# CHARACTERISTICS OF SWITCHING BIOLOGICAL DISEASE-MODIFYING ANTIRHEUMATIC DRUGS IN PATIENTS WITH RHEUMATOID ARTHRITIS FROM REAL WORLD DATA


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## OBJECTIVES

Clinical trials have demonstrated the efficacy of biological disease-modifying antirheumatic drugs (bDMARDs) over traditional conventional synthetic DMARDs (csDMARDs) in patients with rheumatoid arthritis (RA). However, many patients on bDMARDs fail to have a clinical response or achieve remission and are treated with different DMARDs consecutively, often with little rationale. Switching treatments is expensive for payers and may avoidably put patients at risk for potential adverse events (Joensuu et al., 2015). The goal of this study is to describe a treatment pathway for patients with rheumatoid arthritis and identify and compare characteristics of patients who have switched and not switched bDMARD treatments using real world data (RWD).

## METHODS

RA cases were identified using the TriNetX Analytics Network, a global federated health research network providing access to statistics on electronic medical records (EMR) from over 52 million patients at 37 healthcare organizations. To explore the treatment pathway, we required patients to have at least one instance of the 10th revision of the International Statistical Classification of Diseases and Related Health Problems (ICD-10) codes M05 for Rheumatoid arthritis with rheumatoid factor or M06 for Other rheumatoid arthritis documented in the EMR. Patients were also required to have been prescribed methotrexate. A line of treatment was defined as any of the following medications taken within 60 days: methotrexate, abatacept, adalimumab, certolizumab pegol, etanercept, golimumab, infliximab, tocilizumab, rituximab, or anakinra.

To explore the patient characteristics, we required patients to have at least two instances of the ICD-10 codes M05 for Rheumatoid arthritis with rheumatoid factor or M06 for Other rheumatoid arthritis documented in the EMR at least one month apart. Patients included in this analysis also were required to have taken methotrexate at least one week before beginning bDMARD treatment and initiation of a bDMARD had to have occurred on or after January 1, 2010. Patients who had another bDMARD at least one month after the first bDMARD were considered to have switched treatments; patients who did not switch did not have any other bDMARDs after the first bDMARD.

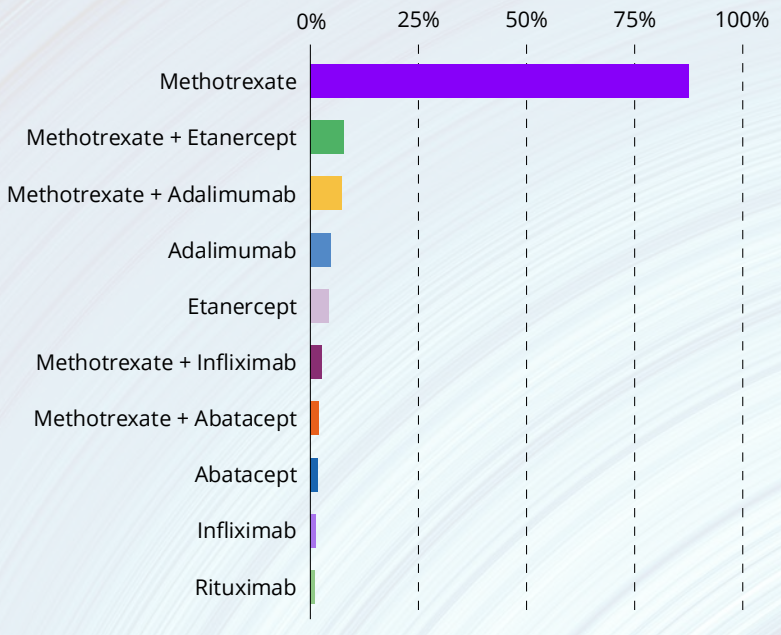


**Figure 2. Top ten identified treatments**

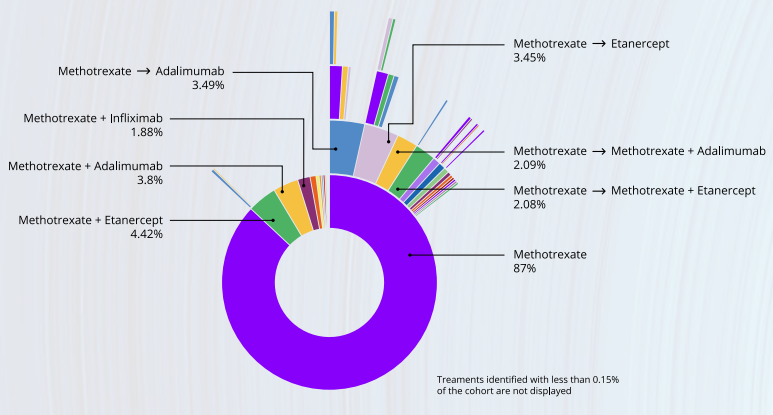


**Figure 1. Sunburst diagram for RA treatment distribution and switches**

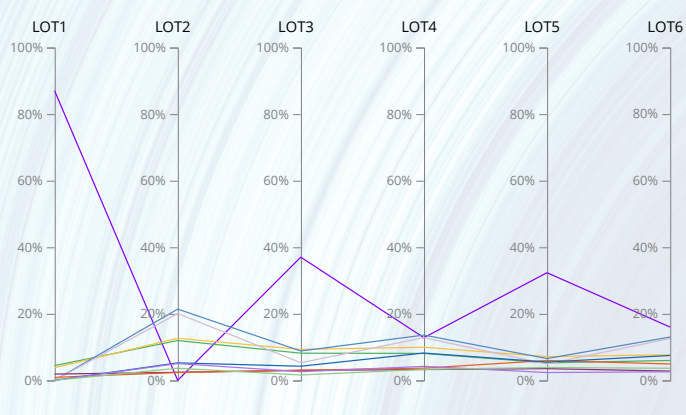


**Figure 3. Distribution of treatment use across all lines of treatment (LOT)**

**Table 1. Baseline patients characteristics and proportion switched**

| | Adalimumab | Etanercept | Infliximab | Abatacept | Rituximab | Certolizumab Pegol | Golimumab | Tocilizumab | Anakinra | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| **Naïve, N** | 2479 | 2564 | 467 | 481 | 256 | 180 | 156 | 170 | 34 | 6787 |
| **% Female** | 75 | 78 | 76 | 85 | 79 | 78 | 84 | 80 | 53 | *NA* |
| **Age, mean ± SD** | 51.1 ± 15.3 | 50.5 ± 16.2 | 58.9 ± 16.3 | 56.4 ± 15.2 | 56.4 ± 14.1 | 56.4 ± 15.1 | 55.4 ± 14.6 | 53.4 ± 17 | *NA* | 40 ± 20.3 |
| **Switched, N (%)** | 548 (22%) | 704 (27%) | 83 (18%) | 101 (21%) | 25 (10%) | 44 (24%) | 38 (24%) | 30 (18%) | 9 (26%) | 1582 (23%) |

**Table 2. Significantly different characteristics between patients that switched vs. not switched for three initial bDMARDs**

| Adalimumab | | Etanercept | | Infliximab | |
|---|---|---|---|---|---|
| | *P* | | *p* | | *p* |
| Female Gender | 0.01 | Female Gender | 0.03 | Younger Age | 0.002 |
| Younger Age | <0.0001 | Younger Age | <0.0001 | Corticosteroid Use | 0.04 |
| Corticosteroid Use | < 0.0001 | Corticosteroid Use | <0.0001 | **M25** Other joint disorder | 0.045 |
| **G93.3** Postviral fatigue syndrome | <0.0001 | **G93.3** Postviral fatigue syndrome | 0.002 | | |
| **J00-J99** Respiratory Diseases | 0.003 | **M15-M19** Osteoarthritis | 0.004 | | |
| **K70-K77** Liver Diseases | 0.004 | **M25** Other joint disorder | < 0.0001 | | |
| **M25** Other joint disorder | <0.0001 | **M54** Dorsalgia | 0.04 | | |
| **M54** Dorsalgia | 0.009 | **M79** Other and unspecified soft tissue disorders | 0.002 | | |
| **M79** Other and unspecified soft tissue disorders | 0.004 | | | | |

## RESULTS

- The treatment pathway and treatment distributions are shown in Figures 1-3. Methotrexate was the most commonly prescribed treatment in the pathway and the most commonly prescribed first line of treatment.
- We identified 6,787 RA patients across 31 healthcare organizations. Of these, 1,582 patients (23%) switched bDMARDs at least once (Table 1).
- Compared to the other bDMARDs, a greater proportion of patients switched from etanercept to another bDMARD (704 patients, 27%).
- Characteristics for starting on one bDMARD and switching to another bDMARD varied by the initial bDMARD and included female gender, younger age, symptoms of pain, swelling, and stiffness in joints and limbs, dorsalgia, postviral fatigue syndrome, and corticosteroid use in the year prior to initiating bDMARD (Table 2).
- Characteristics that often did not differ between patients that switched and did not switch included infectious or parasitic disease, depression, and ischemic heart diseases in the year prior to initiating bDMARD.

## CONCLUSIONS

We were able to develop a treatment pathway for patients with RA taking bDMARDs and to identify and compare characteristics of patients switching or not switching bDMARDs using RWD from EMR. These results can help inform treatment guidelines for prescribing bDMARDs to patients with RA.


Source: Joensuu, JT et al. (2015). The cost-effectiveness of biologics for the treatment of rheumatoid arthritis: a systematic review. *PLoS One, 10(3)*.