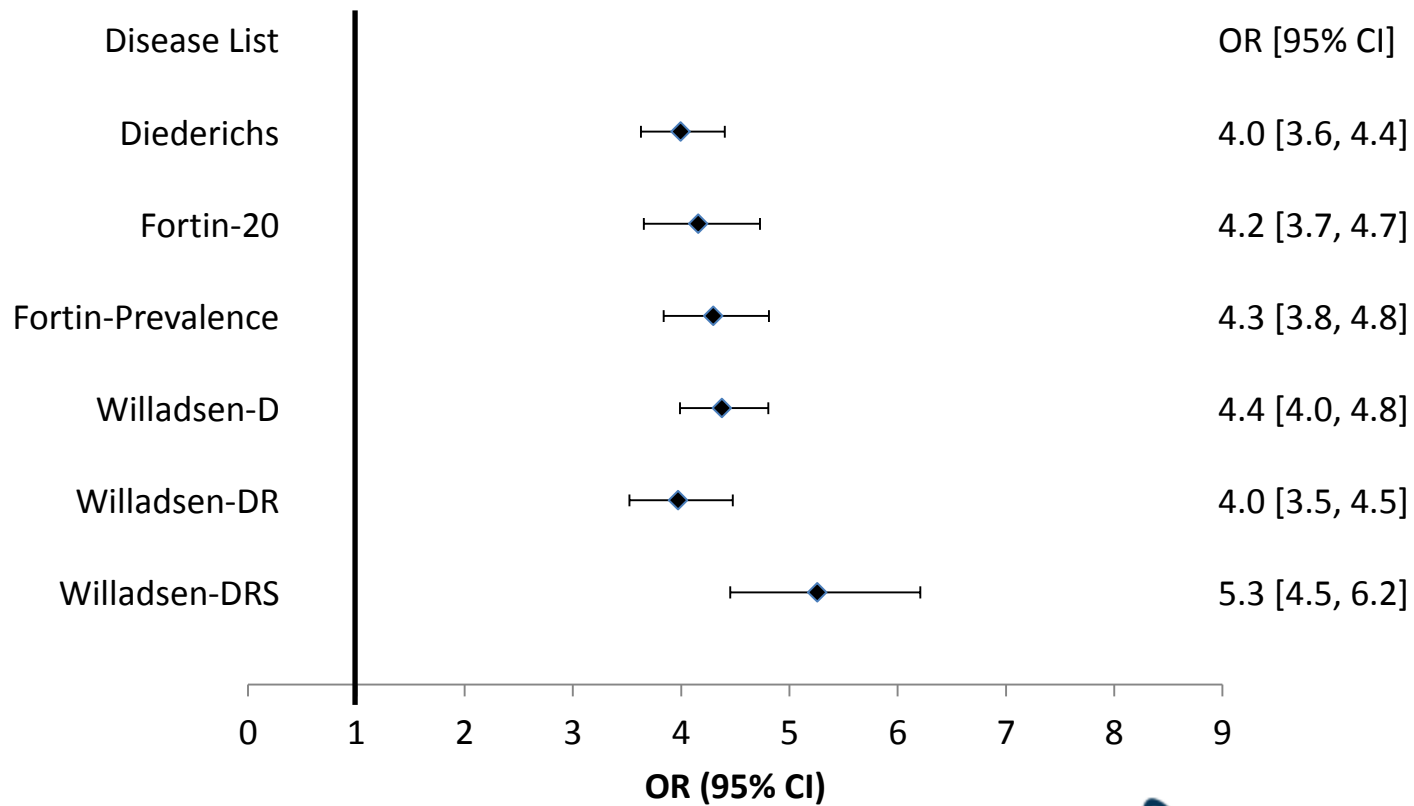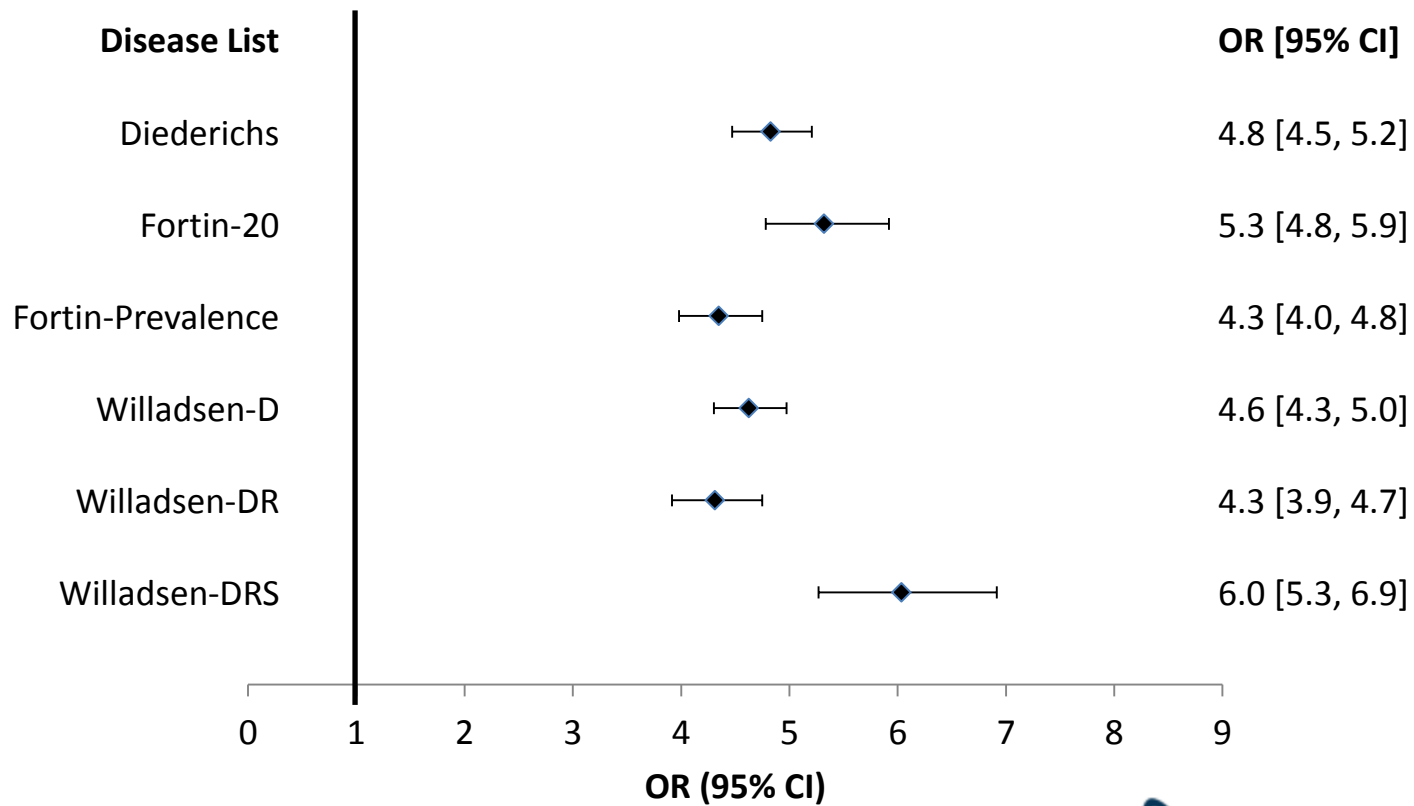Étude longitudinale canadienne sur le vieillissement

Results

ORs for Self-Reported Mental Health (poor or fair vs. good-excellent) for People with MM (2+ CCs) Compared to those without MM Using Different Disease Lists

Disease List	OR [95% CI]
Diederichs	4.0 [3.6, 4.4]
Fortin-20	4.2 [3.7, 4.7]
Fortin-Prevalence	4.3 [3.8, 4.8]
Willadsen-D	4.4 [4.0, 4.8]
Willadsen-DR	4.0 [3.5, 4.5]
Willadsen-DRS	5.3 [4.5, 6.2]

OR (95% CI)

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Results

ORs for Self-Reported Healthy Aging (poor or fair vs. good-excellent) for People with MM (2+ CCs) Compared to those without MM Using Different Disease Lists

Disease List	OR [95% CI]
Diederichs	4.8 [4.5, 5.2]
Fortin-20	5.3 [4.8, 5.9]
Fortin-Prevalence	4.3 [4.0, 4.8]
Willadsen-D	4.6 [4.3, 5.0]
Willadsen-DR	4.3 [3.9, 4.7]
Willadsen-DRS	6.0 [5.3, 6.9]

OR (95% CI)

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Key Messages

- Definition of Multimorbidity and/list of included conditions drives the prevalence rate of Multimorbidity across all age and sex groups
  - → regardless of choosing the 2 or 3 cut point

- Some indication that the list chosen can also impact gender differences seen in Multimorbidity research

- Choice of Multimorbidity list impacts the magnitude of the association with disability, social participation, and self-rated health
  - → prevalence based list not necessary include most disabling conditions
  - → symptoms more likely to impact person-important outcomes than risk factors

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Implications, Next Steps

- Potential clinical and public health importance

  - Clinical trials → addition of symptoms may increase the power to detect changes in patient-important outcomes

  - Intervention targeting → Additional risk factors may "dilute the denominator"

  - Public health → Risk factors may be included to help identify preventative, interventions on modifiable risk factors for future conditions

- Most research focussed on cross-sectional associations

  → Need to look at longitudinal trajectories of person-important outcomes related to multimorbidity

  → Examine how the accumulation of new conditions impacts outcomes

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Acknowledgements

Co-Authors:

- Anne Gilsing, Maastricht University, Netherlands

- Edwin van den Heuvel, Technische Universiteit Eindhoven, Netherlands

- Sohel Nazmul, McMaster University, Canada

- Christopher Patterson, McMaster University, Canada

- Phil St. John, University of Manitoba, Canada

- Marjan van den Akker, University of Manitoba, Canada

- Parminder Raina, McMaster University, Canada

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21

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2. Harrison C, Britt H, Miller G, Henderson J: **Examining different measures of multimorbidity, using a large prospective cross-sectional study in Australian general practice.** *BMJ Open* 2014, **4:** e004694.

3. Diederichs C, Berger K, Bartels DB: **The measurement of multiple chronic diseases--a systematic review on existing multimorbidity indices.** *Journals of Gerontology Series A-Biological Sciences & Medical Sciences* 2011, **66:** 301-311.

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