

ARTICLE ID: BTS0626009

BIOLOGIC THERAPIES FOR PSORIASIS

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RECEIVED: 15July 2025 | REVISED & ACCEPTED: 13 November 2025

KEYWORDS: Psoriasis, Biologics, IL-23, IL-17, TNF- α , IL-12/23, PASI (Psoriasis Area & Severity Index), Efficacy, Safety, Onset, Drug survival, Biosimilars.

ABSTRACT:

Psoriasis is a chronic, immune-mediated inflammatory skin disease affecting 2–3% of global population, with significant impacts on quality of life and comorbid health conditions. Recent advances in understanding the IL-23/IL-17 axis have led to the development of targeted biologic therapies that offer superior efficacy and safety compared to traditional treatments. Biologic agents—including TNF- α inhibitors, IL-12/23 inhibitors, IL-17 inhibitors, and IL-23 inhibitors—have demonstrated high rates of skin clearance (PASI 90/100), durable long-term responses, and favorable safety profiles. IL-17 inhibitors provide rapid onset, while IL-23 inhibitors offer sustained disease control and drug survival. Biosimilars enhance cost-effectiveness and access to care. Clinical guidelines now endorse biologics as first-line systemic therapies for moderate-to-severe psoriasis. Personalized prescribing, monitoring, and screening strategies are essential to optimize outcomes, especially in special populations. This review provides an in-depth analysis of biologic mechanisms, comparative efficacy, long-term safety, and clinical application in the evolving management of psoriasis.

INTRODUCTION: Psoriasis is a persistent, immune-mediated inflammatory skin disease affecting about 2–3% of people worldwide, with substantial effects on quality of life, mental well-being, and work productivity [1]. It is characterized by keratinocyte hyperproliferation, vascular changes, and immune cell infiltration, driven by abnormal crosstalk between innate and adaptive immunity [2]. Genetic predispositions, such as HLA-Cw6, together with environmental triggers like infections, stress, and specific medications, contribute to disease onset and flares [3]. Traditional management relied on topical therapies, phototherapy, and systemic agents such as methotrexate, cyclosporine, and acitretin; however, these approaches

lacked selectivity and were often limited by adverse effects and long-term tolerability issues [4,5]. Advances in understanding the IL-23/IL-17 pathway have led to a major therapeutic shift [2,6]. Biologic treatments that target TNF- α , IL-12/23, IL-17, and IL-23 offer improved efficacy and safety [1,7,8], with IL-23 inhibitors like guselkumab and risankizumab achieving superior PASI responses [7,9]. Current AAD, EDF, and NPF guidelines recommend biologics as first-line options [7–9], and the WHO stresses equitable access worldwide [10].



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CLASSIFICATION OF BIOLOGIC AGENTS [11-21]**TNF- α Inhibitors:** Etanercept, Infliximab, Adalimumab.**IL-12/23 Inhibitors:** Ustekinumab.**IL-17 Inhibitors:** Secukinumab, Ixekizumab.**IL-23 Inhibitors:** Guselkumab, Tildrakizumab, Risankizumab.**Pathophysiology of psoriasis. [22]**

fig-2

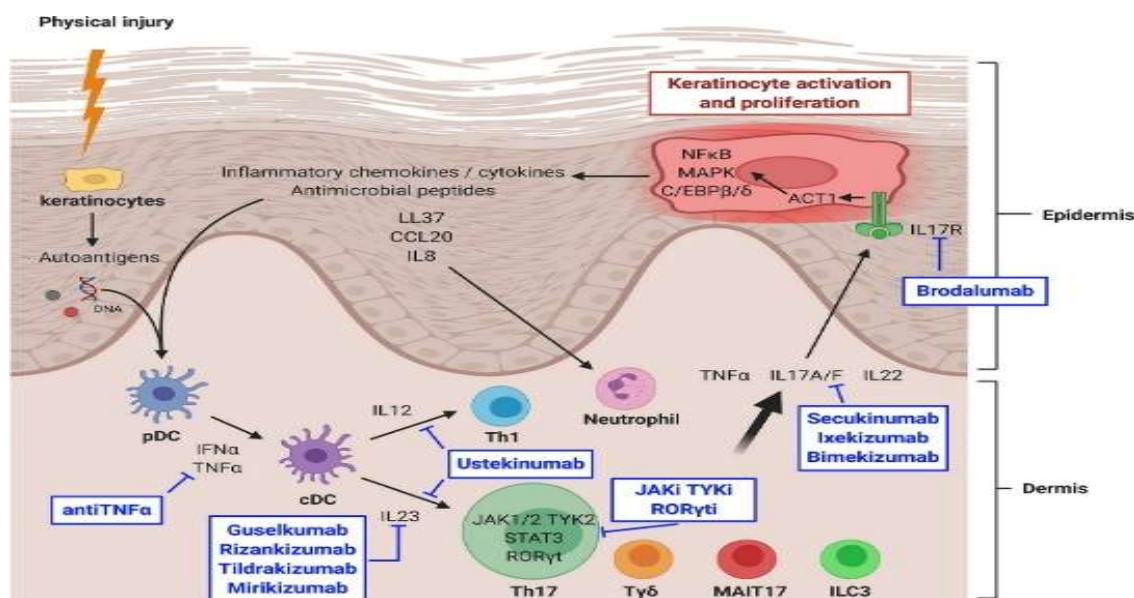


Fig- 3

PHARMACOLOGY & ADMINSTRTION:

MECHANISM OF ACTION: Biologic agents for psoriasis act by selectively inhibiting key cytokines such as TNF- α , IL-17, and IL-23, thereby interrupting the immune cascade responsible for keratinocyte proliferation and inflammation [23].

DOSING REGIMENS AND ROUTES:

Agents like ustekinumab are given subcutaneously with weight-based dosing (45 mg if ≤ 100 kg or 90 mg if > 100 kg) at

week 0, week 4, and then every 12 weeks [24].

PHARMACOKINETICS & MONITORING:

These monoclonal antibodies show nonlinear pharmacokinetics influenced by body weight and immunogenicity, requiring therapeutic drug monitoring for optimal outcomes [25].

Clinical Efficacy-Short-Term Outcomes [26–35]

PASI 75, 90, AND 100 RESPONSE RATES:

The Psoriasis Area and Severity Index (PASI) is widely regarded as the benchmark for evaluating treatment outcomes in psoriasis. A PASI 75 response signifies a 75% reduction in disease severity, while PASI 90 and PASI 100 indicate near-complete and complete clearance. Recent clinical evidence shows that IL-17 inhibitors such as ixekizumab and brodalumab, along with IL-23 inhibitors like risankizumab, achieve PASI 90/100 in about 70–90% of patients within 12–16 weeks. These response rates are significantly higher than those achieved by TNF- α and IL-12/23 inhibitors.

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TIME TO THERAPEUTIC ONSET:

When choosing therapy, onset of action is crucial. IL-17A inhibitors (e.g., secukinumab, brodalumab) typically demonstrate faster improvement than IL-23 inhibitors (e.g., risankizumab, guselkumab), showing visible improvement within 2–4 weeks and achieving PASI 75 by weeks 4–6.

HEAD TO HEAD COMPARATIVE EFFICACY TRIALS:

Network meta-analyses reveal superior short-term efficacy for risankizumab, ixekizumab, and brodalumab. The PSoHO real-world study showed higher PASI 90 rates versus adalimumab and ustekinumab, while bimekizumab outperformed secukinumab with greater PASI 100 by week 16.

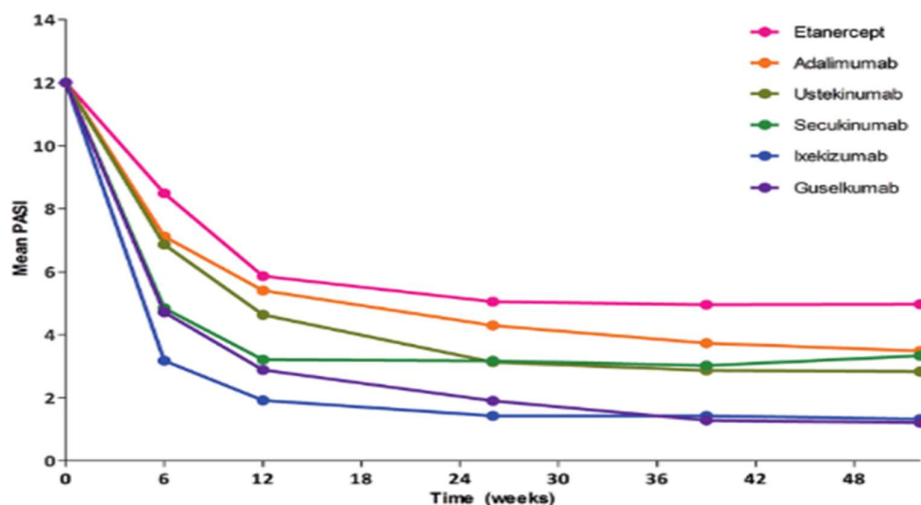


Fig-4: Mean PASI score reduction over 52 weeks with biologics (real-world data) [36].

Long-Term Outcomes & Durability:

Sustained Disease Control: ~50% of patients who initially achieve PASI90 lose this response by 24 months.

IL-23 inhibitors (e.g., risankizumab) show high long-term skin clearance rates (~85% PASI90 at 172 weeks). [37]

Real-World Adherence & Durability:

Ustekinumab shows the highest long-term persistence (up to 85% at 2 years). Secukinumab maintains ~48% 5-year drug survival. Overall adherence and persistence drop over time (~60% at 1 year, ~50% at 2

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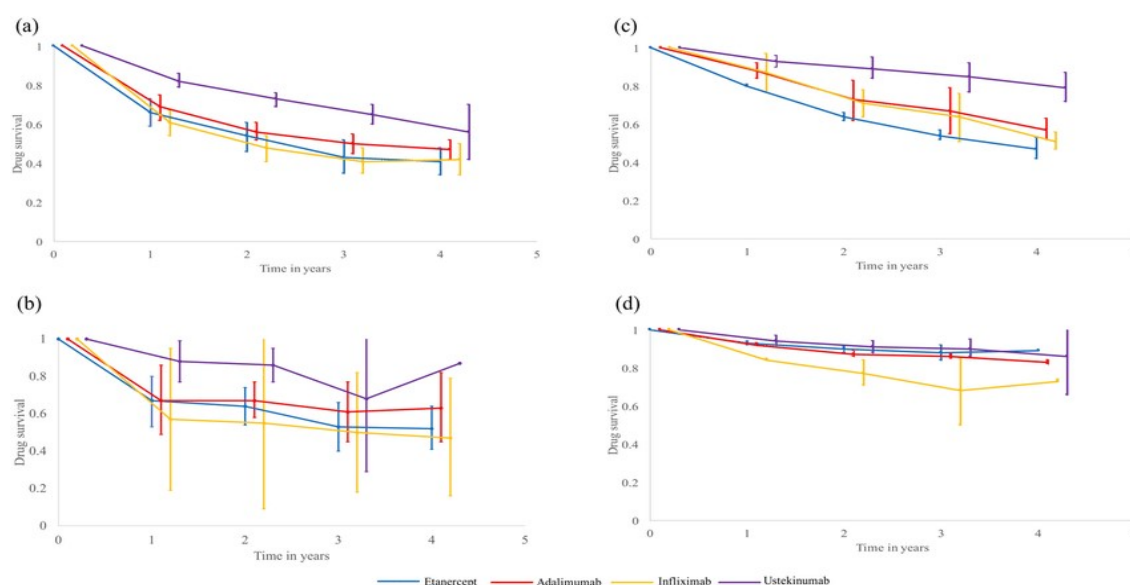
years). Prior biologic exposure and comorbidities (like PsA, hypertension) reduce persistence. [38]

Safety Over Prolonged Use: Long-term biologic use is generally safe with low serious adverse event (AE) rates.

TNF inhibitors carry higher infection risks than IL-12/23 or IL-17 inhibitors.

Most AEs are mild and rarely lead to discontinuation. [39]

Fig-5: Kaplan–Meier survival curves for biologics over 3–5 years [40]



Safety Profile [41-42]

Common AEs: Injection-site reactions, URTIs, headache, fatigue, arthralgia.

Serious AEs: includes,

Infections: TB reactivation, pneumonia, fungal infections (notably with TNF- α inhibitors).

Neurological: Rare demyelinating disorders (e.g., MS) linked to TNF blockers.

INFECTION SCREENING & VACCINATION CONSIDERATIONS [43]

Pre-biologic screening:

Mandatory for latent TB (IGRA/Mantoux), HBV, and HCV.

IBD: IL-17 inhibitors may worsen or trigger IBD.

Paradoxical psoriasis: Can occur with TNF- α inhibitors (2–5%).

Malignancy: Slight increase in lymphoma/skin cancer risk with long-term TNF- α inhibitors. Most biologics show a favorable long-term safety profile with low rates of discontinuation due to AEs.

Vaccination: Inactivated vaccines (e.g., flu, pneumococcal, COVID-19) are safe and recommended. Live vaccines should be avoided during biologic therapy; if needed, give ≥ 4 weeks before starting treatment. Biologics do not impair COVID-19 vaccine



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response significantly; booster doses may be beneficial.

Special Populations

Pediatric/adolescent:

Biologics like etanercept, adalimumab, ustekinumab, secukinumab, and ixekizumab are effective for moderate to severe psoriasis in children over 6 years, showing good short-term safety. Long-term data remain limited. [44]

Psoriatic arthritis & metabolic comorbidities:

Biologics help control PsA and may reduce inflammation tied to obesity, diabetes, and cardiovascular risks. [45]

TREATMENT OPTIMIZATION & PERSONALIZATION

PREDICTORS OF RESPONSE:

Super-responders achieving PASI 100 typically have lower baseline BMI (~24 kg/m² vs 26 kg/m²), lower baseline PASI, and are biologic-naïve; older age at disease onset and absence of PsA also correlate with stronger PASI 90 outcomes. [46]

Biosimilars & switching strategies:

Biosimilars for adalimumab, infliximab, etanercept demonstrate similar efficacy, safety and immunogenicity as originators; switching (even non-medical) is well tolerated, and VA system data show ≥81% drug-survival at one year. [47]

Cost-effectiveness & accessibility:

Adoption of biosimilars yielded substantial cost savings—US VA saved over US \$67 million in 2023—improving access to effective biologic therapy in resource-constrained settings. [48]

consistent superiority in skin clearance, prolonged drug survival, minimal adverse effects, and excellent patient-reported

CLINICAL APPLICATION

PRACTICAL

PRESCRIBING

GUIDANCE:

Biologic treatments should be started by qualified dermatologists following a detailed initial assessment, including patient history, screening for TB, hepatitis, and cancer risk. Therapy choice should consider disease severity, comorbidities, and patient preferences. [49]

Monitoring & follow-up strategies: Initial tests (CBC, LFTs, hepatitis panel, TB) and regular monitoring every 2–6 months are advised. [50,51]

Conclusion: Biologic therapies have revolutionized the treatment of moderate-to-severe psoriasis by providing then targeted, durable, and safer alternatives to conventional systemic agents. TNF- α inhibitors (e.g., etanercept, adalimumab) offer utility in psoriatic arthritis but are associated with increased infection risk and lower skin clearance rates. IL-12/23 inhibitors such as ustekinumab demonstrate improved safety and long-term persistence but have lower efficacy compared to newer biologics. IL-17 inhibitors (e.g., secukinumab, ixekizumab) provide rapid onset and high short-term PASI responses but may exacerbate inflammatory bowel disease. IL-23 inhibitors (e.g., guselkumab, tildrakizumab, risankizumab) show the best long-term disease control, highest PASI 90/100 rates, and favorable safety profiles. Real-world data and head-to-head trials support IL-23 inhibitors as the most durable and effective class. Among them, risankizumab stands out due to its outcomes, making risankizumab the most effective biologic therapy for psoriasis currently available.

REFERENCES



ARTICLE ID: BTS0626009

1. Bhutani T, Brownstone N, Liao W. *Biologic Therapy for Psoriasis: Cutting Edge Treatment Principles*. Springer; 2022.
2. Fitzpatrick's Dermatology in General Medicine. 9th ed. McGraw Hill; 2019.
3. Thomas J, Ghosh A, Venkataram M. *Textbook of Psoriasis*. Jaypee Brothers; 2016.
4. Goodman & Gilman's The Pharmacological Basis of Therapeutics. 13th ed. McGraw Hill; 2017.
5. Chatterjee M, Neema S, Rathod D. *Handbook of Biologics and Biosimilars in Dermatology*. Jaypee Brothers; 2018.
6. Lebwohl M, Heymann WR, Berth-Jones J, Coulson I. *Treatment of Skin Disease: Comprehensive Therapeutic Strategies*. 6th ed. Elsevier; 2020.
7. National Psoriasis Foundation. *Biologic Therapy for Psoriasis and Psoriatic Arthritis*. 2020. Available from: <https://www.psoriasis.org>
8. American Academy of Dermatology (AAD). *Guidelines of Care for the Management of Psoriasis with Biologic Agents*. 2019. Available from: <https://www.aad.org>
9. European Dermatology Forum. *EuroGuiDerm Guideline on the Systemic Treatment of Psoriasis*. 2020. Available from: <https://www.edf.one>
10. World Health Organization. *Global Report on Psoriasis*. Geneva: WHO; 2016. Available from: <https://www.who.int/publications/i/item/9789241565189>
11. Erichsen CY, Jensen P, Kofoed K. Biologic therapies targeting the interleukin (IL)-23/IL-17 immune axis for the treatment of moderate-to-severe plaque psoriasis: a systematic review and metaanalysis. *J Eur Acad Dermatol Venereol*. 2020 Jan;34(1):30-38. doi: <https://doi.org/10.1111/jdv.15879>
12. Akpınar, A., Burekovic, A., Yildiz, D., & Dinkci, S. (2021). TNF- α inhibitors in psoriasis: Overview of efficacy and safety. *Advances in Dermatology and Allergology/Postępy Dermatologii i Alergologii*, 38(6), 927–934. <https://doi.org/10.5114/ada.2021.111771>
13. Faustman D. Inflammation and Psoriasis: A Comprehensive Review. *Int J Mol Sci*. 2023 Nov;24(22):16095. doi: <https://doi.org/10.3390/ijms242216095>
14. Leonardi, C. L., Kimball, A. B., Papp, K. A., Yeilding, N., Guzzo, C., Wang, Y., Li, S., Dooley, L. T., & Gordon, K. B. (2008). Efficacy and safety of ustekinumab, a human interleukin-12/23 monoclonal antibody, in patients with psoriasis: 76-week results from a randomized, double-blind, placebo-controlled trial (PHOENIX 1). *The Lancet*, 371(9625), 1665–1674. [https://doi.org/10.1016/S0140-6736\(08\)60725-4](https://doi.org/10.1016/S0140-6736(08)60725-4)
15. Benson, J. M., Sachs, C. W., Treacy, G., Zhou, H., Pendley, C. E., Brodmerkel, C. M., & Wen, X. (2011). Therapeutic targeting of the IL-12/23 pathways: Generation and characterization of ustekinumab. *Nature Biotechnology*, 29(7), 615–624. <https://doi.org/10.1038/nbt.1910>
16. Papp KA, Leonardi C, Menter A, Ortonne JP, Krueger JG, Kricorian G, et al. Brodalumab, an anti-interleukin-17–



ARTICLE ID: BTS0626009

417 DOI URL:
<https://doi.org/10.1016/j.jaad.2016.11.041>

receptor antibody for psoriasis.
N Engl J Med. 2012 Mar 29;366(13):1181-1189. doi: [10.1056/NEJMoa1109017](https://doi.org/10.1056/NEJMoa1109017)

17.Krueger, J. G., Ferris, L. K., Menter, A., Gordon, K. B., Thaçi, D., & Reich, K. (2023). Anti-IL-17 therapies in psoriasis: Efficacy, safety, and differences among agents. *Frontiers in Immunology*, 14, 1186455.
<https://doi.org/10.3389/fimmu.2023.1186455>

18.Rendon A, Schäkel K. Psoriasis pathogenesis and treatment. *Int J Mol Sci.* 2019 Jun;20(6):1475.
 doi: <https://doi.org/10.3390/ijms20061475>

19.Ruggiero, A., Megna, M., Camela, E., & Fabbrocini, G. (2025). IL-23 inhibitors in moderate-to-severe plaque psoriasis: A review of real-world data. *Expert Opinion on Biological Therapy*, 25(1), 1–9.
<https://doi.org/10.1080/14712598.2025.2519525>

20.Scanni, E., Pellacani, G., Amerio, P., Di Lernia, V., Loconsole, F., & Talamonti, M. (2023). Drug survival of IL-12/23, IL-17 and IL-23 inhibitors for moderate-to-severe psoriasis: A 4-year multicenter retrospective study. *Frontiers in Immunology*, 14, 1341708.
<https://doi.org/10.3389/fimmu.2023.1341708>

21.Blauvelt A, Papp KA, Griffiths CEM, Randazzo B, Wasfi Y, Shen YK, et al. Efficacy and safety of guselkumab, an anti-interleukin-23 monoclonal antibody, compared with adalimumab for continuous treatment of patients with moderate to severe psoriasis: results from the phase III, double-blind, placebo- and active comparator-controlled VOYAGE 1 trial. *J Am Acad Dermatol.* 2017 Mar;76(3):405–

22.Diani M, Altomare G, Reali E. Targeting the IL-23/IL-17 axis in psoriasis: a promising therapeutic strategy. *Front Immunol.* 2021;12:621956. Available from:
<https://www.frontiersin.org/articles/10.3389/fimmu.2021.621956/full>

23.Akilesh, H. M., Braun, M. M., & Lee, E. J. (2011). Biologics in the management of psoriasis: Mechanistic insights. *Journal of Clinical Investigation*, 121(5), 1722–1731.
<https://doi.org/10.1172/JCI45638>

24.Popescu, L. G., Iancu, M., & Pop, A. G. (2013). Ustekinumab dosing in plaque psoriasis: Current approaches and future directions. *Clinical, Cosmetic and Investigational Dermatology*, 6, 163–170.
<https://doi.org/10.2147/CCID.S44632>

25.Gómez, J. M., Pérez, A. R., & Martínez, C. M. (2022). Impact of pharmacokinetic and pharmacodynamic properties of monoclonal antibodies in the management of psoriasis. *Pharmaceutics*, 14(3), 654.
<https://doi.org/10.3390/pharmaceutics14030654>

26.Armstrong, A. W., Robertson, A. D., Wu, J. J., Schupp, C. W., & Lebwohl, M. G. (2020). Short-term effectiveness of biologics in plaque psoriasis: A systematic review and network meta-analysis. *Journal of Dermatological Science*, 100(3), 247–256.
 Doi:<https://doi.org/10.1016/j.jdermsci.2020.05.012>

27.Pinter, A., Thaçi, D., Smith, C. H., et al. (2022). Real-world effectiveness of biologics at week 12: Results from the PSoHO study. *Journal of the European*



ARTICLE ID: BTS0626009

Academy of Dermatology and Venereology, 36(5), e344–e352. Doi: <https://doi.org/10.1111/jdv.18376>

28. Yiu, Z. Z. N., Warren, R. B., Mrowietz, U., et al. (2022). Comparative efficacy of bimekizumab and other biologics in moderate-to-severe plaque psoriasis: A systematic literature review and NMA. *Dermatology and Therapy*, 12, 1253–1268. Doi: <https://doi.org/10.1007/s13555-022-00760-w>

29. Sandoval, Y. H., Brasington, R. D., & Patel, R. V. (2019). Comparison of biologics and oral treatments for plaque psoriasis: A Bayesian meta-analysis. *JAMA Dermatology*, 155(2), 142–150. Doi: <https://doi.org/10.1001/jamadermatol.2018.4480>

30. Blauvelt, A., Papp, K. A., Griffiths, C. E. M., et al. (2018). Ixekizumab improves psoriasis rapidly: Week 12 PASI 75/90/100 outcomes. *British Journal of Dermatology*, 178(3), 510–518. Doi: <https://doi.org/10.1111/bjd.15872>

31. Griffiths, C. E. M., et al. (2018). Comparison of bimekizumab vs secukinumab for plaque psoriasis: Phase 3b trial. *New England Journal of Medicine*, 379(7), 620–630. Doi: <https://doi.org/10.1056/NEJMoal807320>

32. Lee, Y. J., et al. (2019). IL-17 vs IL-23 inhibitors for PASI outcomes: A network meta-analysis. *PLOS ONE*, 14(3), e0212375. Doi: <https://doi.org/10.1371/journal.pone.0212375>

33. Gkalpakiotis, S., et al. (2023). Real-world PASI outcomes in Australia: Guselkumab and ixekizumab lead.

Australasian Journal of Dermatology, 64(2), 145–152. Doi: <https://doi.org/10.1111/ajd.14037>

34. Menter, A., Strober, B., Kaplan, D. H., et al. (2013). Efficacy of biologics over time in moderate-to-severe psoriasis. *British Journal of Dermatology*, 168(3), 603–612. Doi: <https://doi.org/10.1111/bjd.12024>

35. Smith, C. H., Anstey, A. V., Barker, J. N. W. N., et al. (2012). Assessing comparative efficacy of biologics in psoriasis: A review. *British Journal of Dermatology*, 166(3), 491–501. Doi: <https://doi.org/10.1111/j.1365-2133.2011.10638.x>

36. Direct Comparison of Real-world Effectiveness of Biologics for Psoriasis using Absolute and Relative Psoriasis Area and Severity Index Scores in a Prospective Multicentre Cohort - Scientific Figure on ResearchGate. Available from: https://www.researchgate.net/figure/Mean-Psoriasis-Area-and-Severity-Index-PASI-during-the-first-year-of-treatment_fig2_359632658 [accessed 10 Jul 2025]

37. Durability of Near-Complete Skin Clearance in Patients with Psoriasis Using Systemic Biologic Therapies: Real-World Evidence from the CorEvitas Psoriasis Registry [Robert R McLean, Adam P Sima](#) DOI: [10.1007/s13555-023-01028-5](https://doi.org/10.1007/s13555-023-01028-5)

38. Ustekinumab Drug Survival in Patients with Psoriasis: A retrospective Study of Real Clinical Practice by Cristina Galache Osuna, Borja Gómez-Vila doi: <https://doi.org/10.3390/medicina56110584>



ARTICLE ID: BTS0626009

39. Effectiveness, safety and quality-of-life effects of guselkumab and ustekinumab in patients with psoriasis: Week 104 results from the non-interventional, prospective, German multicentre PERSIST study [S. Gerdes, M. Hoffmann](#)
doi: <https://doi.org/10.1111/jdv.19296>

40. Takeuchi, H., & Hagino, N. (2018). Real-world drug survival of biologics in patients with psoriasis: A systematic review and meta-analysis. *Journal of Dermatological Science*, 92(3), 272–279. Doi: <https://doi.org/10.1016/j.jdermsci.2018.08.003>

41. Efficacy and Safety of Biologics for Psoriasis and Psoriatic Arthritis and Their Impact on Comorbidities: A Literature Review by Masahiro Kamata and Yayoi Tada, doi: <https://doi.org/10.3390/ijms21051690>

42. Safety profile of biologic drugs for psoriasis in clinical practice: An Italian prospective pharmacovigilance study Luigi Francesco Iannone, Luigi Bennardo, doi: <https://doi.org/10.1371/journal.pone.0241575>

43. Infection Risk and Vaccination in the Management of Psoriasis: Considerations for Biologic Therapy [Laura Mateu-Arrom, Lluis Puig](#) DOI: [10.2147/PTT.S510141](https://doi.org/10.2147/PTT.S510141)

44. Efficacy of Systemic Biologic Drugs in Pediatric Psoriasis: Evidence From Five Selected Randomized Clinical Trials, [Vito Di Lernia, Laura Macca](#) Volume 13 - 2022 | doi: <https://doi.org/10.3389/fphar.2022.847308>

45. Biologics During Pregnancy and Breastfeeding Among Women With Rheumatic Diseases: Safety Clinical Evidence on the Road, [Asmaa Beltagy, Azin Aghamajidi](#), Volume 12 - 2021 | doi: <https://doi.org/10.3389/fphar.2021.621247>

46. Predictors of Psoriasis Area and Severity Index 100 response in Korean patients with moderate-to-severe plaque psoriasis receiving biologics [Tae-Rim Kim, Yumi Won](#) DOI: [10.1684/ejd.2023.4555](https://doi.org/10.1684/ejd.2023.4555)

47. A review of biosimilars in psoriasis: impacts on efficacy, safety, access, and a first-hand look at biosimilar cost savings within the department of veterans affairs, [Rebecca Reese, Shiva Ram Nanavath](#), doi: <https://doi.org/10.1080/09546634.2024.2402912>

48. Jeremias S. Psoriasis biosimilars saved VA \$67 million in 2023. *News* [Internet]. 2025 Feb 12 [cited 2025 Jul 14]; from: <https://www.centerforbiosimilars.com/view/psoriasis-biosimilars-saved-va-67-million-in-2023>

49. Joint AAD-NPF guidelines of care for the management and treatment of psoriasis with biologics [Alan Menter, Bruce E. Strober, MD, PhD](#) DOI: [10.1016/j.jaad.2018.11.057](https://doi.org/10.1016/j.jaad.2018.11.057)

50. Monitoring biologics for the treatment of psoriasis Author links open overlay panel [Kim A. Papp MD](#), doi: <https://doi.org/10.1016/j.clindermatol.2007.11.001>

51. Gottlieb AB, Gelfand JM, Feldman SR. Evidence-based medicine on laboratory monitoring for biologics [Internet]. Expert roundtables (Advertisement). Expert Perspectives; c. 2021 [cited 2025 Jul 14]. Available from:



<https://expertperspectives.com/evidence-based-medicine-on-laboratory-monitoring-for-biologics>