Canadian Frailty Network | Réseau canadien des soins aux personnes fragilisées

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Exposure to potentially inappropriate medications among long-term care residents with cognitive impairment in Ontario:

Is there an association with frailty?

ICES

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Conflicts of Interest

- The study co-authors have no conflicts of interest to declare

Background

Previous studies have documented high rates of potentially inappropriate medications (PIMs), such as antipsychotics, in the long-term care (LTC) in Canada[1, 2]

- Associated with an increased risk of falls and fractures, stroke, and mortality[3]

These studies are often cross-sectional and shed limited information as to whether individuals newly start (or stop) PIMs in the LTC environment.

Particularly at risk are "frail" individuals

- Significant co-morbidity complicated by age-related physiological changes and the frequent presence of cognitive impairment, disability, social isolation and depression
- Resident Assessment Instrument (RAI) data allows us to examine frailty in some detail

1. Morgan et al 2016 Age & Aging; 2. Bronskill et al., JAMDA 2012; 3. Lau et al Arch Int. Med 2005

Objectives

To examine the prevalence of PIM use among newly admitted residents with dementia and/or cognitive impairment in Ontario

- On admission to long-term care AND
- In the 180 days following admission to long-term care

To study the association between frailty status and newly starting and/or stopping PIMs

- And whether this association is modified by additional resident characteristics

Methods

Methods: Study Cohort

Retrospective cohort study of Ontario adults, aged 66 and older, newly admitted to LTC between April 1st 2011 and March 31st 2014, with diagnosis of dementia OR meaningful cognitive impairment.

Dementia and/or meaningful cognitive impairment cohort identified using:

- Dementia algorithm based on administrative data
  - Jaakkimainen et al, Journal of Alz Disease (in press)
- RAI-MDS pick-list (CCRS-LTC) at time of admission
  - Alzheimer's disease
  - Dementia other than Alzheimer's disease
- Cognitive Performance Scale (CPS): Score of ≥2 on admission RAI-assessment

Methods: Potentially Inappropriate Medications

American Geriatrics Society (2015) Beers criteria[4]

- List of drugs that should be avoided in older adults and those with certain diseases
- Associated with poor health outcomes – falls, mortality

Examined four drug classes that should be avoided in patients with dementia or cognitive impairment (Table 3);

- Antipsychotics
  - prescribed to manage psychosis, but often prescribed for behavioural issues in dementia
- H2 receptor antagonists
  - prescribed for gastric reflux & ulcers
- Benzodiazepines
  - prescribed for insomnia & anxiety
- Anticholinergics
  - prescribed for gastrointestinal disorders, incontinence, COPD, asthma

4. AGS Expert Panel, J Am Geriatr Soc. 2015

Methods: Analyses

PIM prevalence was determined at long-term care admission (point-prevalence) and during the 180 days following admission (period prevalence)

Cox proportional-hazards models were used to examine the association between frailty and PIM initiation/discontinuation

Individuals were censored at:

- Death
- Study end
- Hospital admission ≥3 days

Models were adjusted for age, sex, aggregated diagnosis groups, and behavioural characteristics

Methods: Frailty Index

- 72-item index
- Derived from Resident Assessment Instrument (RAI) MDS
- Domains:
  - Psychosocial well-being
  - Mood
  - Cognition
  - Communication
  - Functional Status
  - Incontinence
  - Disease diagnoses
  - Health conditions
  - Nutrition/Medications

Hogan *et al. BMC Geriatrics* 2012, **12**:56
http://www.biomedcentral.com/1471-2318/12/56

BMC Geriatrics

RESEARCH ARTICLE Open Access

Comparing frailty measures in their ability to predict adverse outcome among older residents of assisted living

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Abstract

Background: Few studies have directly compared the competing approaches to identifying frailty in more vulnerable older populations. We examined the ability of two versions of a frailty index (43 vs. 83 items), the Cardiovascular Health Study (CHS) frailty criteria, and the CHESS scale to accurately predict the occurrence of three outcomes among Assisted Living (AL) residents followed over one year.

Methods: The three frailty measures and the CHESS scale were derived from assessment items completed among 1,066 AL residents (aged 65+) participating in the Alberta Continuing Care Epidemiological Studies (ACCES). Adjusted risks of one-year mortality, hospitalization and long-term care placement were estimated for those categorized as frail or pre-frail compared with non-frail (or at high/intermediate vs. low risk on CHESS). The area under the ROC curve (AUC) was calculated for select models to assess the predictive accuracy of the different frailty measures and CHESS scale in relation to the three outcomes examined.

Results: Frail subjects defined by the three approaches and those at high risk for decline on CHESS showed a statistically significant increased risk for death and long-term care placement compared with those categorized as either not frail or at low risk for decline. The risk estimates for hospitalization associated with the frailty measures and CHESS were generally weaker with one of the frailty indices (43 items) showing no significant association. For death and long-term care placement, the addition of frailty (however derived) or CHESS significantly improved on the AUC obtained with a model including only age, sex and co-morbidity, though the magnitude of improvement was sometimes small. The different frailty/risk models did not differ significantly from each other in predicting mortality or hospitalization; however, one of the frailty indices (83 items) showed significantly better performance over the other measures in predicting long-term care placement.

Conclusions: Using different approaches, varying degrees of frailty were detected within the AL population. The various approaches to defining frailty were generally more similar than dissimilar with regard to predictive accuracy with some exceptions. The clinical implications and opportunities of detecting frailty in more vulnerable older adults require further investigation.

Keywords: Frailty, Predictive accuracy, Agreement, Assisted living

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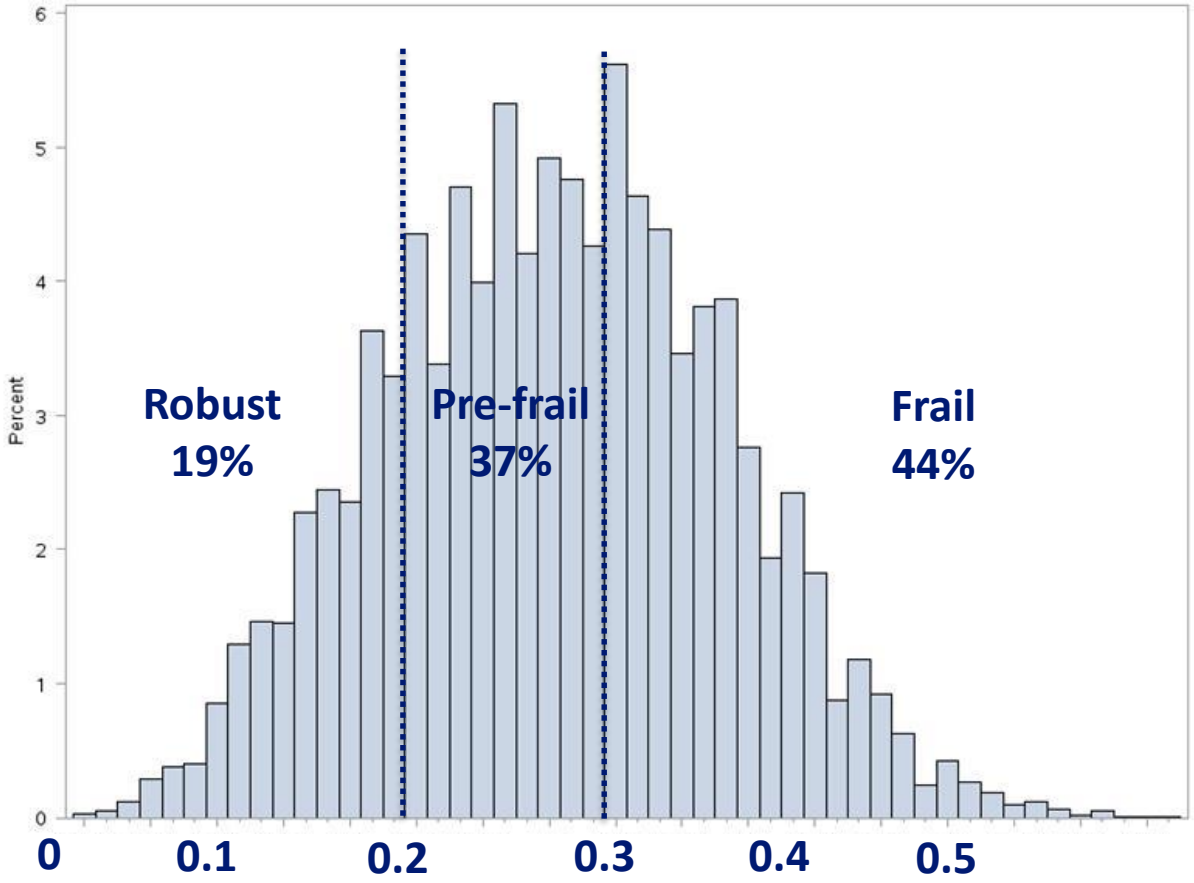
Results

Results: Frailty Index in Our Cohort

We identified 41,351 older adults newly entering long-term care with a diagnosis of dementia and/or meaningful cognitive impairment.



Results: Baseline Characteristics

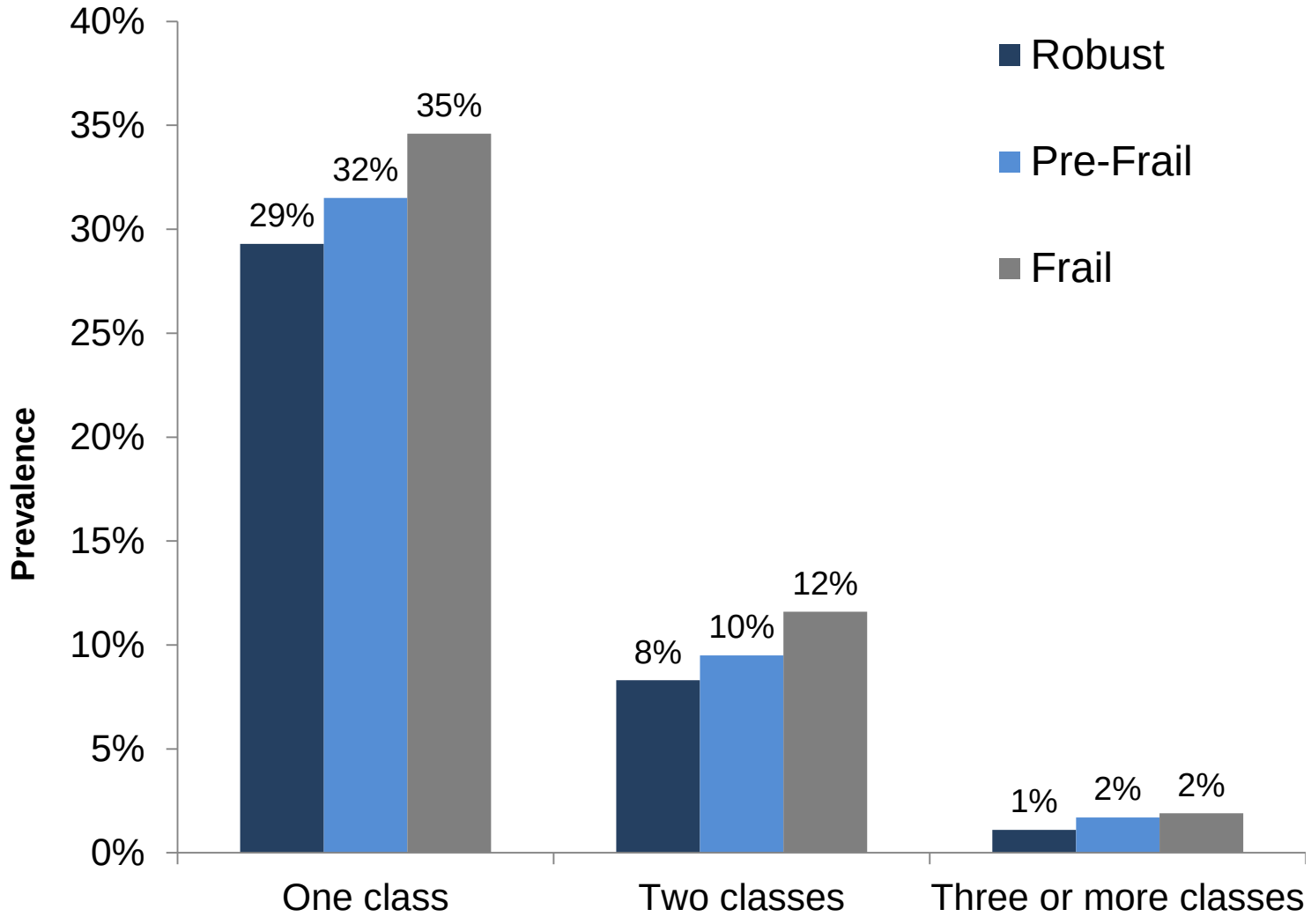
	Overall	Robust	Pre-frail	Frail
		< 0.2	0.2-0.3	> 0.3
Older adults newly admitted to LTC, N	**41,351**	**7,898**	**15,244**	**18,209**
Age at LTC admission				
Mean ±SD	84.7 ± 6.9	83.7 ± 7.0	84.5 ± 6.9	85.2 ± 6.9
Median (IQR)	85 (80-90)	84 (79-89)	85 (80-89)	86 (81-90)
Sex, female, %	64.7	63.9	65.2	64.6
Low income ODB flag, %	28.8	29.6	29.4	27.8
Aggregated Diagnosis Groups				
Mean ±SD	10.1 ± 4.0	9.3 ± 4.0	9.9 ± 4.1	10.5 ± 4.0
Median (IQR)	10 (7-13)	9 (6-12)	10 (7-13)	11 (8-13)
0-5, %	14.4	19.1	15.8	11.3
6-9, %	39.4	42.4	39.9	37.7
10+, %	46.1	38.5	44.3	51.0

Results: Historical Health System Utilization*

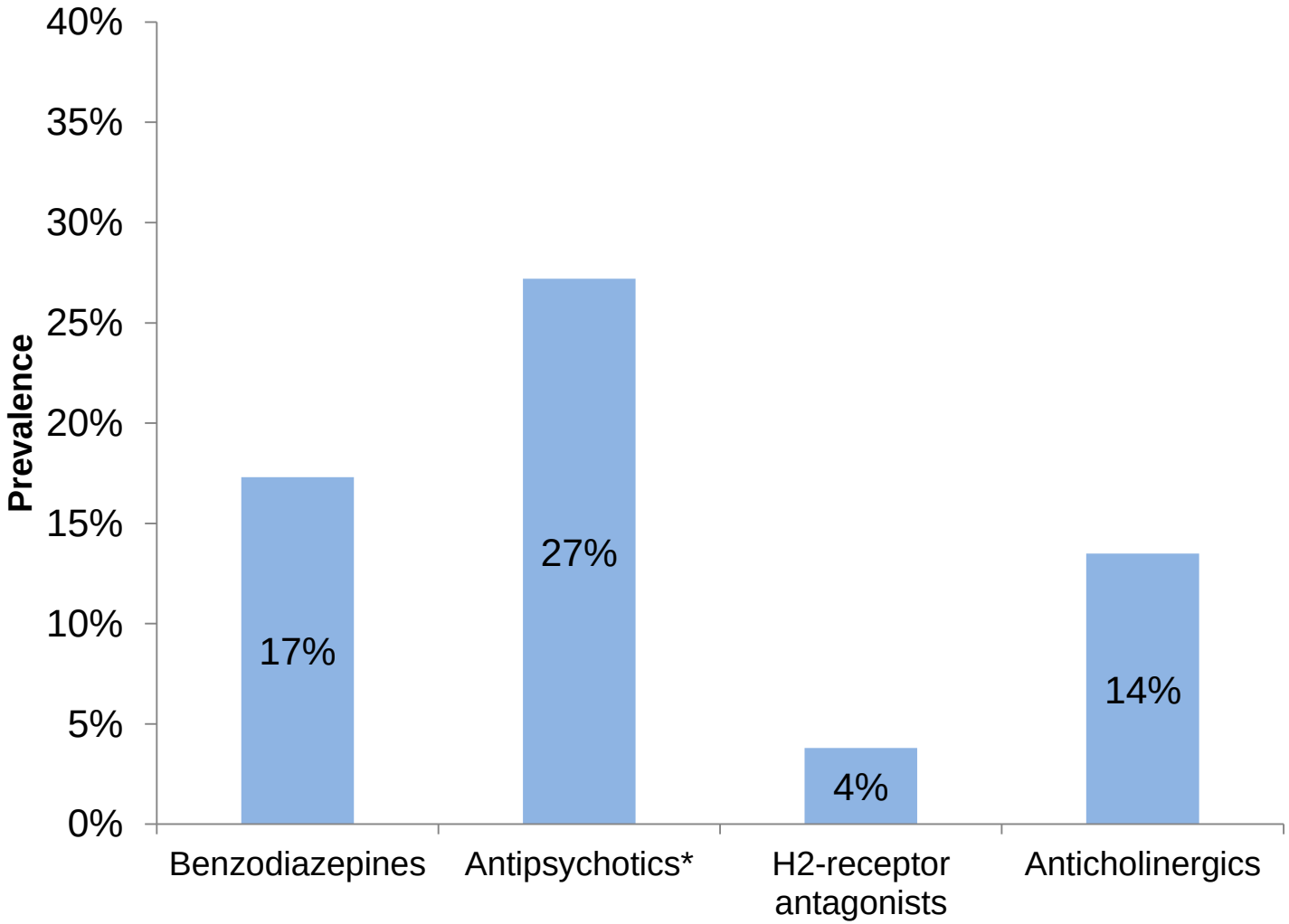
	Overall	Robust	Pre-frail	Frail
		< 0.2	0.2-0.3	> 0.3
Older adults newly admitted to LTC, N	**41,351**	**7,898**	**15,244**	**18,209**
Any primary care visit, %	98.1	98.0	98.1	98.1
High continuity of primary care† (>median)	50.0	53.1	51.5	47.5
Any specialist visit, %	86.9	86.3	87.0	87.0
Any emergency department visit, %	88.1	81.3	86.5	92.4
Any acute care admissions, %	58.5	49.5	56.8	63.8
Any alternate level of care days, %	28.3	20.6	26.8	33.0
History of psychosis, %	14.0	13.5	13.4	14.7

*Utilization in the past 2 years
†Continuity of primary care based on proportion of visits to provider responsible for most visits
Based on Bice and Boxerman, 1977 Med Care

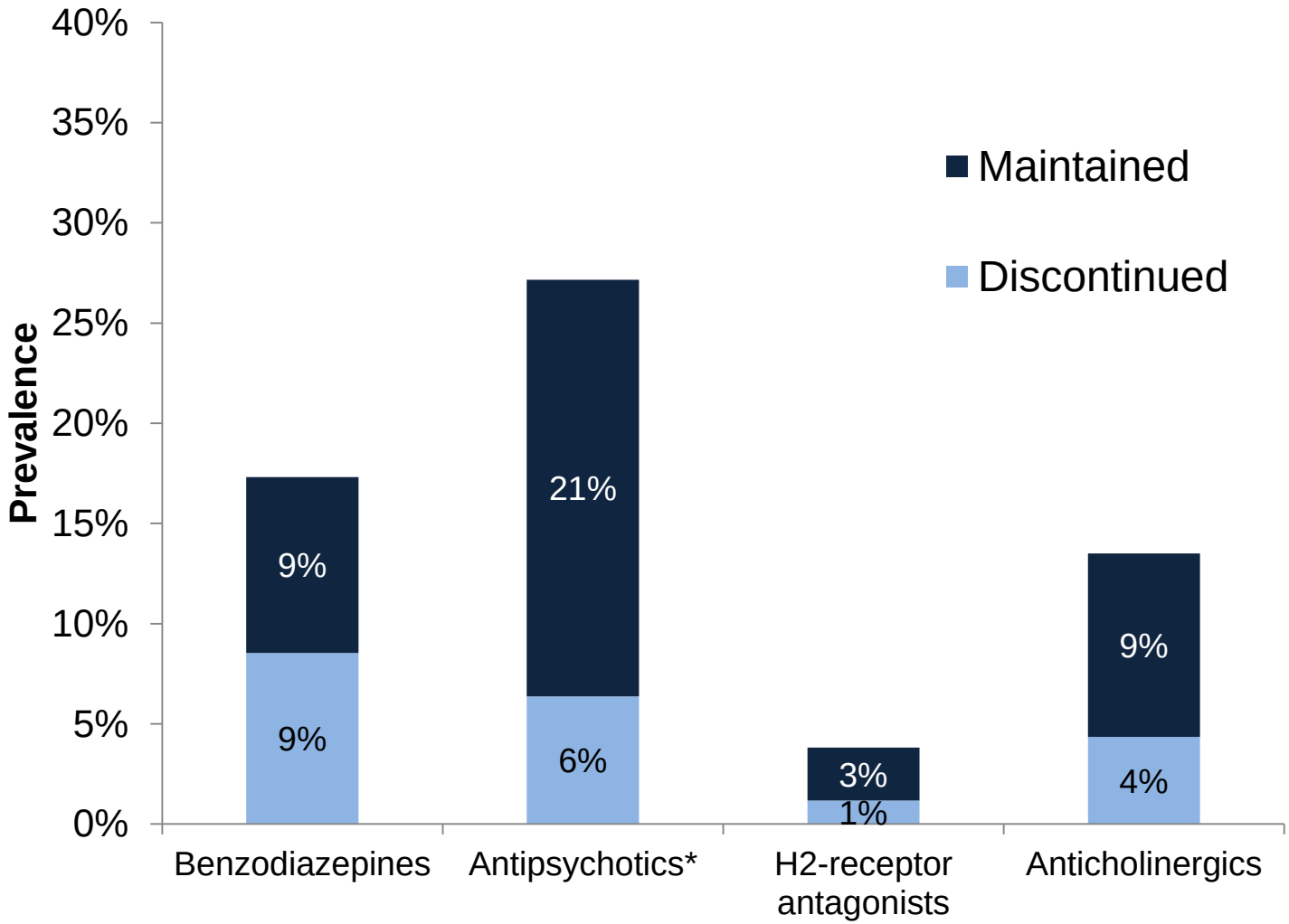
Results: Prevalence of PIMs (Beers 2015) at admission among older Ontario long-term care residents with dementia or cognitive impairment (2011-2014)



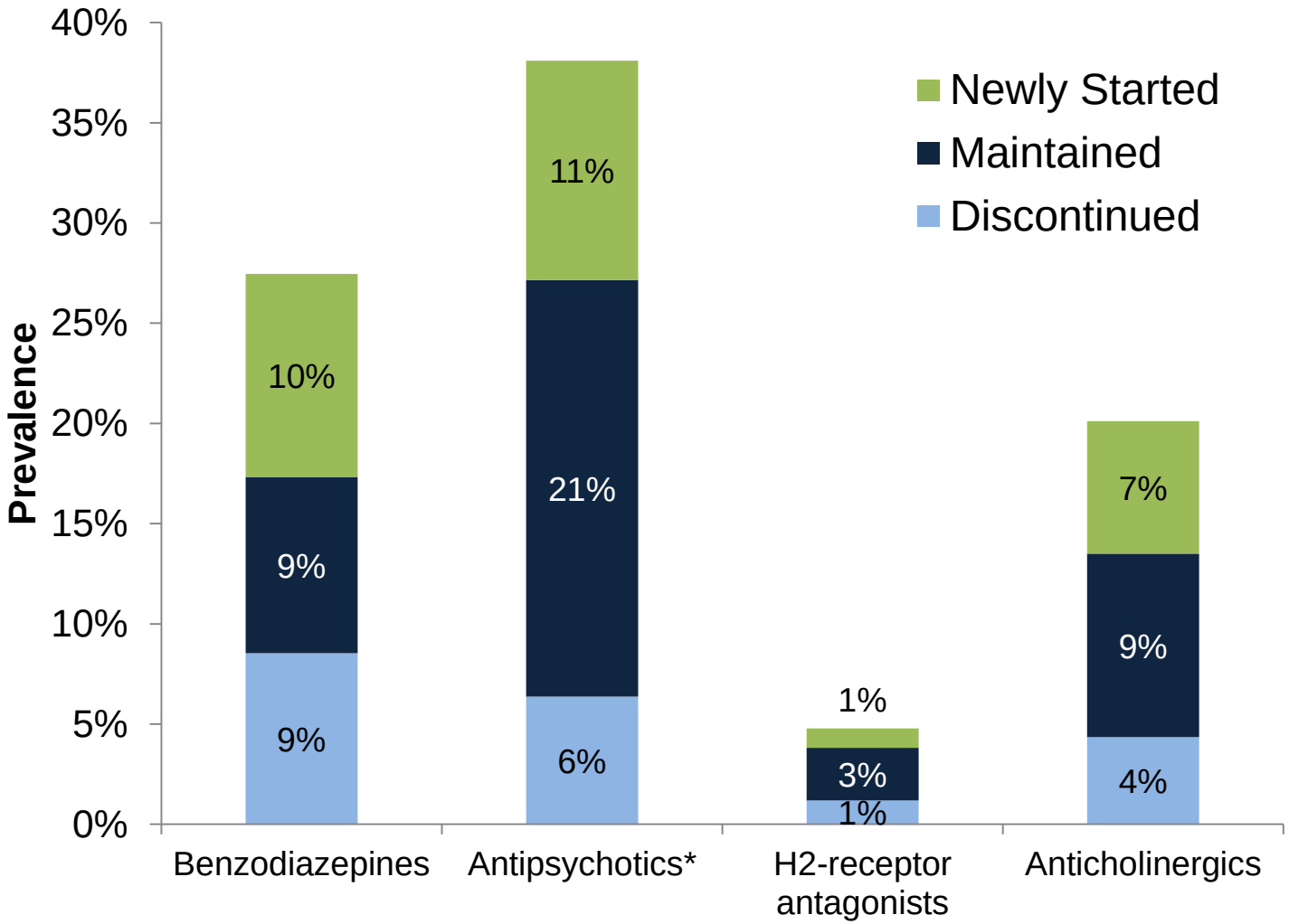
Results: Prevalence of PIMs (Beers 2015) at admission, by drug class, among older Ontario long-term care residents with dementia or cognitive impairment (2011-2014)



Results: Pattern of PIM use (Beers 2015) at admission and during 180-day follow-up among older Ontario long-term care residents with dementia or cognitive impairment (2011-2014)

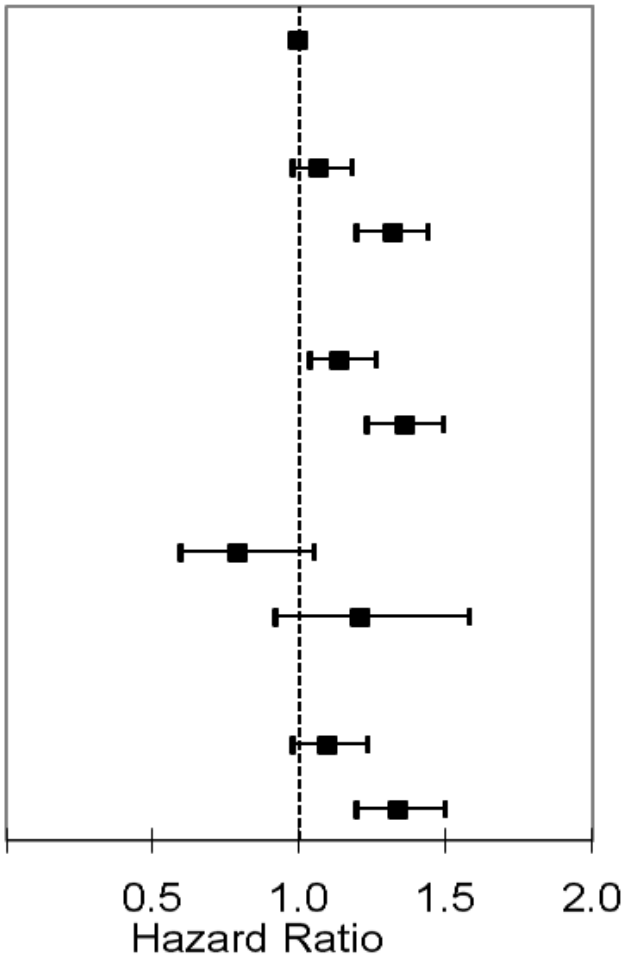


Results: Pattern of PIM use (Beers 2015) at admission and during 180-day follow-up, by drug class, among older Ontario long-term care residents with dementia or cognitive impairment (2011-2014)



Results: Adjusted Hazard Ratios* for PIM Initiation in 180 days after LTC admission among older Ontario long-term care residents with dementia and/or cognitive impairment, by frailty status

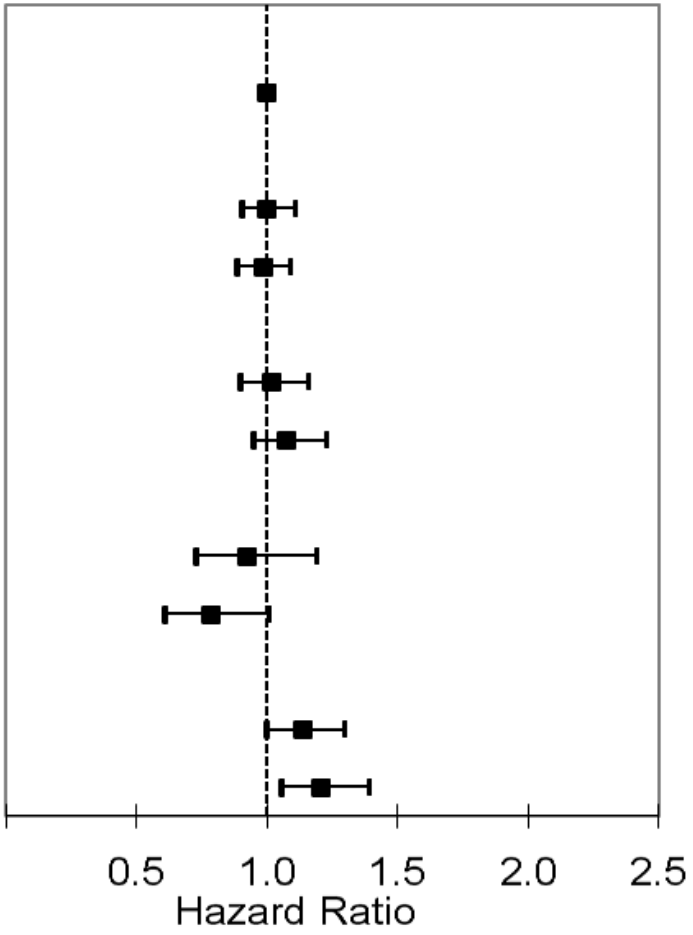
	Hazard Ratio (95% CI)
Robust (ref.)	1.0
Benzodiazepines	
Pre-frail	1.07 (0.98, 1.18)
Frail	1.32 (1.20, 1.44)
Antipsychotics	
Pre-frail	1.14 (1.04, 1.26)
Frail	1.36 (1.23, 1.49)
H_2-receptor antagonists	
Pre-frail	0.79 (0.60, 1.05)
Frail	1.21 (0.92, 1.58)
Anticholinergics	
Pre-frail	1.10 (0.98, 1.23)
Frail	1.34 (1.20, 1.50)



*Adjusted for age, sex, clustering in LTC homes, ADGs, aggressive behaviours

Results: Adjusted Hazard Ratios* for PIM Discontinuation in 180 days following LTC admission among older Ontario long-term care residents with dementia or cognitive impairment, by frailty status

	Hazard Ratio (95% CI)
Robust (ref.)	1.0
Benzodiazepines	
Pre-frail	1.00 (0.91, 1.11)
Frail	0.99 (0.89, 1.09)
Antipsychotics	
Pre-frail	1.02 (0.90, 1.16)
Frail	1.08 (0.95, 1.23)
H_2-receptor antagonists	
Pre-frail	0.93 (0.73, 1.19)
Frail	0.79 (0.61, 1.01)
Anticholinergics	
Pre-frail	1.14 (1.00, 1.30)
Frail	1.21 (1.06, 1.39)



*Adjusted for age, sex, clustering in LTC homes, ADGs and aggressive behaviours

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Summary

Almost half of newly admitted long-term care residents were on at least one PIM at admission

- Antipsychotics were the most commonly prescribed, followed by benzodiazepines and anticholinergics; H2 receptor antagonists were rarely prescribed

These drug therapies were frequently maintained during the follow-up period

- In particular 77% of antipsychotics and 68% of anticholinergics were continued.
- Exception was benzodiazepines where 49% were discontinued.

Frail individuals were more likely to be on a PIM or have one newly started

- Frail individuals were significantly more likely to be newly prescribed benzodiazepines, antipsychotics, and anticholinergics

Frail individuals were not more likely to have a PIM discontinued

- Exception was anticholinergics which were more likely to be discontinued
- Frail individuals with aggressive behaviours were more likely to have an antipsychotic initiated, however, the effect was not significant

Implications

Many residents are prescribed PIMs in the community and enter LTC on these drug therapies

- Messaging & interventions to help optimize prescribing in the LTC environment are often focused on not initiating PIM
  - Does support for discontinuation require the same types of interventions?

Frail LTC residents with dementia and/or meaningful cognitive impairment are more likely to be prescribed a PIM than robust individuals

- Troublesome, as these are often the most vulnerable individuals
- Next step is to look at association with adverse events

Acknowledgements

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Thank You


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Methods: Data Sources

Linked administrative databases:

CIHI-DAD	Discharge Abstract Database
OHIP	Ontario Health Insurance Plan Claims Database
ODB	Ontario Drug Benefit Claims
CCRS	Continuing Care Reporting System (including Long-Term Care and Complex Continuing Care)
OMHRS	Ontario Mental Health Reporting System
NACRS	National Ambulatory Care Reporting System
RPDB	Registered Persons Database files (RPDB)

All Ontarians with first long-term care admission date between April 1, 2011 and March 31, 2014 in CCRS-LTC	N=71,638
Exclusion criteria	**N**
Death before and on admission date	78
Invalid sex	37
Age < 66 or Age > 105 on admission date	5,107
Non-Ontario resident	115
LTC flag in previous 1 year (OHIP, ODB, CCRS-LTC), but not within 14 days	1,702
No ODB claims in previous 1 year	2,333
No RAI-assessment within 14 days of LTC admission	9,723
No dementia or Cognitive Impairment	10,839
Hospital admissions at index	353
Final study cohort	**41,351**

Results: Subgroup analysis-PIM initiation by behaviours among frail individuals

	Hazard Ratio (95% CI)
Benzodiazepines	
Mild to severe aggression	1.39 (1.20, 1.60)
No aggression	1.38 (1.23, 1.56)
Antipsychotics	
Mild to severe aggression	1.63 (1.42, 1.87)
No aggression	1.40 (1.23, 1.60)
H_2 receptor antagonists	
Mild to severe aggression	1.02 (0.62, 1.68)
No aggression	1.24 (0.90, 1.72)
Anticholinergics	
Mild to severe aggression	1.38 (1.15, 1.65)
No aggression	1.38 (1.19, 1.36)

*Adjusted for age, sex, clustering in LTC homes, and ADGs