

Do indicators of health system performance for older adults change over time?



An analysis of multiple frail cohorts

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Background

Population-based measures of health system performance are commonly reported nationally and internationally

- Often don't distinguish between important aspects of successful aging among older adults
 - Multimorbidity, cognitive impairment, functional dependence
 - Community-dwelling +/- home care & long-term care settings
- Among older adults, there is a lack of consensus in operational definitions of frailty at a population-level with health administrative data

Background

Have investments in services for older adults changed patterns of system use over time?

- From a health policy perspective ... integration and coordination across sectors of the health system is of on-going importance



How do you evaluate health system investments for older adults at a population level over time?

- From a research perspective ... can we integrate data sources across settings to provide a more complete picture of the system?

Study Objectives

To describe how frequently cohorts based on different definitions of 'frailty' identify the same older adults in Ontario

To examine trends over time in a series of health system performance indicators across different cohorts of older adults

- Stability of trends over time
- Comparisons in trends between cohorts

Have investments in services for older adults changed patterns of health system use over time?

Methods: Study Design & Setting

Retrospective, population-based, repeated annual cross-sectional study, using linked health administrative databases

Selection of **13 frail cohorts** based clinical comorbidity, functional characteristics, care setting and historical health system costs

Selection of **14 health system performance indicators** based on relevance for older populations

Methods: Cohort Definitions

Community-Dwelling

- Older adults aged 66+ years
- Oldest adults aged 85+ years
- Older adults with morbidity burden (ADG 10+)
- Older adults with polypharmacy (10+ concurrent drugs)
- Older adults with a history of physician diagnosed dementia
- Older adults with a history of palliative care services

Long-Term Care

- Oldest adults (85+ years) who are long-term care residents

RAI-HC Assessment

- Older adults with a recent RAI-HC assessment
- Older adults with a recent RAI-HC & behavioural symptoms
- Older adults with a recent RAI-HC & high CHESS score
- Older adults with a recent RAI-HC & high MAPLe

Costs

- Older adults with a history as high-cost system users
- Older adults with a history as low-cost system users

Methods: Inclusion Criteria

- Older adults, aged 66 years and older in Ontario
- Valid health card number
- Alive on April 1st of each fiscal year, between 2002/03 and 2012/13, creating yearly cohorts

- Some exceptions:
 - Older Adults/Older Long-Term Care Residents cohorts start at age 85+
 - Some indicators/cohorts will start when data is available
 - Recent RAI-HC assessment (2007-2012)
 - Behavioural symptoms (2007-2012)
 - High MAPLe score(2007-2012)
 - High CHESS score (2007-2012)
 - High-cost (2007-2012)
 - Low-cost (2007-2012)

Methods: Exclusion Criteria

- Invalid IKN
- Death on or prior to April 1st (index date)
- Invalid/missing age or sex
- Invalid age (< 66 or > 120 years)
- Non-Ontario resident
- Non-community-dwelling, i.e. in an acute care hospital, complex continuing care, long-term care, rehabilitation hospital or psychiatric facility at index (except older long-term care cohort)
- Date of last contact with health care system > 5 years prior to index date

Methods: Data Sources

- Registered Persons Database (RPDB)
- Ontario Health Insurance Plan (OHIP)
- ICES Provider Database (IPDB)
- Discharge Abstract Database (DAD)
- National Ambulatory Care Reporting System (NACRS)
- Ontario Drug Benefit (ODB)
- Continuing Care Reporting System (CCRS)
- Home Care Database (HCD)
- Resident Assessment Instrument- Home Care (RAI-HC)

Methods: Health System Performance Indicators

System Access

- Rate of unscheduled emergency department visits
- Rate of primary care visits
- Rate of hospital admissions
- Rate of emergency department visits for potentially preventable conditions
- Rate of death
- Percentage of individuals waiting for long-term care placement
- Access to a usual provider of primary care
- Percentage of individuals receiving long-stay home care services

Effectiveness

- Rate of primary care visits within 7 days of inpatient discharge
- Rate of hospital readmissions within 30 days of inpatient discharge
- Proportion of inpatient days accounted for by alternate level of stay (ALC)

Safety

- Rate of hospital admissions for fall-related injuries

Costs

- Older adults with a history as high-cost system users
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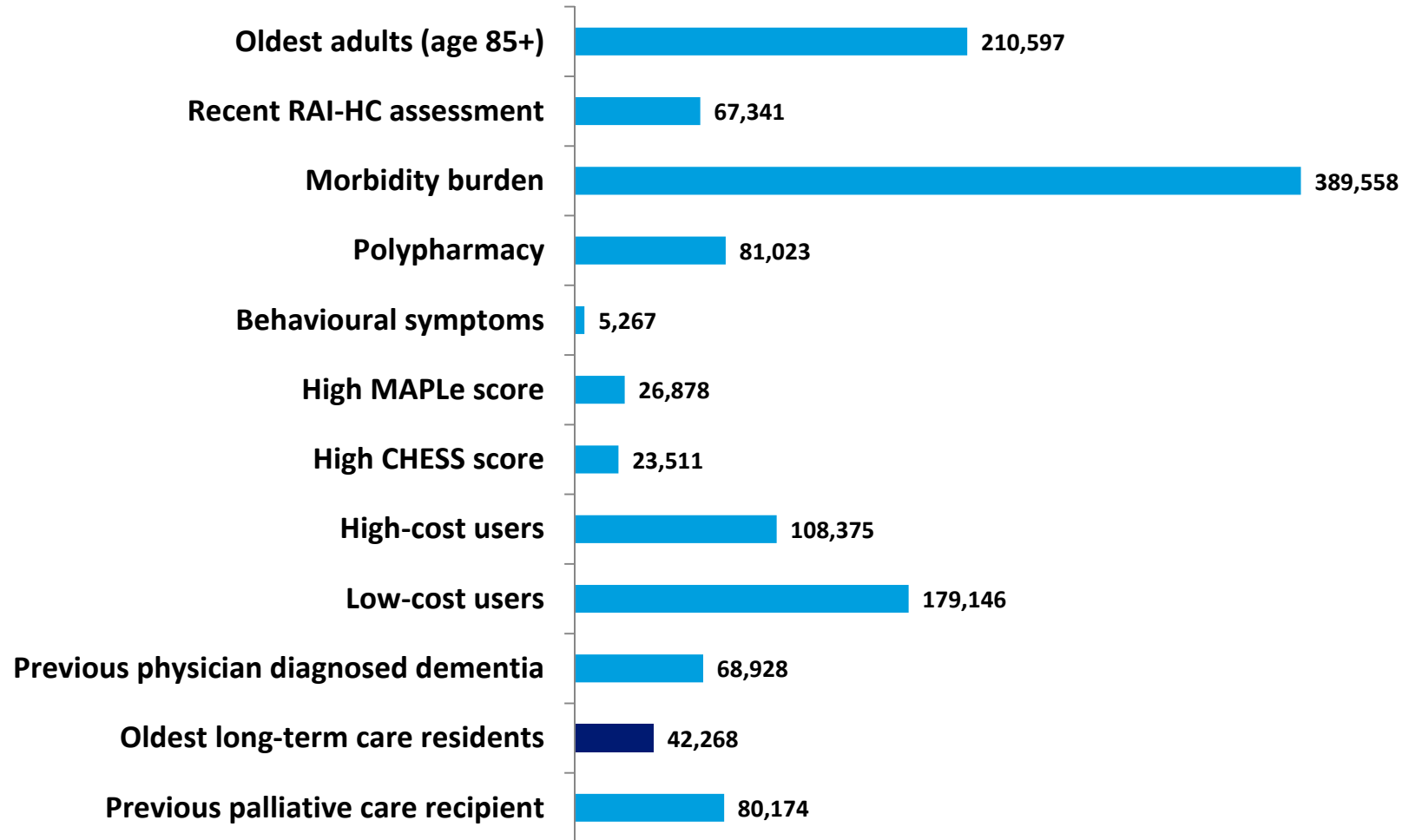
Methods: Analysis

- Descriptive statistics to compare proportion of individuals in each cohort
- Linear regression models to examine temporal trends, adjusted for age and sex
- Note: Some indicators were calculated prospectively (rates) while others were retrospective (proportions)

Demographic characteristics of community-dwelling adults in Ontario, aged 66 years and over, 2011/12

Community-dwelling older adults, N	1,713,104
Age (mean \pm SD)	75.3 \pm 7.14
Sex, n (%)	
Female	939,657 (54.9)
Male	773,447 (45.1)
Neighbourhood income level, n (%)	
Q1 (Lowest)	319,331 (18.6)
Q2	349,981 (20.4)
Q3	335,167 (19.6)
Q4	345,714 (20.2)
Q5 (Highest)	357,118 (20.8)
ODB low income flag, n (%)	247,765 (14.5)
Rurality Index of Ontario, n (%)	
Rural	234,431 (13.7)
Urban	1,477,877 (86.3)

Distribution of cohort size, 2011/12



Cross-tabulation of overlap between cohorts, fiscal 2011/12

Cohort	2011 (N)	Older adults	Oldest adults	RAI-HC assessment	Morbidity burden	Poly-pharmacy	Behavioural symptoms	High MAPLe score	High CHES score	High-cost	Low-cost	Dementia	Oldest LTC residents	Palliative care
Older adults	1,713,104		12.3%	3.9%	22.7%	4.7%	0.3%	1.6%	1.4%	6.3%	10.5%	4.0%	n/a	4.7%
Oldest adults	210,597	100%		13.6%	30.3%	7.1%	1.1%	5.9%	4.7%	10.9%	9.7%	12.3%	n/a	8.1%
Recent RAI-HC assessment	67,341	100%	42.6%		53.7%	18.3%	7.8%	39.9%	34.9%	39.3%	0.0%	25.1%	n/a	25.5%
Morbidity burden	389,558	100%	16.4%	9.3%		11.1%	0.6%	3.5%	3.6%	19.2%	0.2%	7.3%	n/a	13.7%
Polypharmacy	81,023	100%	18.4%	15.2%	53.3%		0.8%	5.6%	6.4%	24.9%		10.7%	n/a	15.8%
Behavioural symptoms	5,267	100%	42.6%	100.0%	43.1%	12.6%		98.6%	49.6%	36.6%	0.0%	65.9%	n/a	22.0%
High MAPLe score	26,878	100%	46.0%	100.0%	50.8%	16.9%	19.3%		42.9%	38.0%	0.0%	47.1%	n/a	24.2%
High CHES score	23,511	100%	42.3%	24.4%	58.9%	22.1%	11.1%	49.0%		47.0%	0.0%	26.5%	n/a	35.1%
High-cost users	108,375	100%	21.2%	24.4%	69.1%	18.6%	1.8%	9.4%	10.2%		0.0%	11.4%	n/a	41.6%
Low-cost users	179,146	100%	11.4%	4.0%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%		1.2%	n/a	0.0%
Previous physician diagnosed dementia	68,928	100%	37.5%	24.5%	41.2%	12.6%	5.0%	18.3%	9.0%	17.9%	3.0%		n/a	11.1%
Oldest long-term care residents	42,268	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a		n/a
Previous palliative care recipient	80,174	100%	21.4%	21.4%	66.4%	16.0%	1.4%	8.1%	10.3%	56.2%	0.0%	9.5%	n/a	

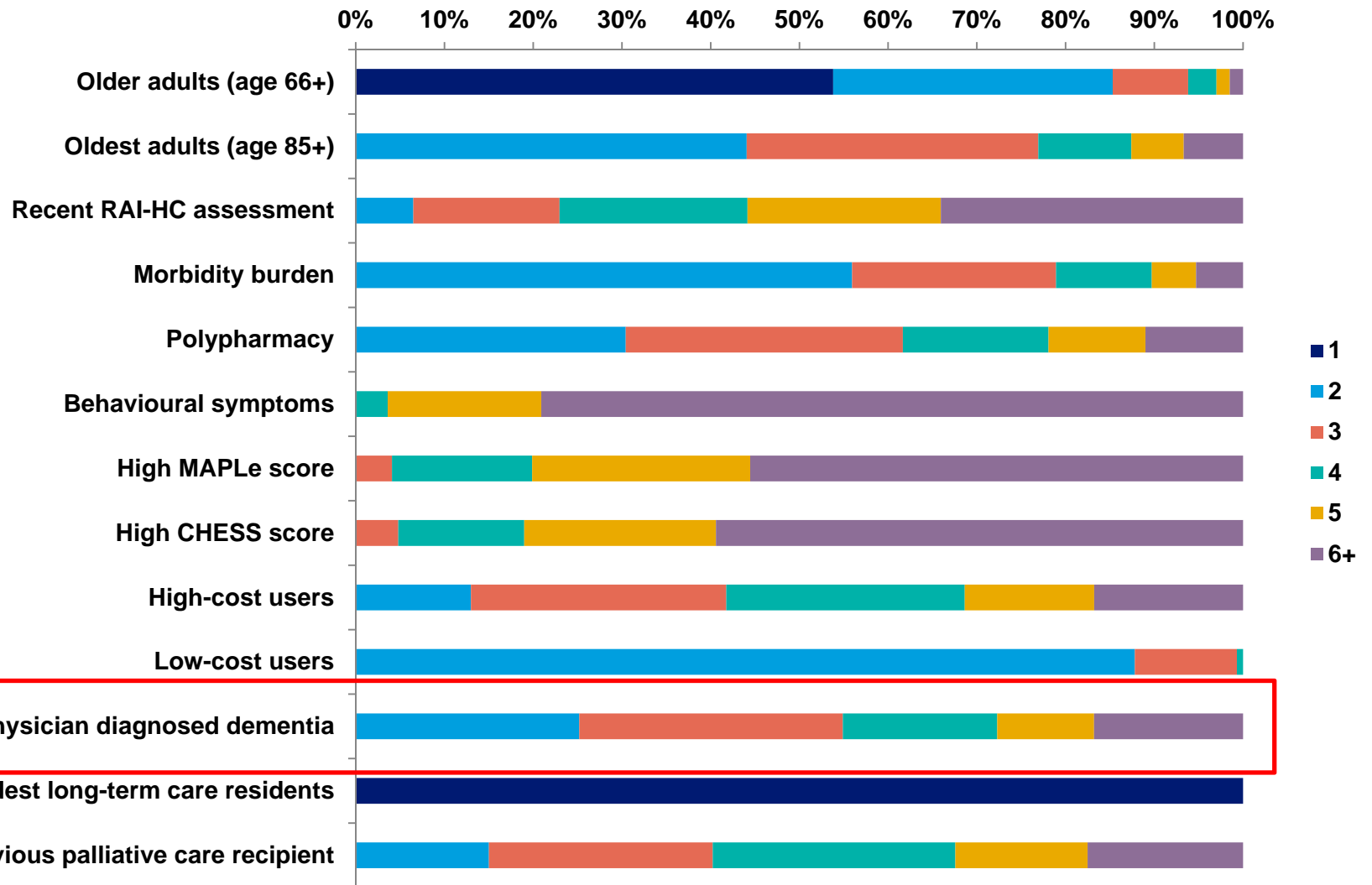
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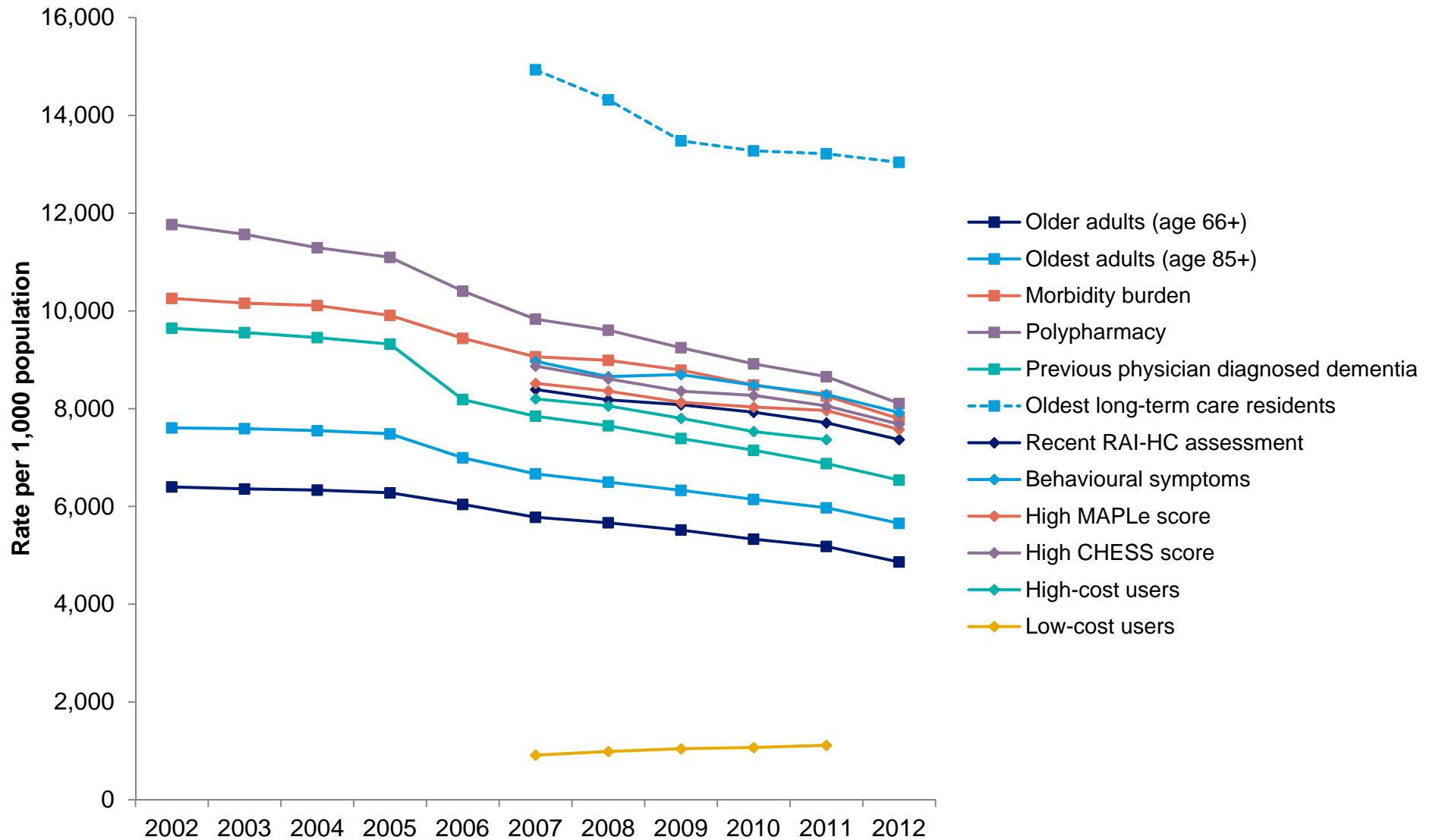
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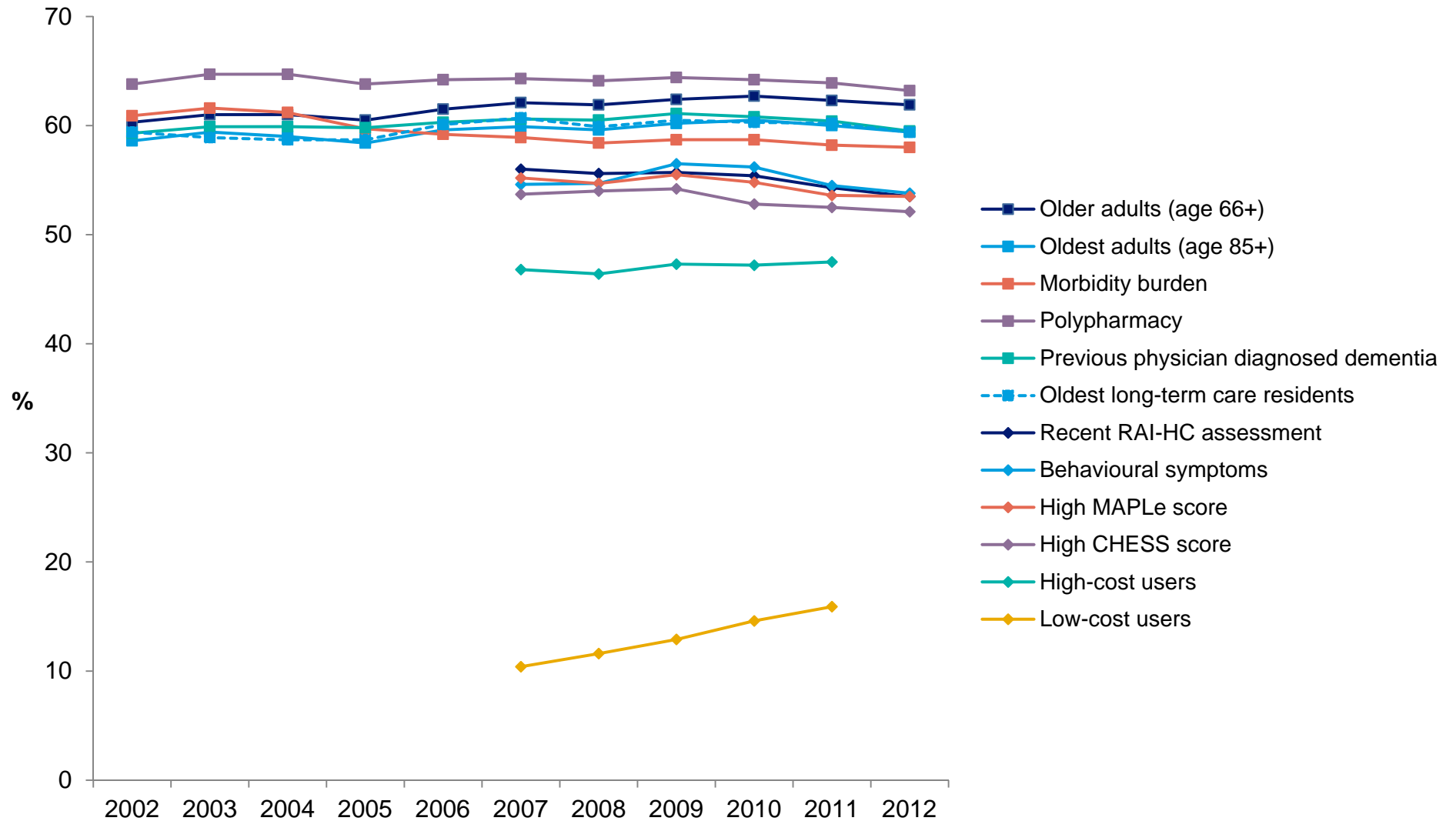
Inclusion in multiple cohorts, 2011/12



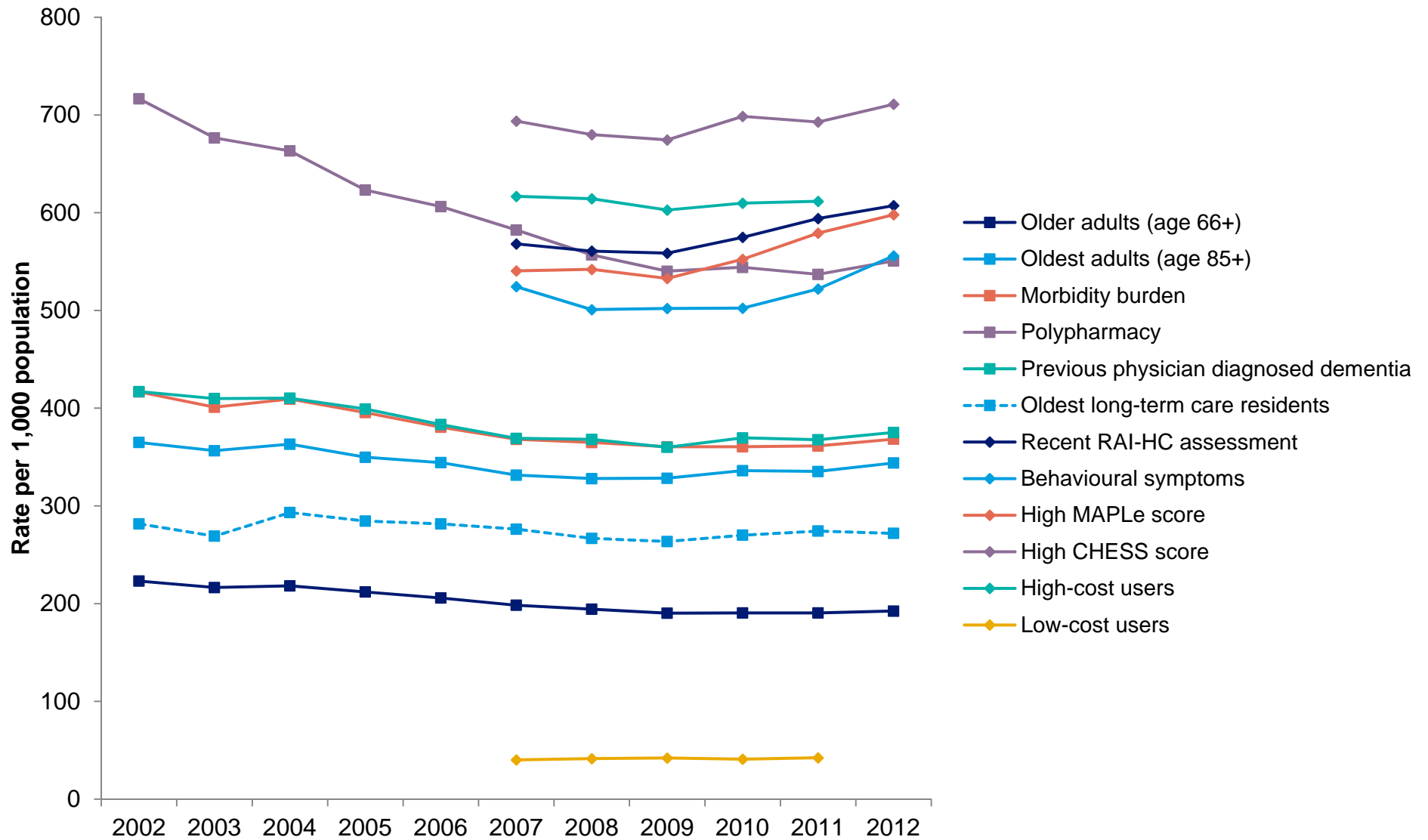
Rate of primary care visits among older adults in Ontario, by year (per 1,000 population)



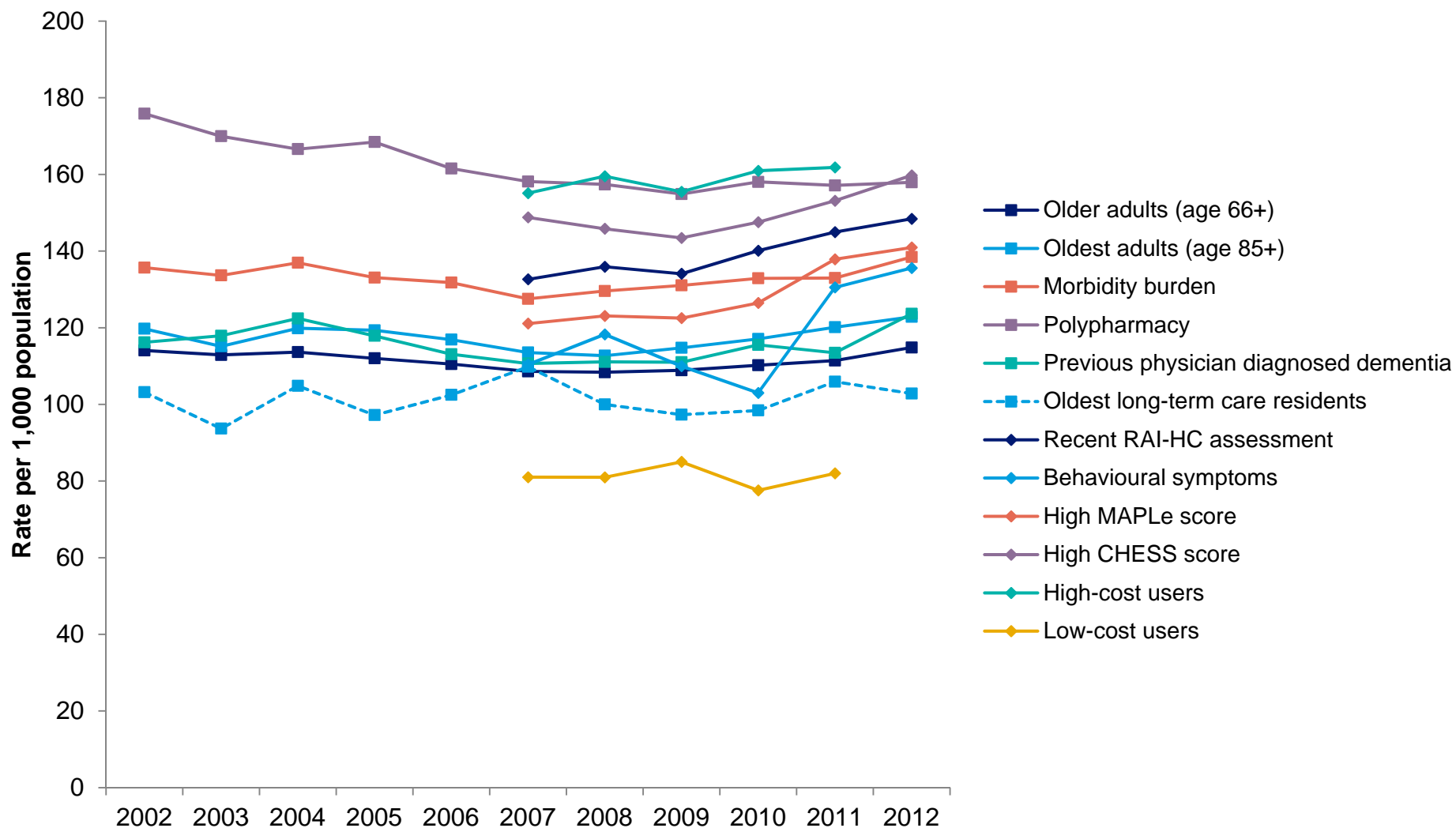
Percentage of older adults in Ontario with a usual provider of primary care



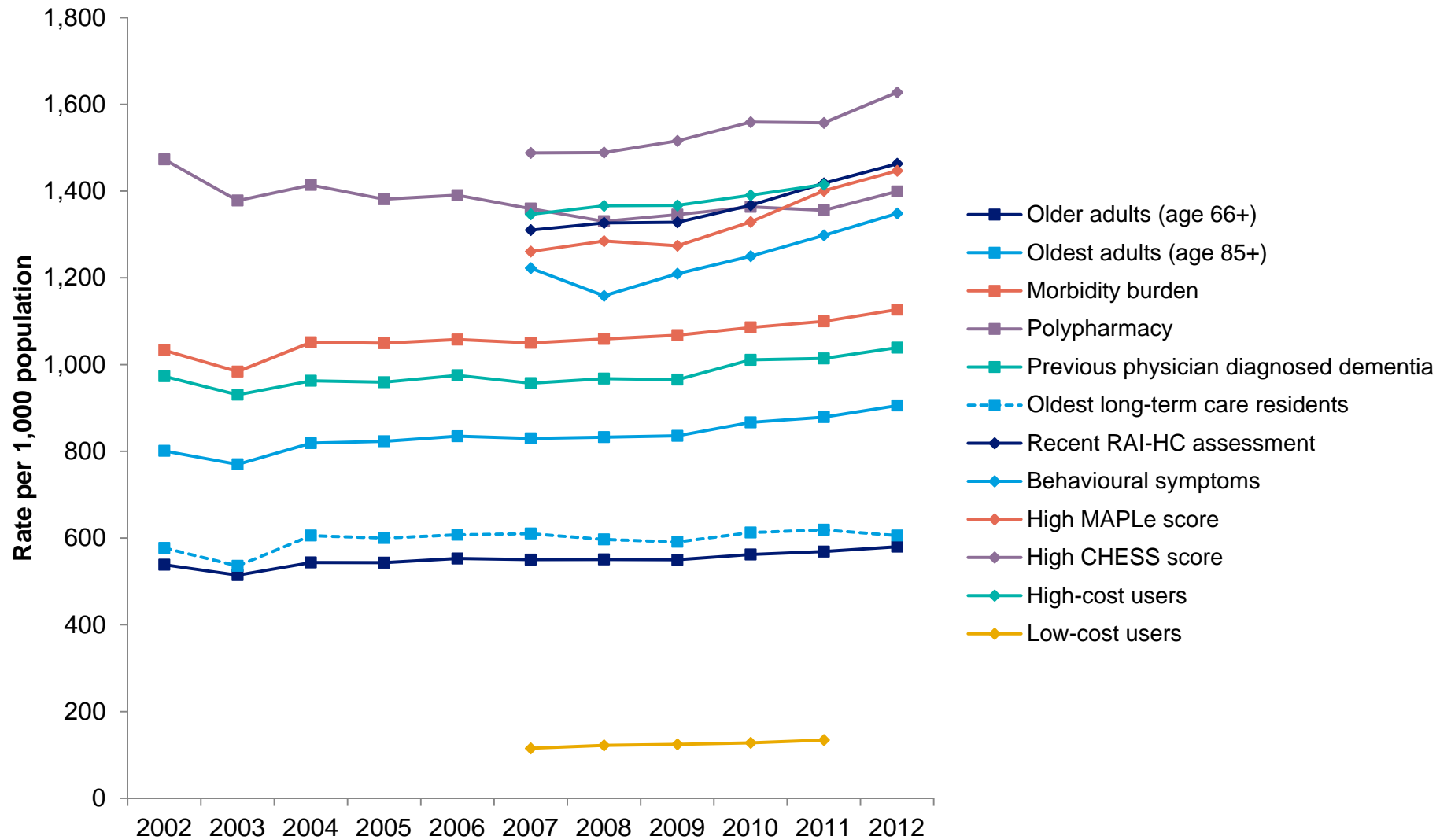
Rate of hospitalizations among older adults in Ontario, by year (per 1,000 population)



Rate of 30-day hospital readmissions among older adults in Ontario, by year (per 1,000 population)



Rate of emergency department visits among older adults in Ontario, by year (per 1,000 population)



Discussion

While there was overlap across cohorts (often due to definition), distinct patterns emerged that are worth pursuing further

- Polypharmacy cohort was consistently high → what are the underlying characteristics of this group?
- Home care assessment group have already been identified as high-need → are there other preventive steps that could keep them out of emergency departments?

Variation in level of performance between cohorts for some indicators and not for others

- Rate of inpatient hospitalization greater variability; proportion with a usual provider of primary care less variability → suggests where interventions might be possible?

Findings confirm the heterogeneity of older adults in Ontario

- Important to identify key subgroups when examining health system performance indicators for older adults; importance of low-cost group and general 65+ group for providing a comparison

No dramatic changes in trends over time due to health system improvements?

- Aging at Home announcement in Ontario (2007)

Next steps

On-going monitoring of performance indicators for older adults over time

- Are these patterns associated with increases in adverse outcomes?

Consider data visualization techniques for future projects

- For knowledge translation
 - 14 indicators x 12 cohorts represents more data than we could present here (or in an academic manuscript)
 - Forthcoming ICES Chartbook
- For as an analytical tool
 - Are there more sophisticated ways to examine these trends?

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- *The opinions, results and conclusions reported in this paper are those of the authors and are independent from the funding sources. No endorsement by ICES or the MOHLTC is intended or should be inferred.*