# Incidence of COVID-19 hospitalization in patients with psoriasis taking systemic immunomodulators

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## Background

- Current research on COVID-19-related outcomes in patients with psoriasis, particularly regarding influence of treatments, is subject to lack of comparator group, selection bias, confounding, and insufficient statistical power.[1]
- It remains uncertain whether immunomodulatory treatments for psoriasis enhance or decrease the risk of severe COVID-19-related outcomes, including hospitalization.

## Objective

- To compare the risk of COVID-19-related hospitalization according to immunomodulator treatment type in patients with psoriasis

## Methods

**Study design/setting:** Retrospective cohort study of the IBM Explorys database

**Time frame:** 3/1/2020 – 12/31/2020

**Exposure:** Drug exposure was classified as biologic, oral immunomodulator, both or neither treatment based on prescription orders between 12/01/2019 and 02/29/2020

- Biologic drug classes: TNF-alpha, IL-12/IL-23, IL-17A, and IL-23 inhibitors
- Specific biologic drugs: etanercept, adalimumab, infliximab, golimumab, certolizumab, ustekinumab, secukinumab, ixekizumab, brodalumab, tildrakizumab, guselkumab, risankizumab
- Oral immunomodulators: methotrexate, cyclosporine, apremilast

**Primary Outcome:** Hospital admission with diagnosis of COVID-19 or positive lab test occurring between admission and discharge

**Statistical Analysis:** Cumulative incidence of COVID-19-related hospitalization was calculated during the study period for each treatment group. Propensity score weighting was used to compare COVID-19-related hospitalization between treatment groups, adjusting for comorbidities and demographic characteristics.

## Results

**Table 1.** Incidence of COVID-19 hospitalization, March 1 – Dec. 31, 2020, among psoriasis patients according to use of biologics and oral immunomodulators

| Treatment group | Cumulative incidence % | # hospitalizations / # patients | Cumulative incidence/1,000 (95% CI[a]) |
|---|---|---|---|
| Biologics (Bio) | 0.31 | 8 / 2,593 | 3.1 (1.6-6.1) |
| Oral immunomodulators (OIs) | 0.95 | 15 / 1,585 | 9.5 (5.7-15.6) |
| Both (Bio + OIs) | 0.68 | 3 / 444 | 6.8 (2.3, 19.7) |
| Neither | 0.39 | 184 / 47,352 | 3.9 (3.4-4.5) |
| Methotrexate (MTX) | 1.4 | 13 / 898 | 14 (8.5-24.6) |
| Apremilast | 0.34 | 2 / 585 | 3.4 (0.9, 12.4) |
| Cyclosporine | 0 | 0 / 59 | 0 (0, 6.1) |
| TNF-α inhibitors (TNF-α) | 0.47 | 6 / 1,282 | 4.7 (2.1-10.2) |
| IL-17A inhibitors | 0.14 | 1 / 699 | 1.4 (0.3-8.1) |
| IL-12/IL-23 inhibitors | 0.31 | 1 / 322 | 3.1 (0.5-17.4) |
| IL-23 inhibitors | 0 | 0 / 170 | 0 (0-22.1) |

**Table 2.** Relative risk of COVID-19 related hospitalization according to treatment group in unadjusted and propensity score (PS)-weighted analysis

| Index | Ref. | Relative risk (95% CI) | | Risk difference per 1,000 (95% CI) | |
|---|---|---|---|---|---|
| | | PS-Weighted | p-value[a] | Unadjusted | PS-Weighted |
| Bio | OIs | 0.35 (0.14, 0.86) | .02 | -6 (-12, -1) | -6 (-11, -0.3) |
| Bio | Neither | 0.60 (0.29, 1.27) | .18 | -0.8 (-3, +1) | -2 (-5, +0.5) |
| Bio + OIs | OIs | 0.79 (0.21, 2.95 | .72 | -3 (-12, +6) | -2 (-12, +8) |
| TNF-α | MTX | 0.39 (0.14, 1.07) | .07 | -10 (-18, -1) | -7 (-16, +1) |
| TNF-α | Neither | 0.90 (0.38, 2.14) | .81 | 0.8 (-3, +5) | -0.5 (-5, +4) |
| MTX | Control | 2.78 (1.47, 5.26) | .002 | +11 (+3, +18) | +9 (+1, +17) |

a – P-value for propensity score-weighted relative risk

## Results

- Proportion of females in each treatment group was 56% (n=1,449) in biologics, 62% (n=988) in OIs, 64% (n=282) in both, and 57% (n=27,003) in neither.
- Median ages of the biologics, OIs, both, and neither group were 53 (IQR 42-63), 61 (IQR 50-70), 56 (IQR 45-64), and 60 (IQR 47-70) years, respectively.
- 54% (n=1,391) of patients on biologics, 48% (n=762) on OIs, and 75% (n=331) on both had PsA, compared to 13% (n=6,181) of the neither group.

## Conclusions

- In this U.S.-based psoriasis patient cohort during the first wave of the COVID-19 pandemic, methotrexate use was associated with a significantly greater risk of COVID-19-related hospitalization relative to no systemic immunomodulatory treatment.
- Use of biologics was associated with a lower risk of COVID-19-related hospitalization than use of OIs.
- These data are relevant to dermatologists and other prescribers, as they may encourage infection mitigation strategies such as vaccination and pre-exposure prophylaxis for their psoriasis patients on systemic immunomodulators.

## References

1. Piaserico S, Gisondi P, Cazzaniga S, Di Leo S, Naldi L. Assessing the Risk and Outcome of COVID-19 in Patients with Psoriasis or Psoriatic Arthritis on Biologic Treatment: A Critical Appraisal of the Quality of the Published Evidence. J Invest Dermatol. 2022;142(2):355-363.e7. doi:10.1016/j.jid.2021.04.036

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