

# Efficacy and Cost Effectiveness of Biological Agents in Moderate to Severe Psoriatic Arthritis: A Meta-Analysis

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## Objectives

Psoriatic arthritis (PsA) is a debilitating disease of the joints and if left untreated, irreversible damage would incur. A substantial percentage of medical expenses come directly from biologics. The objective of this study is to analyze the efficacy and cost-effectiveness of biologics in moderate to severe PsA patients in Taiwan.

## Methods

We performed our literature search by searching for relevant PsA trials in Medline, CENTRAL, and Embase starting from inception, constituting a total of 15 randomized controlled trials for inclusion in total. Trials with the biologics adalimumab, etanercept, golimumab, secukinumab, ixekizumab, and ustekinumab were included. We assessed outcomes at 12-24 weeks and calculated the risk difference(RD) of efficacy between biologics and placebo. The primary endpoint would be the RD of American College of Rheumatology 20 Response(ACR20) with the secondary endpoint being cost-effectiveness calculated with the incremental cost- effectiveness ratio(ICER).

The ICER is calculated as follows:

$$\frac{(\text{direct cost of biologics} - \text{direct cost of placebo})}{(\% \text{ achieving ACR20 in biologic group} - \% \text{ achieving ACR20 in placebo group})}$$

## Results

In the fixed effect model, adalimumab(RD=0.31, 95%CI=0.25-0.37), etanercept( RD=0.21, 95%CI=0.16-0.27), golimumab(RD=0.39, 95%CI=0.31-0.47), secukinumab(RD=0.3, 95%CI=0.26-0.34), ixekizumab(RD=0.31, 95%CI=0.22-0.39) and ustekinumab(RD=0.23, 95%CI=0.17-0.29) were all statistically significantly superior to placebo. According to ACR20 calculations on yearly spending, the direct costs were NTD\$1,034,400 (best case scenario NTD\$866,659; worst case scenario NTD\$1,282,656 )for adalimumab; NTD\$1,513,600(NTD\$1,177,244-NTD\$1,986,600) for etanercept; NTD\$ 944,369 (NTD\$ 783,625; worst case scenario-NTD\$ 1,188,077) for golimumab; NTD\$ 972,100 (NTD\$ 857,735-NTD\$ 1,121,654) for secukinumab; NTD\$ 1,275,468 (NTD\$ 1,013,833- NTD\$ 1,719,250) for ixekizumab; NTD\$ 2,060,674 (NTD\$ 1,634,328- NTD\$2,787,971) for ustekinumab.

## Conclusions

Patients with moderate to severe PsA using biologics all achieved effectiveness with statistically significant difference. Golimumab, secukinumab and adalimumab were most cost effective in the ACR20 scenario. According to the willingness to pay(WTP) threshold established by the WHO, with the exception of ustekinumab's worst case scenario, all biologics are cost-effective.