Impact of Residential Area on the Profile of Rheumatoid Arthritis Patients Initiating Their First Biologic DMARD: Results From The Ontario Best Practices Research Initiative (OBRI)

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BACKGROUND

- Access to care and management of Rheumatoid Arthritis (RA) patients may differ based on residential area which, in turn, can affect the real-world effectiveness of anti-rheumatic medications.

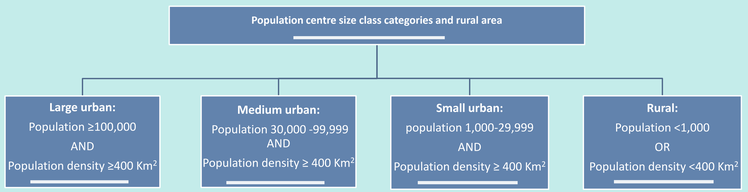
OBJECTIVES

- We aimed to:
  - Describe differences in the profile of patients initiating their first biologic disease modifying antirheumatic drugs (bDMARDs) based on their residence in urban vs. rural areas.
  - Investigate the association between residential area status and administration route of bDMARDs.

METHODS

- The Ontario Best Practices Research Initiative (OBRI) includes a clinical registry of RA patients (OBRI-RA registry) followed in routine care in Ontario, Canada.
- RA patients enrolled in the OBRI initiating their first bDMARD within 30 days prior to or anytime following enrolment were included in the analysis. Patients were excluded if they had less than 2 years of follow-up and less than 2 visits during this period of time.
- Residential area of patients (rural Vs. urban) were identified using two methods:
  - Postal codes
  - Population centre size class categories and rural area developed by Statistics Canada (Figure 1)

Figure 1: Population centre size class categories



- Distance in kilometer between postal codes of patients and clinical sites are also calculated.
- Patients sociodemographics, disease characteristics, and medications were descriptively compared between residential area status of patients.
- The association between patient's residence from treating physician's practice, patient residential area type, and administration route (subcutaneous vs. infusion) of bDMARDs were examined using logistic regression models.

RESULTS

Table 1: Patient Profile at Initiation of First bDMARD According to Residential Area Status

	Residential Area Status					
	Based on postal code N=629			Based on population centre size class categories N=607		
	Urban (N=522)	Rural (N=107)	p-value	Urban (N=398)	Rural (N=209)	p-value
Patient female gender, n (%)	421 (80.7)	84 (78.5)	0.61	322 (80.9)	164 (78.5)	0.48
Age, mean (SD)	56.1 (12.7)	56.6 (12.7)	0.71	56.5 (12.4)	55.9 (12.8)	0.53
RA disease duration, mean (SD)	8.8 (9.1)	8.4 (7.6)	0.64	9.0 (9.4)	8.1 (8.0)	0.22
Early RA (duration ≤ 1 yr.), n (%)	70 (13.4)	12 (11.2)	0.54	57 (14.3)	21 (10.0)	0.31
Post-secondary education, n (%)	286 (54.8)	62 (57.9)	0.62	226 (56.8)	111 (53.1)	0.41
Smoking status, n (%) - Never - Past - Current	 246 (47.1) 180 (34.5) 82 (15.7)	 44 (41.1) 39 (36.4) 22 (20.6)	 0.36	 196 (49.2) 136 (34.2) 61 (15.3)	 87 (41.6) 77 (36.8) 41 (19.6)	 0.17
Marital status, n (%) - Married - Single/divorced/widowed	 337 (64.6) 185 (35.4)	 88 (82.2) 19 (17.8)	 **0.0004**	 255 (64.1) 143 (35.9)	 161 (77.0) 48 (23.0)	 **0.001**
Race, n (%) - Caucasian - Non-Caucasian	 407 (78.0) 66 (12.6)	 102 (95.3) 2 (1.9)	 **0.001**	 301 (75.6) 61 (15.3)	 196 (93.8) 5 (2.4)	 **<0.001**
Household annual income, n (%) - ≥ 50000 CAD - < 50,000 CAD	 227 (43.5) 161 (30.8)	 49 (45.8) 40 (37.4)	 0.55	 166 (41.7) 134 (33.7)	 105 (50.2) 62 (29.7)	 0.11
Health insurance coverage, n (%) - Public and private - Public	 366 (70.1) 132 (25.3)	 74 (69.2) 29 (27.1)	 0.73	 281 (70.6) 106 (26.6)	 149 (71.3) 50 (23.9)	 0.56
28 Tender Joint Counts , mean (SD)	7.2 (6.6)	7.9 (5.9)	0.43.	6.6 (5.1)	7.1 (5.0)	0.27
Clinical Disease Activity Index (0-76), mean (SD)	24.8 (13.1)	25.2 (12.8)	0.81	24.3 (12.9)	26.1 (12.8)	0.15
Health Assessment Questionnaire – Disability Index (0-3), mean (SD)	1.3 (0.7)	1.3 (0.8)	0.78	1.3 (0.8)	1.3 (0.8)	0.66
Presence of erosions at X-ray, n (%) - Yes - No	 243 (46.6) 193 (37.0)	 54 (50.5) 32 (29.9)	 0.23	 186 (46.7) 142 (35.7)	 101 (48.3) 75 (35.9)	 0.88
Number of comorbidities, mean (SD)	3.5 (2.7)	3.6 (2.7)	0.67	3.5 (2.8)	3.5 (2.5)	0.70
Prior use of csDMARDs, n (%)	460 (88.1)	94 (87.9)	0.95	356 (89.4)	177 (84.7)	0.08
Concomitant use of csDMARDs, n (%)	444 (85.1)	90 (84.1)	0.79	332 (83.4)	183 (87.5)	**0.04**
Concomitant use of oral steroids, n (%)	112 (21.5)	32 (29.9)	**0.04**	82 (20.6)	56 (26.8)	0.06
Concomitant use of NSAIDs, n (%)	100 (19.2)	23 (21.5)	0.51	77 (19.3)	42 (20.1)	0.73
Type of bDMARDs, n (%) - TNFi - Non-TNFi	 460 (88.1) 62 (11.9)	 93 (86.9) 14 (13.1)	 0.73	 347 (87.2) 51 (12.8)	 185 (88.5) 24 (11.5)	 0.64
Administration route of BDMARDs, n (%) - Subcutaneous (SC) - Infusion	 426 (81.6) 96 (18.6)	 93 (86.9) 14 (13.1)	 0.19	 17 (79.7) 81 (20.3)	 183 (87.6) 26 (12.4)	 **0.02**
Distance between patients and clinical sites (km), mean (SD)	47.5 (204.6)	127.8 (305)	**0.01**	26.7 (34.6)	94.6 (129.0)	**<0.001**
Physician female gender, n (%)	226 (43.7)	46 (41.1)	0.48	174 (43.7)	84 (40.2)	0.40

Fonts in bold are statistically significant (p-value< 0.05).

- Other than marital status and race (higher proportion of married and Caucasian in rural area), no significant differences in sociodemographics were observed between groups (Table 1).
- At the time of initiation of their first bDMARD, patients from urban areas were less likely to have erosions and had lower swollen joint counts. However, these differences did not reach statistical significance. Concomitant use of oral steroids was lower in patients from urban areas (Table 1).
- In multivariate logistic regression analysis, patients living within longer distance (OR: 0.91; 0.90-0.99) and in the rural area (OR: 0.58; 0.36-0.94) were less likely to use infusion route for bDMARDs (Table 2; Model 1 and Model 3).

Table 2: The association between residential area status and administration route of bDMARDs using univaraite and multivariate logistic regression

	bDMARD infusion vs. SC Odds Ratio (OR); 95% Confidence Interval (CI); p-value			
	Unadjusted model	Adjusted models		
		Model 1	Model 2	Model 3
Distance between patients and clinic address (per 10 km)	0.99 (0.98-1.01), 0.22	**0.91 (0.90-0.99), 0.03**	-	-
Residential area status based on postal code Urban Rural	 Ref 0.67 (0.37-1.22), 0.19	 -	 Ref 0.67 (0.37-1.24), 0.21	 -
Residential area status based on population centre size categories Urban Rural	 Ref **0.56 (0.35-0.90), 0.02**	 -	 -	 Ref **0.58 (0.36-0.94), 0.03**
Age	1.01 (0.99-1.02), 0.42	1.00 (0.98-1.02), 0.75	1.00 (0.99-1.02), 0.75	1.00 (0.99-1.02), 0.74
Patient gender (ref=male)	**1.22 (0.71-2.09), 0.02**	1.19 (0.68-2.06), 0.54	1.21 (0.70-2.09), 0.50	1.15 (0.66-2.00), 0.62
Physician gender (ref=male)	**0.58 (0.38-0.90), 0.02**	**0.58 (0.37-0.91), 0.02**	**0.60 (0.38-0.93), 0.02**	0.64 (0.41-1.01), 0.05
RA disease duration	**1.03 (1.01-1.05), 0.003**	**1.02 (1.00-1.05), 0.04**	**1.02 (1.00-1.05), 0.04**	**1.03 (1.00-1.05), 0.03**
Prior use of csDMARDs	**3.13 (1.23-7.96), 0.02**	**2.68 (1.03-6.96), 0.04**	2.58 (0.99-6.67), 0.05	2.42 (0.93-6.29), 0.07

- All three adjusted models included patient age and gender as covariates; furthermore, variables that were significantly associated with bDMARD administration route in univariate analysis were also considered.
- Fonts in bold are statistically significant (p-value< 0.05).

CONCLUSIONS

- Important differences may exist in the profiles of RA patients initiating their first bDMARD, and residing in rural versus urban areas.
- Patients living in the rural areas and within longer distance from their treating physician's practice are more likely to be treated with subcutaneous as opposed to intravenous bDMARDs.

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