Received: 16 September 2023 | Accepted: 7 December 2023

DOI: 10.1111/jdv.19756

JEADV JOURNAL OF THE EUROPEAN ACADEMY OF DERMATOLOGY & VENEREOLOGY

LETTER TO THE EDITOR

# Price variability of TNF-α inhibitor biosimilars among European countries

Dear Editor,

The treatment of psoriasis has been revolutionized by biological drugs. Despite their excellent efficacy and safety, their high cost represents a hindrance to a wider and early use.[1–3] In the last few years, however, the expiration of the patents of TNF-α inhibitors has allowed the development of biosimilar versions of these agents.[4–6] While biosimilars are associated with significant reductions in drug costs,[7,8] price variability across Europe of the biosimilar agents used in psoriasis has not been studied yet. The aim of this study was therefore to investigate the price variability across European countries of the currently available biosimilar agents for psoriasis, that is, TNF-α inhibitor biosimilars of adalimumab, etanercept and infliximab.

A survey was conducted of five dermatologists working at academic reference centres for psoriasis in in Denmark (Aarhus), France (Toulouse), Germany (Lübeck), Italy (Verona) and Spain (Barcelona). Dermatologists were requested to provide the price of one package of adalimumab, etanercept and infliximab originator and biosimilars paid by their local hospital pharmacies. Based on the prices per package, the price per unit dose (i.e. the amount of medication administered to a patient in a single dose) was then calculated. For infliximab, the unit dose was considered either 400 mg (corresponding to 5 mg/kg considering a patient weight of 80 kg) for I.V. vials or one S.C. 120 mg syringe.

The highest biosimilar prices per unit dose were reported in Germany and the lowest ones in Italy and Spain, with prices in France and Denmark lying in between (Tables 1 and 2). Regarding adalimumab biosimilars, the highest price per unit dose was reported in Germany (€494.51) while the lowest one in Italy (€23.60). Regarding etanercept biosimilars, the highest price per unit dose was also reported in Germany (€282.52) while the lowest one in Italy (€11.69). Lastly, regarding infliximab biosimilars, the highest price per unit dose was reported in Germany (€716.45) while the lowest one in Spain (€191.60).

The main finding of this survey is that there is significant price variability of TNF-α inhibitor biosimilars across European countries, with drug prices in Italy and Spain being lower than in Germany, France and Denmark, both in absolute terms and relatively to the originator's price. Of note, a caveat applies to the German prices, as discounts in Germany among insurances, pharmacies, hospitals and producers (pharma) are not publicly available and transparent. Hence, the prices reported in this study represent pharmaceutical list prices, which may not coincide with real prices. Insurance companies may have separate contracts with manufactures with a discount for their ensured patients. Value-added tax of 19% on the top in Germany is adding more to this cost. Furthermore, TNF-α inhibitor biosimilars are provided by hospital pharmacies in Germany only to patients treated in the hospital as inpatients, not to outpatients.

The price variability found in this study may be explained by the different pricing policies adopted by different European countries with regard to biosimilars.[9] Indeed, the most frequent biosimilar pricing mechanisms include mandatory discounts applied at launch, progressive price discounts applied over time and additional discounts negotiated through tendering or direct contracting with providers.[9] In most European countries, no single pricing mechanism is adopted but multiple pricing mechanisms are combined, both at national and local level.[9] Notably, a survey of hospital pharmacists and purchasers found considerable variations

**TABLE 1** Drug prices per unit dose of adalimumab originator and its biosimilars in European countries (in Euro).

| | HUMIRA® | AMGEVITA® | HULIO® | HYRIMOZ® | IDACIO® | IMRALDI® |
|---|---|---|---|---|---|---|
| Germany (Lübeck) | NA | 488.38–494.51 | NA | 488.38 | 488.38 | 488.55 |
| Denmark (Aarhus) | 316.78 | 205.44 | NA | 210.70 | NA | 202.94 |
| France (Toulouse) | 278.50 | 234.50 | 234.50 | 234.50 | 234.50 | 234.50 |
| Italy (Verona) | 143.00 | 41.58 | NA | 23.76 | 23.60 | 24.83 |
| Spain (Barcelona) | 156.75 | 54.11 | NA | 54.00 | 42.00 | 50.00 |

*Note*: The unit dose considered was 40 mg syringe/auto-injector.

Abbreviation: NA, not available.

**TABLE 2** Drug prices per unit dose of etanercept and infliximab originators and their biosimilars in European countries (in Euro).

| | ENBREL® | BENEPALI® | ERELZI® | REMICADE®[a] | FLIXABI®[a] | INFLECTRA®[a] | REMSIMA®[a]/[b] | ZESSLY®[a] |
|---|---|---|---|---|---|---|---|---|
| Germany (Lübeck) | 282.52 | 282.52 | NA | NA | NA | NA | 716.45[b] | NA |
| France (Toulouse) | 133.75 | 131.00 | 131.00 | 528.00 | 528.00 | 528.00 | 241.00[b] | NA |
| Italy (Verona) | 39.27 | NA | 11.69 | 1155.56 | NA | 519.20 | 285.92[a] | 224.40 |
| Spain (Barcelona) | 169.07 | 48.00 | 63.00 | 938.52 | 232.00 | NA | 220.00[a] | 191.60 |

*Note*: The unit dose considered for etanercept was 50 mg syringe/auto-injector; for infliximab, it was either 400 mg for I.V. vials or one S.C. 120 mg syringe.
Abbreviation: NA, not available.
[a]I.V. intravenous.
[b]S.C. subcutaneous.

in the organization and design of tenders for off-patent biologicals and biosimilars across Europe.[10] In conclusion, this study—though limited by the inclusion of only one centre per country—found considerable biosimilar price variability across Europe, which may have a remarkable impact on healthcare costs and influence psoriasis patients' access to biological treatment.

## FUNDING INFORMATION

No funding or sponsorship was received for this study or publication of this article.

## CONFLICT OF INTEREST STATEMENT

Geat D has no conflicts of interest to disclose. Gisondi P has been consultant and/or speaker for AbbVie, Almirall, Amgen, Janssen, Leo-pharma, Eli Lilly, Novartis, Pierre Fabre, Sandoz, Sanofi and UCB. Maurelli M has no conflicts of interest to disclose. Puig L has served as a scientific advisor and/or clinical study investigator for, or has received consultancy and/or speaker's honoraria from and/or participated in clinical trials sponsored by AbbVie, Almirall, Amgen, Baxalta, Biogen, Boehringer Ingelheim, Bristol Myers Squibb, Celgene, Fresenius-Kabi, Janssen, JS BIOCAD, LEO Pharma, Lilly, Mylan, Novartis, Pfizer, Regeneron, Roche, Sandoz, Samsung-Bioepis, Sanofi and UCB. Paul C has received grants and personal fees from Amgen, AbbVie, Celgene, Eli Lilly, Novartis, Janssen, Pfizer and Leo Pharma. Thaçi D has served as a consultant, advisory board member and/or investigator for Pfizer, AbbVie, Almirall, Amgen, Beiersdorf, Bristol Myers Squibb, Boehringer Ingelheim, Celltrion, Eli Lilly, Janssen-Cilag, Kyowa, LEO Pharma, New Bridge, Novartis, Regeneron, Sandoz, Sanofi, Sun Pharma and UCB. Iversen L has served as a consultant and/or paid speaker for and/or participated in clinical trials sponsored by AbbVie, Almirall, Amgen, Astra Zeneca, BMS, Boehringer Ingelheim, Celgene, Centocor, Eli Lilly, Janssen Cilag, Kyowa, Leo Pharma, MSD, Novartis, Pfizer, Regranion, Samsung, Union Therapeutics and UCB. Bellinato F has no conflicts of interest to disclose. Girolomoni G has been consultant and/or speaker for AbbVie, Almirall, Amgen, Boehringer-Ingelheim, Bristol-Myers Squibb, Eli-Lilly, Leo Pharma, Novartis, Pfizer, Regeneron, Samsung Bioepis and Sanofi.

## DATA AVAILABILITY STATEMENT

All data generated or analysed during this study are included within the manuscript.

Davide Geat[1,2]
Paolo Gisondi[1]
Martina Maurelli[1]
Luis Puig[3]
Carle Paul[4]
Diamant Thaçi[5]
Lars Iversen[6]
Francesco Bellinato[1]
Giampiero Girolomoni[1]

[1]*Section of Dermatology and Venereology, Department of Medicine, University of Verona, Verona, Italy*
[2]*Spedali Civili Hospital, Brescia, Italy*
[3]*Department of Dermatology, Hospital de la Santa Creu i Sant Pau, Universitat Autònoma de Barcelona, Barcelona, Spain*
[4]*Department of Dermatology, INSERM Infinity, Toulouse University, Toulouse, France*
[5]*Comprehensive Center for Inflammation Medicine, University of Lübeck, Lübeck, Germany*
[6]*Department of Dermatology, Aarhus University Hospital, Aarhus, Denmark*

**Correspondence**
Davide Geat, Section of Dermatology and Venereology, Department of Medicine, University of Verona, Piazzale Stefani 1, Verona 37124, Italy.
Email: davidegeat@outlook.it

## ORCID

*Davide Geat* https://orcid.org/0000-0003-3430-2077
*Paolo Gisondi* https://orcid.org/0000-0002-1777-9001
*Martina Maurelli* https://orcid.org/0000-0001-7492-8010
*Luis Puig* https://orcid.org/0000-0001-6083-0952
*Francesco Bellinato* https://orcid.org/0000-0002-6163-6921
*Giampiero Girolomoni* https://orcid.org/0000-0001-8548-0493

## REFERENCES


1. Svedbom A, Dahlén J, Mamolo C, Cappelleri JC, Mallbris L, Petersson IF, et al. Economic burden of psoriasis and potential cost offsets with biologic treatment: a Swedish register analysis. Acta Derm Venereol. 2016;96:651–7.
2. Burgos-Pol R, Martínez-Sesmero JM, Ventura-Cerdá JM, Elías I, Caloto MT, Casado MÁ. The cost of psoriasis and psoriatic arthritis in 5 European countries: a systematic review. Actas Dermosifiliogr. 2016;107(7):577–90.
3. Nast A, Mrowietz U, Kragballe K, de Jong EM, Puig L, Reich K, et al. Barriers to the prescription of systemic therapies for moderate-to-severe psoriasis—a multinational cross-sectional study. Arch Dermatol Res. 2013;305:899–907.
4. Barker J, Girolomoni G, Egeberg A, Goncalves J, Pieper B, Kang T. Anti-TNF biosimilars in psoriasis: from scientific evidence to real-world experience. J Dermatolog Treat. 2020;31(8):794–800.
5. Bellinato F, Gisondi P, Mason E, Ricci P, Maurelli M, Girolomoni G. Real-life effectiveness of adalimumab biosimilars in patients with chronic plaque psoriasis. Dermatol Ther. 2022;12(6):1303–11.
6. Gisbert JP, Gaffney K, Young D, Ebbers HC, Girolomoni G. Current evidence on the use of the adalimumab biosimilar SB5 (ImraldiTM): a multidisciplinary perspective. Expert Opin Biol Ther. 2022;22(2):109–21.
7. Aladul MI, Fitzpatrick RW, Chapman SR. The effect of new biosimilars in rheumatology and gastroenterology specialities on UK healthcare budgets: results of a budget impact analysis. Res Social Adm Pharm. 2019;15(3):310–7.
8. Kvien TK, Patel K, Strand V. The cost savings of biosimilars can help increase patient access and lift the financial burden of health care systems. Semin Arthritis Rheum. 2022;52:151939.
9. Moorkens E, Vulto AG, Huys I, Dylst P, Godman B, Keuerleber S, et al. Policies for biosimilar uptake in Europe: an overview. PLoS One. 2017;12(12):e0190147.
10. Barbier L, Simoens S, Soontjens C, Claus B, Vulto AG, Huys I. Off-patent biologicals and biosimilars tendering in Europe—a proposal towards more sustainable practices. Pharmaceuticals. 2021;14(6):499.