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Cost per responder analysis of bimekizumab vs other licensed anti-interleukin therapies in psoriatic arthritis from a UK perspective

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Objective

To compare the cost per responder (CPR) of bimekizumab vs other currently licenced IL-17A, IL-12/23, and IL-23 inhibitors for the treatment of psoriatic arthritis (PsA) based on clinical efficacy in the UK at weeks 16 - 24.

Introduction

- PsA is a chronic, systemic, inflammatory disease in which patients experience musculoskeletal symptoms alongside psoriasis-associated skin inflammation[1]
- Bimekizumab, alone or in combination with methotrexate, is indicated for the treatment of active psoriatic arthritis (PsA) in adults who have had an inadequate response or who have been intolerant to one or more disease-modifying antirheumatic drugs (DMARDs)[2]
- Bimekizumab, a monoclonal IgG1 antibody that selectively inhibits interleukin IL-17F in addition to IL-17A, has demonstrated clinical improvements in both joint and skin efficacy out to week 52 in patients with PsA from the BE OPTIMAL (bDMARD naïve) and BE COMPLETE (prior tumor necrosis factor inhibitor [TNFi] or inadequate responders)[3,4]

Materials and Methods

- A 16 to 24-week cost per responder (CPR) model was developed based on a published network meta-analysis (NMA) that analysed approved biologic and targeted systemic disease-modifying anti-rheumatic drugs for PsA[5]
- The analysis included approved IL inhibitor biologics; anti-IL-17A/IL-17F (bimekizumab), anti-IL17As (ixekizumab and secukinumab), anti-IL12/23 (ustekinumab), and anti-IL23s (guselkumab and risankizumab) (**Table 1**)
- The CPR tool included the Psoriatic Arthritis Response Criteria (PsARC), the American College of Rheumatology (ACR) score, and the Psoriasis Area and Severity Index (PASI) score outcome measures in patients with PsA. PsARC, ACR50, PASI90, and PASI100 response rates were used in the analysis to assess treatment outcomes in bio-naïve and bio-experienced PsA (**Tables 1 and 2**)
- The pricing of medications relied on the 2023 NHS list rates as provided in the British National Formulary, and the dosage recommendations were applied without considering any potential local or national discounts that might be available. The model used combined regimens for secukinumab and ustekinumab which was based on dual dose ratios[6-13]
- The CPR was calculated by multiplying the number of doses in the first 16 weeks of treatment (including week 16) by the NHS list price divided by the response rate

Results

- Bimekizumab demonstrated the lowest cost per PsARC, ACR50, PASI100, and PASI90-response at week 16 in both bio-naïve (£7,830, £14,542, £12,995, and £9,851 respectively) and bio-experienced patients (£7,185, £13,277, £10,530, and £8,725 respectively) (**Figures 1 to 4**)
- Ustekinumab had the highest cost per PsARC response in the bio-naïve (£10,917) and bio-experienced (£11,067) population (**Figure 1**). Risankizumab had the highest cost per ACR50 response of £39,913 in both bio-naïve and bio-experienced patients (**Figure 2**)
- Secukinumab demonstrated the highest cost per PASI100 (£32,033) in the bio-naïve population whilst ixekizumab had the highest cost per PASI100 (£39,706) in the bio-experienced population (**Figure 3**)

Conclusions

The results demonstrate that treatment with bimekizumab for patients with PsA at week 16 - 24 based on NHS list price is associated with the lowest cost per PsARC, ACR50, PASI100, and PASI90 response versus currently licensed IL-inhibitors in both bio-naïve and bio-experienced patients in the UK.

Summary of Cost Per Responder Results in Patients with PsA

As per the analysis, bimekizumab demonstrated the lowest cost per responder compared to other currently licensed IL inhibitor biologic treatments, based on NHS list price.

Bio-naïve patients - Bimekizumab is ranked			
PsARC	1st against 5 treatments	PASI90	1st against 5 treatments
ACR50	1st against 6 treatments	PASI100	1st against 4 treatments

Bio-experienced patients - Bimekizumab is ranked			
PsARC	1st against 3 treatments	PASI90	1st against 5 treatments
ACR50	1st against 6 treatments	PASI100	1st against 3 treatments

Table 1 Response rates at 16 – 24 weeks in bio-naïve patients with PsA

IL inhibitor biologic treatment	ACR50 Response probability at 16 - 24 weeks (%) - Bio-naïve	PsARC Response probability at 16 - 24 weeks (%) - Bio-naïve	PASI90 Response probability at 16-24 weeks (%) - Bio-naïve	PASI100 Response probability at 16-24 weeks (%) - Bio-naïve	Cost per patient for first 16 weeks treatment based on list price
Bimekizumab (Bimzelx®) 160 mg Q4W*	42.0	78.0	62.0	47.0	£6,108
Secukinumab (Cosentyx®) combined dose‡	29.0	63.0	64.0	33.0	£7,118
Ixekizumab (Taltz®) 160 mg for 1 dose then 80 mg Q4W*	34.0	62.0	59.0	34.0	£6,750
Guselkumab (Tremfya®) 100 mg week 0 and 4 then 100 mg Q8W	25.0	NA	45.0	NA	£6,750
Ustekinumab (Stelara®) combined dose‡	39.1	66.5	44.4	22.2	£6,441
Risankizumab (Skyrizi®) 150 mg week 0 and 4 then 150 mg Q12W	25.8	59.0	NA	NA	£9,978

Table 2 Response rates at 16 – 24 weeks in bio-experienced patients with PsA

IL inhibitor biologic treatment	ACR50 Response probability at 16 - 24 weeks (%) - Bio-experienced	PsARC Response probability at 16 - 24 weeks (%) - Bio-experienced	PASI90 Response probability at 16-24 weeks (%) - Bio-experienced	PASI100 Response probability at 16-24 weeks (%) - Bio-experienced	Cost per patient for first 16 weeks treatment based on list price
Bimekizumab (Bimzelx®) 160 mg Q4W*	46.0	85.0	70.0	58.0	£6,108
Secukinumab (Cosentyx®) combined dose‡	25.0	NA	50.0	36.0	£7,118
Ixekizumab (Taltz®) 160 mg for 1 dose then 80 mg Q4W*	39.0	67.0	46.0	17.0	£6,750
Guselkumab (Tremfya®) 100 mg week 0 and 4 then 100 mg Q8W	25.0	NA	51.0	NA	£6,750
Ustekinumab (Stelara®) combined dose‡	25.1	NA	32.9	NA	£6,441
Risankizumab (Skyrizi®) 150 mg week 0 and 4 then 150 mg Q12W	18.2	58.2	NA	NA	£9,978

NA – Data unavailable due to unpublished data.
Cost per patient includes week 16 dose.

* Treatment brands include a separate dose for patients with PsA+PsO. For bimekizumab, the recommended dose is 320mg Q4W for the first 16 weeks then 320mg Q8W. For ixekizumab, the recommended dose is 160mg for 1 dose then 80mg Q2W for 6 doses then 80mg Q4W. All results are based on PSA-only patients.

‡ The recommended dose for secukinumab is 150mg weekly for 5 doses then Q4W or 300mg weekly for 5 doses then Q4W for patients with concomitant plaque psoriasis. The recommended dose for ustekinumab is 45mg week 0,4 then Q12W for patients ≤100kg or increased to 90mg for patients >100kg. The ratio for ustekinumab is based on NICE TA180. The manufacturer's base-case analysis assumed a weighted average of weight-based dosing whereby 80% of people received ustekinumab 45 mg and 20% of people received ustekinumab 90 mg[14]

Figure 1 Cost per PsARC-responder at week 16 - 24 in bio-naïve and bio-experienced patients with PsA

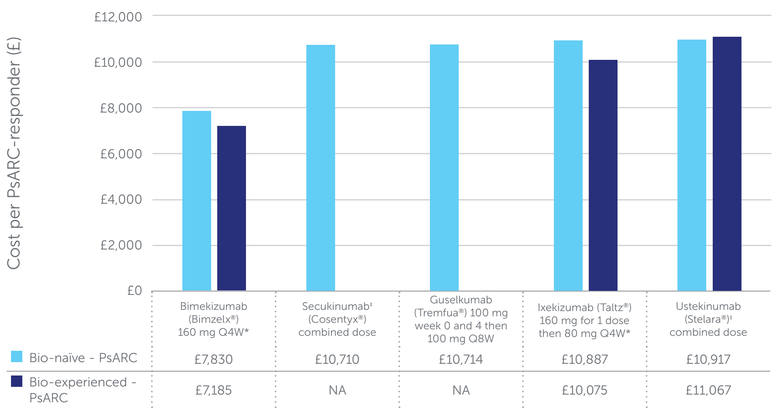

Figure 2 Cost per ACR50-responder at week 16 - 24 in bio-naïve and bio-experienced patients with PsA

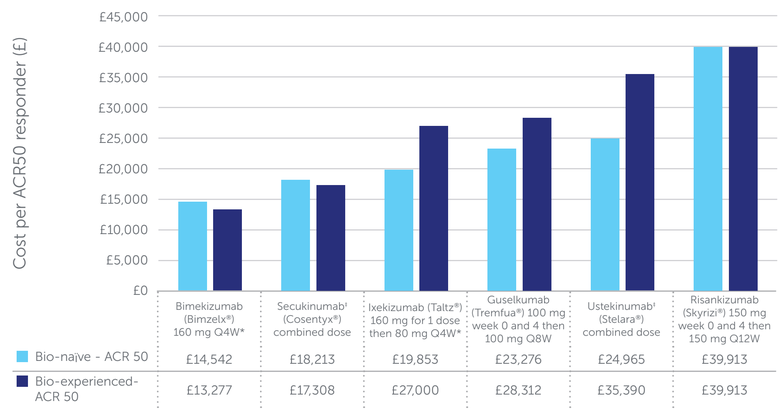

Figure 3 Cost per PASI100-responder at week 16 - 24 in bio-naïve and bio-experienced patients with PsA

Figure 4 Cost per PASI90-responder at week 16 - 24 in bio-naïve and bio-experienced patients with PsA

Limitations

- There are a very limited number of head-to-head randomized control clinical trials that exist for IL-17, IL-23, and IL-12/23 inhibitor therapies in PsA. Results are based on clinical data and therefore CPR may be different in clinical practice.
- Cost calculations are based on the NHS list price and include the week 16 dose for all treatments

CPR: Cost per responder; PsA: psoriatic arthritis; PsO: psoriasis; IL: interleukin; IgG1: Immunoglobulin G1; NMA: Network Meta-Analyses; DMARD: disease-modifying antirheumatic drug; bDMARDs: biological or targeted synthetic disease-modifying antirheumatic drug; TNFi: tumor necrosis factor inhibitor; NHS: National Health Service; PsARC: Psoriatic Arthritis Response Criteria; ACR: American College of Rheumatology; PASI: Psoriasis Area and Severity Index; Q2W: every 2 weeks; Q4W: every 4 weeks; Q8W: every 8 weeks; Q12W: every 12 weeks; PBO: placebo.

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