

# Geographical Patterns of Healthcare Utilization Among RA and OA Patients

Sofia Pedro<sup>1</sup>, Luke Desilet<sup>2</sup>, Patricia Katz<sup>3</sup>, Kaleb Michaud<sup>1,2</sup>

<sup>1</sup> FORWARD, The National Databank for Rheumatic Diseases, Wichita, KS

<sup>2</sup> University of Nebraska Medical Center, Omaha, NE

<sup>3</sup> University of California, San Francisco, CA

Living in urban areas was associated with greater healthcare utilization among adults with RA and OA when compared to those who lived in rural areas.



## BACKGROUND

- Rural residence has been associated with disparities in healthcare-related outcomes in both rheumatic diseases and other chronic conditions.
- A primary causal pathway for this may be through having greater difficulty in accessing healthcare.
- Objective: we sought to investigate the relationships between geographical location and healthcare utilization.

## RESULTS

- Of the 38,569 participants with RA, 74.5% lived in urban areas, 12.3% in large rural areas and 13.2% in small rural areas. For the 8,449 with OA, the distribution was very similar: 75.1% urban, 12.5% large rural and 12.5% small rural.
- Table 1 presents patients characteristics for both diagnoses. RA patients who lived in urban areas had more medical visits as well as diagnostic tests and rheumatologist visits; for OA only the number of medical visits had a similar pattern (Figure 1).
- After adjusting for demographics, clinical measures, and treatments by using double selection LASSO, RA patients who lived on urban areas had a 13% increase in all visits per 6 months when compared to small rural areas (Figure 2).
- Even those who lived in large rural areas had a 4% increase on all visits. For OA patients only when comparing urban vs rural an increase of 10% was observed.
- All healthcare utilization variables were increased for patients who lived in urban areas when compared to those who lived in rural areas except for GP/family visits, especially for RA.

Table 1. Patient characteristics by location and disease (RA and OA) §.

| Variable                          | RA patients   |               |               |         | OA patients    |               |               |         |
|-----------------------------------|---------------|---------------|---------------|---------|----------------|---------------|---------------|---------|
|                                   | Urban         | Large Rural   | Small rural   | p-value | Urban          | Large Rural   | Small rural   | p-value |
| Male sex, % (n)                   | 19.68 (5560)  | 21.70 (1008)  | 23.48 (1178)  | 0.000   | 16.16 (1007)   | 15.65 (162)   | 16.71 (173)   | 0.806   |
| White ethnicity, % (n)            | 94.35 (26657) | 96.66 (4491)  | 97.15 (4875)  | 0.000   | 95.84 (5974)   | 97.20 (1006)  | 98.84 (1023)  | 0.000   |
| Age (years)                       | 63.00 (14.41) | 63.87 (13.95) | 64.59 (13.56) | 0.000   | 67.94 (12.66)  | 67.69 (12.47) | 67.21 (12.05) | 0.211   |
| Education level (years)           | 13.59 (2.40)  | 13.26 (2.34)  | 13.02 (2.26)  | 0.000   | 13.74 (2.41)   | 13.46 (2.36)  | 13.21 (2.25)  | 0.000   |
| Married (yes/no), % (n)           | 67.74 (19138) | 70.73 (3286)  | 72.78 (3652)  | 0.000   | 62.79 (3914)   | 69.18 (716)   | 70.63 (731)   | 0.000   |
| Duration (years)                  | 18.23 (13.12) | 18.42 (13.00) | 18.66 (12.95) | 0.086   | 20.63 (13.98)  | 20.49 (13.72) | 21.35 (13.92) | 0.267   |
| Comorbidity Index (0-9)           | 1.98 (1.66)   | 2.07 (1.70)   | 2.04 (1.67)   | 0.001   | 2.18 (1.63)    | 2.39 (1.66)   | 2.28 (1.63)   | 0.001   |
| Ever smoked, %                    | 41.58 (11748) | 42.55 (1977)  | 42.67 (2141)  | 0.207   | 37.29 (2324)   | 36.23 (375)   | 33.72 (349)   | 0.083   |
| BMI (kg/m <sup>2</sup> )          | 28.41 (17.87) | 28.63 (6.99)  | 28.93 (32.64) | 0.192   | 34.11 (356.66) | 30.63 (7.92)  | 30.66 (8.10)  | 0.907   |
| HAQ Disability score (0-3)        | 1.16 (0.75)   | 1.21 (0.76)   | 1.21 (0.76)   | 0.000   | 1.16 (0.71)    | 1.24 (0.70)   | 1.21 (0.72)   | 0.003   |
| Patient activity score (0-10)     | 4.03 (2.28)   | 4.20 (2.28)   | 4.19 (2.27)   | 0.000   | 4.17 (2.20)    | 4.45 (2.11)   | 4.33 (2.20)   | 0.000   |
| Fatigue scale (VAS 0-10)          | 4.77 (3.07)   | 4.93 (3.06)   | 4.85 (3.01)   | 0.002   | 4.83 (3.03)    | 5.16 (2.95)   | 5.07 (2.99)   | 0.001   |
| Pain Scale (VAS 0-10)             | 4.26 (2.89)   | 4.46 (2.89)   | 4.40 (2.87)   | 0.000   | 4.57 (2.82)    | 4.86 (2.74)   | 4.70 (2.78)   | 0.006   |
| Global severity (0-10)            | 3.96 (2.58)   | 4.10 (2.57)   | 4.13 (2.57)   | 0.000   | 4.08 (2.52)    | 4.36 (2.50)   | 4.27 (2.54)   | 0.001   |
| Health satisfaction (0-5), %      |               |               |               |         |                |               |               |         |
| Somewhat satisfied                | 34.06 (9622)  | 32.61 (1515)  | 33.60 (1686)  | 0.258   | 33.68 (2099)   | 33.82 (350)   | 31.69 (328)   | 0.719   |
| Neither dissatisfied or satisfied | 16.84 (4757)  | 17.65 (820)   | 17.14 (860)   |         | 17.05 (1063)   | 16.81 (174)   | 17.39 (180)   |         |
| Somewhat dissatisfied             | 23.75 (6709)  | 24.82 (1153)  | 24.39 (1224)  |         | 25.33 (1579)   | 25.22 (261)   | 26.76 (277)   |         |
| Very dissatisfied                 | 12.10 (3418)  | 12.27 (570)   | 12.46 (625)   |         | 12.61 (786)    | 14.11 (146)   | 13.53 (140)   |         |
| DMARD lifetime count              | 2.30 (1.68)   | 2.22 (1.65)   | 2.33 (1.68)   | 0.004   | 0.33 (0.93)    | 0.38 (1.00)   | 0.36 (0.94)   | 0.266   |
| Biologic lifetime count           | 1.11 (1.34)   | 1.01 (1.30)   | 1.00 (1.27)   | 0.000   | 0.08 (0.48)    | 0.06 (0.45)   | 0.07 (0.47)   | 0.511   |
| DMARD use, %                      | 67.54 (17991) | 68.77 (2997)  | 70.46 (3363)  | 0.000   | 10.12 (578)    | 10.76 (102)   | 11.45 (109)   | 0.419   |
| Biologics use, %                  | 42.93 (12129) | 40.01 (1859)  | 40.14 (2014)  | 0.000   | 1.19 (74)      | 0.97 (10)     | 1.45 (15)     | 0.597   |
| TNF use, %                        | 32.94 (9307)  | 30.67 (1425)  | 30.49 (1530)  | 0.000   | 0.90 (56)      | 0.48 (5)      | 0.68 (7)      | 0.336   |
| Non TNF use, %                    | 8.93 (2524)   | 7.86 (365)    | 8.23 (413)    | 0.024   | 0.27 (17)      | 0.29 (3)      | 0.77 (8)      | 0.035   |
| Jak use, %                        | 2.06 (582)    | 2.04 (95)     | 2.25 (113)    | 0.668   | 0.06 (4)       | 0.19 (2)      | 0.00 (0)      | 0.234   |

§ Values are means (standard deviations) except when indicated otherwise.

## METHODS

- Study participants were enrolled in the FORWARD Databank, a US-wide rheumatic disease longitudinal registry, with an RA or OA diagnosis and a completed 6-month questionnaire.
- Participant home address was converted into 10 codes using RUCA code version 2. This was further aggregated into 3 categories: rural small isolated, large rural, and urban.
- Healthcare utilization variables such as medical visits and diagnostic tests were analyzed by geographical categories. Anova and chi-squares tests were initially used to look at bivariate analysis between location and utilization.
- Double selection LASSO with Poisson regression was used to assess the best model when modeling the association between number of medical visits and the geographical location

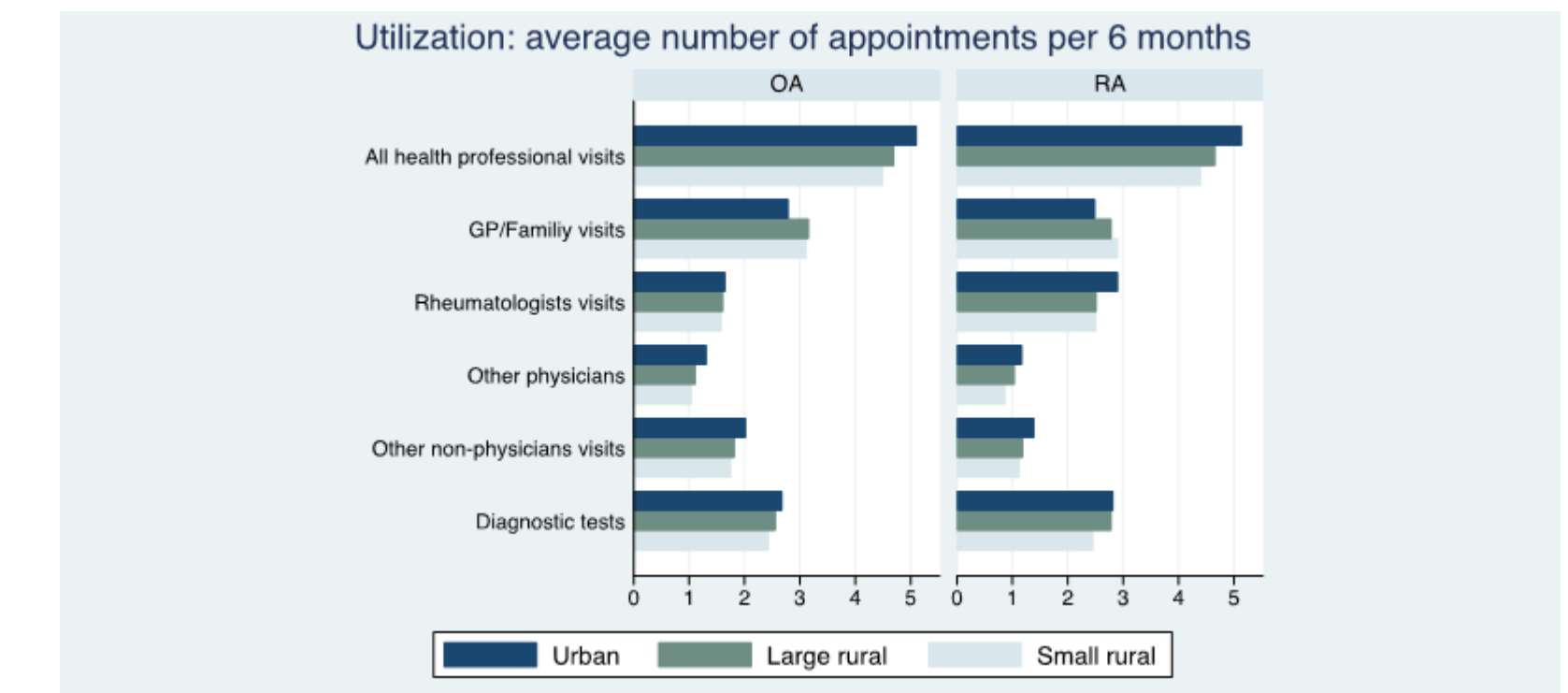


Figure 1. Healthcare utilization (mean) by diagnosis and location.

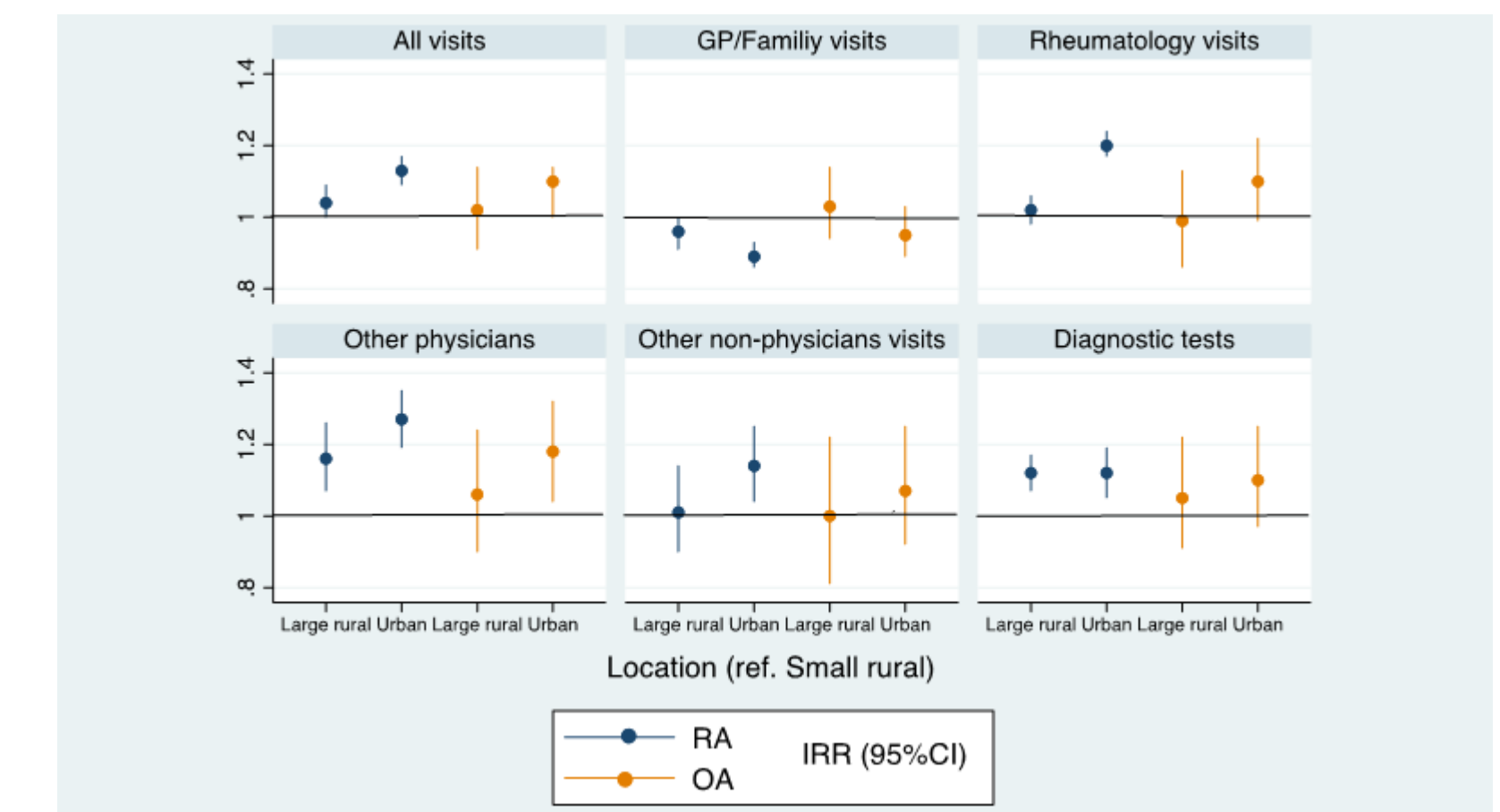


Figure 2. Incident rate ratio (IRR) from the double selection LASSO with Poisson regression model for the utilization variables.

## CONCLUSION

- We found that geographical characteristics were associated with healthcare utilization.
- Patients living in urban areas had considerably more medical visits and diagnostic tests in comparison with those who lived in small rural areas.
- Future work will examine if these differences impact disease-specific outcomes.