# Biomarker Testing in Rheumatoid Arthritis Leads to Lower Total Cost of Care

Sarah McLarty PharmD, James Arnold PhD, Luke Ascoli, Kjel A. Johnson PharmD

## Objective

Rheumatoid arthritis (RA) affects less than 1% of the US population but contributes to $22.3 billion in total annual healthcare costs. Biomarker tests are used to diagnose and monitor RA. This study was conducted to determine the effects of biomarker testing on healthcare costs.

## Methods

A study was conducted using medical and pharmacy claims from 1/2019 – 7/2022. Members were split into study arms by therapy (biologic vs methotrexate (MTX) monotherapy) and line of business (Medicare or commercial). The effect of biomarker use was calculated by comparing total costs per member per month (PMPM). Biomarkers were split into three categories: diagnostic, inflammation levels, and disease monitoring. Diagnostic tests include the rheumatoid factor and cyclic citrullinated peptide antibody. Inflammatory level tests included C-reactive protein and erythrocyte sedimentation. Multi-biomarker disease activity tests were included as disease monitoring biomarkers. Statistical significance was calculated using an ordinary least squares regression; p<0.05 was deemed significant.

1. Shah, P. (2021, Sept 28). *Mitigating the impact of RA*. CVSHealth.
2. Johnson K, et al. Medical Savings of Timely Rheumatoid Arthritis Diagnoses. Arthritis Rheumatol. 2020; 72 (suppl 10).

**Table 1**. Reduction in total cost of care, per member per month, in commercial methotrexate utilizers

| Biomarker Test | Members | Cost Difference (PMPM) | P value |
|---|---|---|---|
| Diagnostic | 3665 | -$305.10 | p< 0.01 |
| Chronic Inflammatory | 6858 | +$74.91 | Not significant |
| Disease Monitoring | 324 | +$55.74 | Not significant |

**Table 2**. Reduction in total cost of care, per member per month, in commercial biologic utilizers

| Biomarker Test | Members | Cost Difference (PMPM) | p value |
|---|---|---|---|
| Diagnostic | 4,494 | -$875.09 | p <0.01 |
| Chronic Inflammatory | 13,314 | +$117.75 | Not significant |
| Disease Monitoring | 971 | -$242.32 | p <0.01 |

**Table 3**. Reduction in total cost of care, per member per month, in Medicare methotrexate utilizers

| Biomarker Test | Members | Cost Difference (PMPM) | p value |
|---|---|---|---|
| Diagnostic | 3,793 | -$134.18 | p <0.01 |
| Chronic Inflammatory | 10,856 | -$122.94 | p <0.01 |
| Disease Monitoring | 800 | -$41.61 | Not significant |

**Table 4**. Reduction in total cost of care, per member per month, in Medicare biologic utilizers

| Biomarker Test | Members | Cost Difference (PMPM) | p value |
|---|---|---|---|
| Diagnostic | 1,417 | -$678.12 | p <0.01 |
| Chronic Inflammatory | 5,504 | $-97.45 | Not significant |
| Disease Monitoring | 582 | -$544.14 | p <0.01 |

## Results

Diagnostic biomarkers saved $305.10 PMPM in the commercial MTX arm (n=7,760, p<0.01). Disease monitoring and inflammatory biomarkers showed non-significant added costs of $55.74 and $74.91 PMPM, respectively.

Diagnostic biomarkers saved $875.09 PMPM, and disease monitoring biomarkers saved $242.32 PMPM in the commercial biologic arm (n=15,070, p<0.1). Inflammatory biomarkers insignificantly increased costs by $117.75 PMPM.

Diagnostic biomarkers saved $134.18 PMPM in the Medicare MTX arm (n=13,964, p<0.01). Disease monitoring and inflammation biomarker tests insignificantly saved $41.61 and $122.94 PMPM, respectively.

Diagnostic biomarkers saved $678.12 PMPM, and disease monitoring biomarkers saved $544.14 PMPM in the Medicare biologic arm (n=4,197, p<0.01). Inflammatory level biomarkers added an insignificant $97.45 PMPM.

## Conclusion

Members with diagnostic biomarkers had significant monthly savings. As innovative biomarker tests come to market, further analysis is required to understand their therapeutic and monetary value.

© 2023 CVS Health and/or one of its affiliates. All rights reserved. This document contains proprietary information and cannot be reproduced, distributed or printed without written permission from CVS Health. Data use and disclosure is subject to applicable law, corporate information firewalls and client contractual limitations.