Polypharmacy and potentially inappropriate medications in older adults living in rural regions: a population-based cohort study

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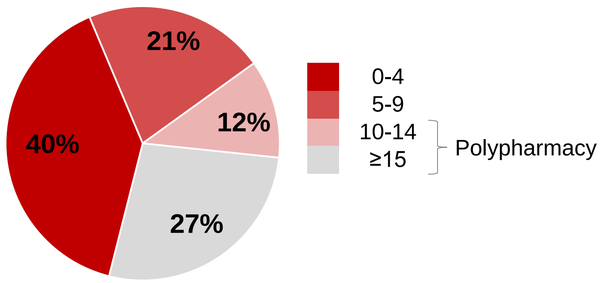
BACKGROUND

Number of different medications in adults >65 years in the province of Québec, Canada (2016)[1]



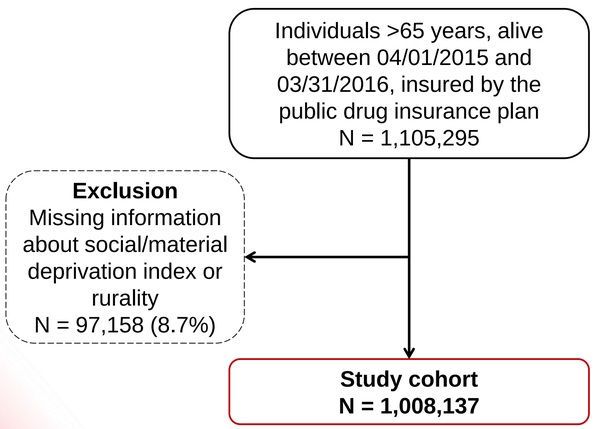
- Polypharmacy and potentially inappropriate medications (PIMs) are common in older adults[2]
- Exposure to polypharmacy and/or to PIMs is associated with negative outcomes, such as hospitalizations or death[3,4]
- Healthcare setting is different in rural areas compared to urban areas[5], however no study has compared exposure to polypharmacy and PIMs in rural and urban settings

OBJECTIVE

To compare the proportions of older adults exposed to polypharmacy and to PIMs in rural and urban areas, and to identify the determinants associated with those exposures

STUDY COHORT

Figure 1. Flowchart of the study cohort



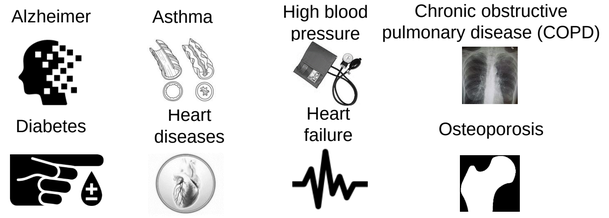
METHODS

Design and data analysis

- Population-based study in the province of Québec (Canada) using the Québec Integrated Chronic Disease Surveillance System database[6]
- PIMs exposure: ≥1 PIM (according to the 2015 Beers criteria) claim in 2015
- Use of robust Poisson regression to identify associated factors while controlling for sex, age, and comorbidities
- Sensitivity analyses: thresholds of ≥15 and ≥20 different medications for polypharmacy

Covariates

- **Sociodemographic**: sex (M/F); age; social and material deprivation index; rurality (urban: ≥10,000 inhabitants; rural: <10,000 inhabitants)
- **Medical (in 2014)**: number of hospitalizations (HP); chronic disease diagnostics (yes/no)



RESULTS

Characteristics (%)		Total N = 1,008,137	Rural areas N = 233,542	Urban areas N = 774,595	Relative risks (95% confidence intervals)	
Polypharmacy		36.9	38.6	36.5	**Outcome**	
PIM exposure		47.5	49.9	46.5	**Polypharmacy**	**PIM exposure**
Rurality		-	-	-	1.08 (1.08-1.09)	1.09 (1.09-1.10)
Female		55.5	51.9	56.5	1.20 (1.20-1.21)	1.29 (1.28-1.29)
Age group	**66-75**	61.6	63.5	61.0	Reference	
	76-85	30.1	28.5	30.5	1.14 (1.14-1.15)	1.06 (1.06-1.07)
	≥ 86	8.3	7.9	8.4	1.18 (1.17-1.18)	1.08 (1.07-1.08)
Material deprivation index	**1**	18.6	3.1	23.3	Reference	
	2	19.1	9.6	22.0	1.05 (1.04-1.06)	1.04 (1.03-1.05)
	3	19.9	18.1	20.4	1.07 (1.06-1.08)	1.04 (1.03-1.05)
	4	21.3	29.4	18.9	1.08 (1.07-1.09)	1.05 (1.04-1.06)
	5	21.0	39.7	15.3	1.08 (1.07-1.09)	1.05 (1.04-1.06)
Social deprivation index	**1**	17.4	23.2	15.6	Reference	
	2	19.0	30.7	15.4	1.02 (1.01-1.03)	1.02 (1.01-1.03)
	3	21.0	26.9	19.2	1.04 (1.03-1.04)	1.04 (1.03-1.04)
	4	21.3	14.6	23.3	1.05 (1.04-1.06)	1.05 (1.05-1.06)
	5	21.4	4.6	26.4	1.09 (1.08-1.10)	1.09 (1.08-1.10)
Alzheimer		3.8	3.7	3.8	1.19 (1.18-1.20)	1.20 (1.19-1.21)
Asthma		10.1	8.9	10.4	1.28 (1.28-1.29)	1.13 (1.12-1.13)
Blood pressure		63.7	62.2	64.1	1.67 (1.66-1.68)	1.19 (1.18-1.19)
COPD		18.4	19.4	18.1	1.39 (1.38-1.40)	1.19 (1.18-1.19)
Diabetes		23.8	22.8	24.1	1.78 (1.77-1.79)	1.18 (1.17-1.18)
Heart diseases		28.0	29.1	27.7	1.50 (1.49-1.51)	1.12 (1.12-1.13)
Heart failure		7.1	7.6	6.9	1.13 (1.13-1.14)	1.05 (1.05-1.06)
Osteoporosis		26.2	22.4	27.3	1.17 (1.16-1.17)	1.08 (1.07-1.08)
HP (mean – min-max)		0.1 (0-23)	0.2 (0-22)	0.1 (0-23)	1.10 (1.09-1.10)	1.09 (1.09-1.09)

Deprivation indices: 1- least deprived to 5 - most deprived

DISCUSSION

- Older adults are slightly more exposed to polypharmacy and PIMs in rural areas than in urban areas
- Living in a more deprived (social and material) area and rurality are associated with an increased risk of being exposed to polypharmacy and PIMs
- Sensitivity analyses showed no significant differences, though the association was greater as the threshold increased
- Public health authorities could integrate those findings into their policies, especially concerning deprescription (e.g. in rural areas and among the most materially and socially deprived older adults)

Strengths and limitations

- Exhaustive medico-administrative data
- No data on medical services (e.g., family doctor or specialist visits)
- Exposure to both polypharmacy and PIMs may be underestimated as data are not available in some situations (e.g., hospital stays, long-term care facilities)

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