Biomarker profile and disease burden associated with intermittent and long-term oral corticosteroid use in patients with severe asthma prior to biologic initiation in real-life (STAR)

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Summary of the STAR study

Aim

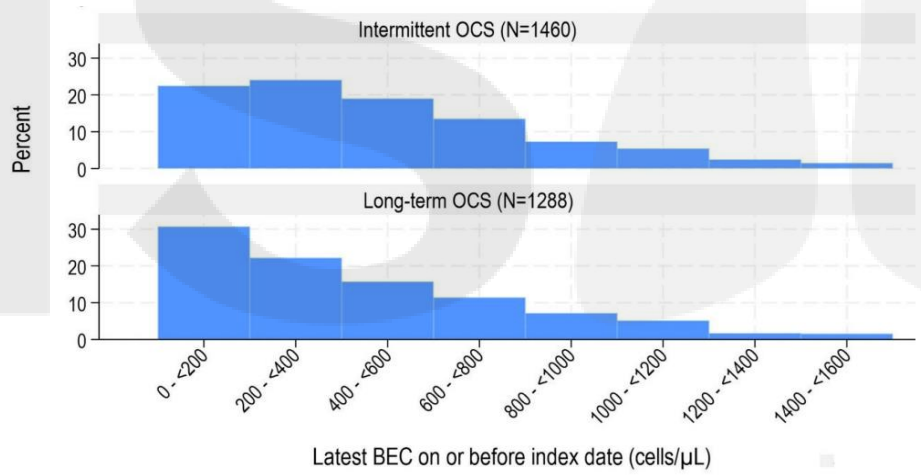
- To study the effect of **OCS use** prior to biologic initiation on SA phenotype and **biomarker profile**
- To characterize the **burden of SA** among **long-term OCS users** by biomarker profile

Methods

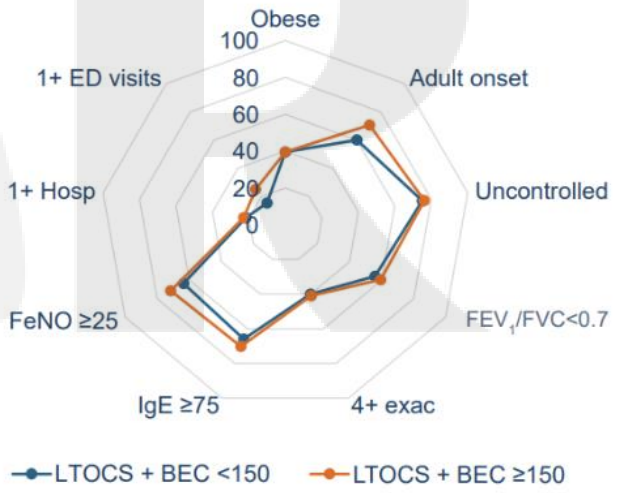
4,305 patients from 23 countries in **ISAR** (2003-2023) were included. **Biomarker distributions** were described according to OCS use*. **Long-term OCS** users were characterized according to BEC.

Results

Pre-biologic BEC distribution according to OCS use



Disease characteristics of long-term OCS users by BEC



Conclusions

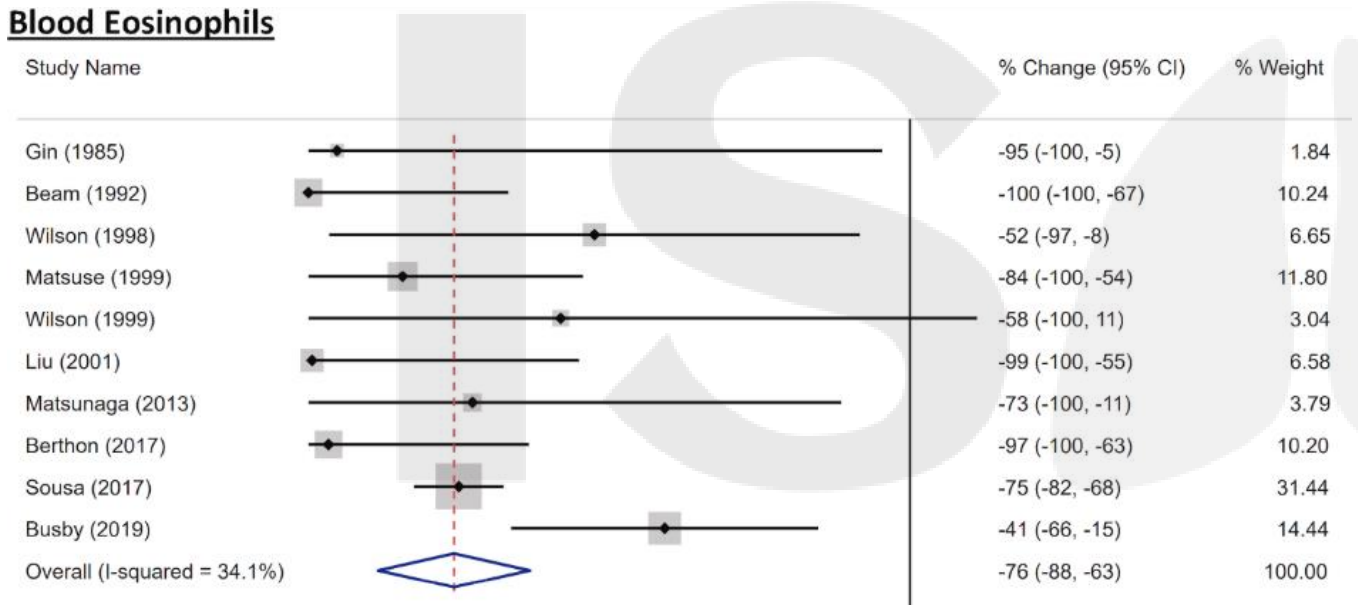
- **OCS (intermittent and long term) affect BEC** distribution.
- Biologic access criteria should consider **long-term OCS users with low BEC**, who have high disease burden.

*3 cohorts: (i) no prescription for OCS, (ii) prescription(s) for intermittent OCS (i.e, 90 days in previous 12 months, usually short courses for exacerbations), and (iii) prescriptions for long-term OCS (i.e, >90 days in previous 12 months)
BEC = Blood eosinophil count; ED = Emergency department; FeNO = Fractional exhaled nitric oxide; FEV1 = Forced expiratory volume in 1 second; FVC = Forced vital capacity; IgE = Immunoglobulin E; ISAR = International Severe Asthma Registry; OCS = Oral corticosteroids; SA = Severe asthma

Schleich F et al. Biomarker profile and disease burden associated with intermittent and long-term oral corticosteroid use in patients with severe asthma prior to biologic initiation in real-life (STAR). *World Allergy Organ J* 2025;18:101066

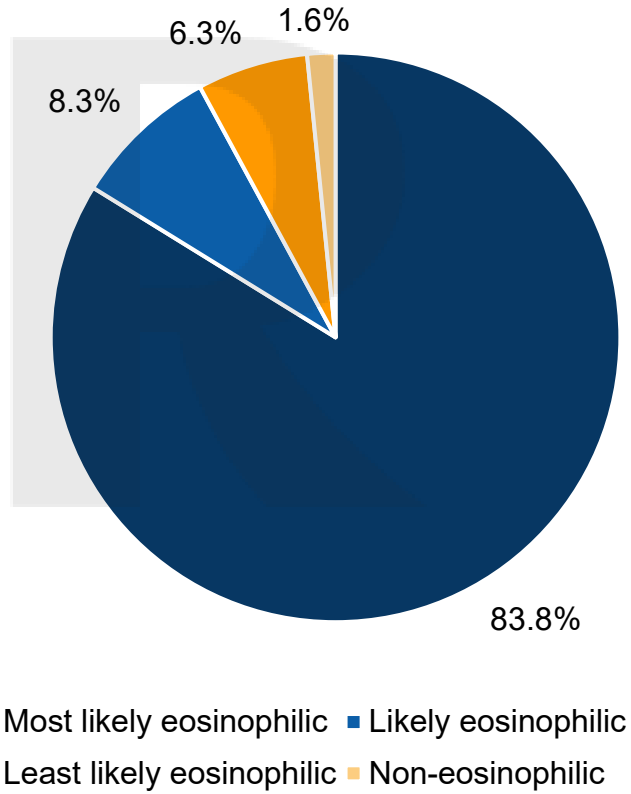
Background and Rationale

Weighted % change in BEC following OCS in stable asthma[1]



BEC was reduced by 76% across all studies in this meta-analysis

Proportion of asthma phenotypes in ISAR (n=1,716)[2]



BEC = Blood eosinophil count; FeNO = Fractional exhaled nitric oxide; ISAR = International Severe Asthma Registry; OCS = Oral corticosteroids

[1]Busby J et al. The effects of oral corticosteroids on lung function, type-2 biomarkers and patient-reported outcomes in stable asthma: A systematic review and meta-analysis. *Respir Med* 2020;173:106156. [2]Heaney LG et al. Eosinophilic and Noneosinophilic Asthma: An Expert Consensus Framework to Characterize Phenotypes in a Global Real-Life Severe Asthma Cohort. *CHEST* 2021;160(3):814-830

Aim

To explore the effect of OCS (intermittent and long-term) prior to biologic initiation on severe asthma phenotype and biomarker profile

To characterize the burden of severe asthma among patients prescribed long-term OCS by biomarker profile

BEC = Blood eosinophil count; FeNO = Fractional exhaled nitric oxide; OCS = Oral corticosteroids

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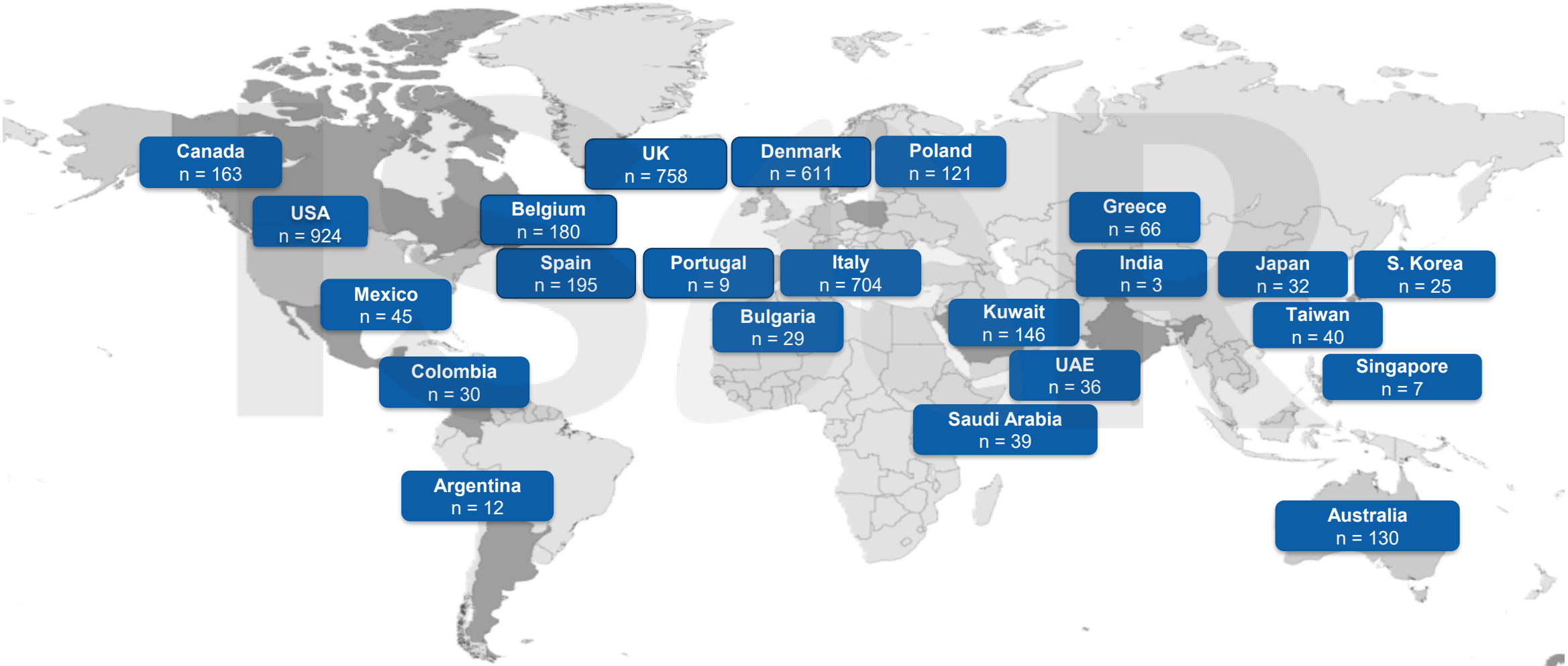
STAR study data source: ISAR (23 countries)



Schleich F et al. Biomarker profile and disease burden associated with intermittent and long-term oral corticosteroid use in patients with severe asthma prior to biologic initiation in real-life (STAR). *World Allergy Organ J* 2025;18:101066

Methods

Patients

Inclusion criteria
- ISAR patients ≥18 years old, severe asthma*
- Initiated biologic therapy
- Data for ≥1 year prior to biologic initiation

Exclusion criteria
- Received bronchial thermoplasty
- Missing biologic initiation date
- No pre-biologic assessment
- Comorbidity conventionally treated with long-term OCS

Variables

Demographics

Biomarkers:
- BEC, FeNO, IgE

Disease characteristics:
- Asthma onset and duration
- Eosinophilic phenotype
- Exacerbations
- Asthma control
- Lung function
- Asthma treatment pattern
- HCRU

Statistical analyses

Continuous and **categorical** variables were summarized.

Comparisons between groups:
- T-tests
- Mann-Whitney tests
- Poisson regression
- Chi-square tests

***P* values ≤0.05** were considered statistically significant.

*Severe asthma is defined as receiving treatment at GINA 2018 Step 5 or with uncontrolled asthma at GINA Step 4

BEC = Blood eosinophil count; FeNO = Fractional exhaled nitric oxide; HCRU = Healthcare resource utilization; IgE = Immunoglobulin E; ISAR = International Severe Asthma Registry; OCS = Oral corticosteroids

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Patient flow and overall phenotypic characterization

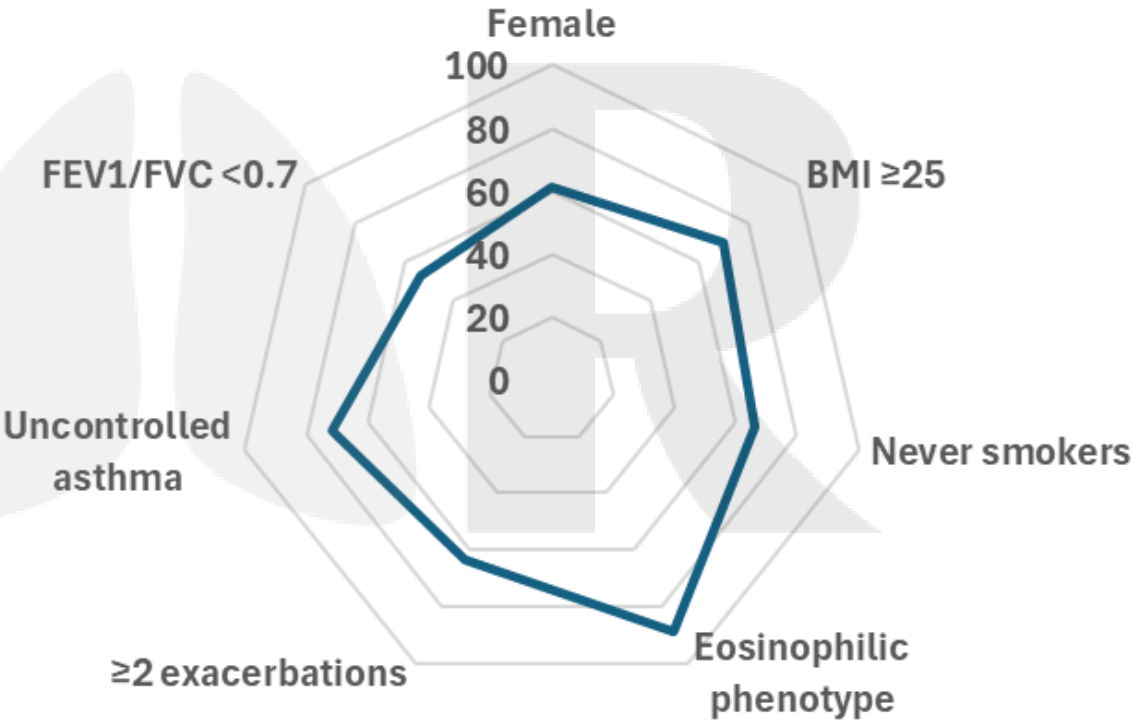
Patients with severe asthma (n=17,553)

Received biologics (n=9,014)

Exclusions (e.g., insufficient data on pre-biologic OCS use), n=4,709

Included in study (n=4,305)

- **No OCS** (n=215)
- **Intermittent OCS** (n=2,330) — ≤90 days in the last 12 months, usually short courses for exacerbations
- **LTOCS** (n=1,760) — >90 days in the last 12 months



BMI = Body mass index; FEV1 = Forced expiratory volume in 1 second; FVC = Forced vital capacity; HCRU = Healthcare resource utilization; ISAR = International Severe Asthma Registry; LTOCS = Long-term OCS; OCS = Oral corticosteroids

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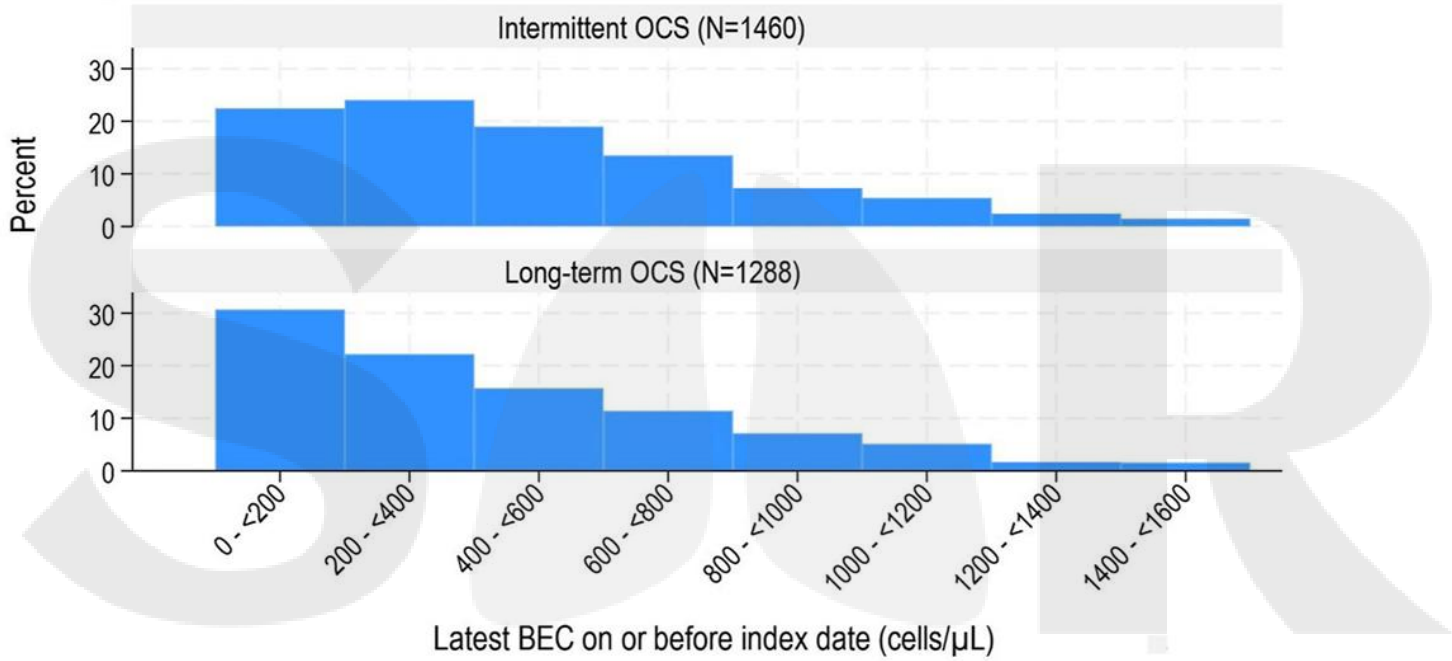
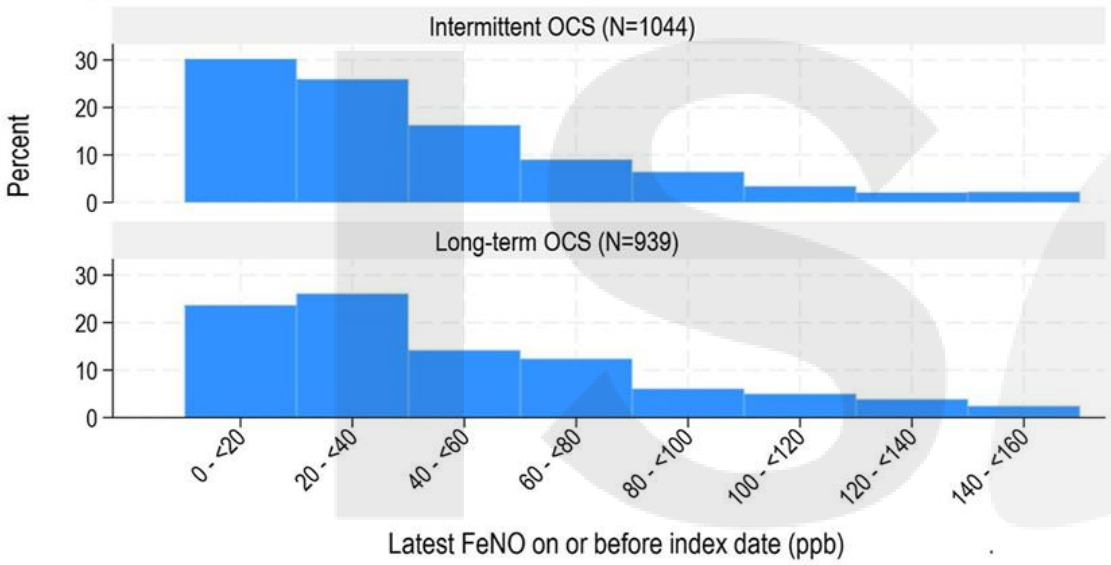
Pre-biologic BEC according to OCS use



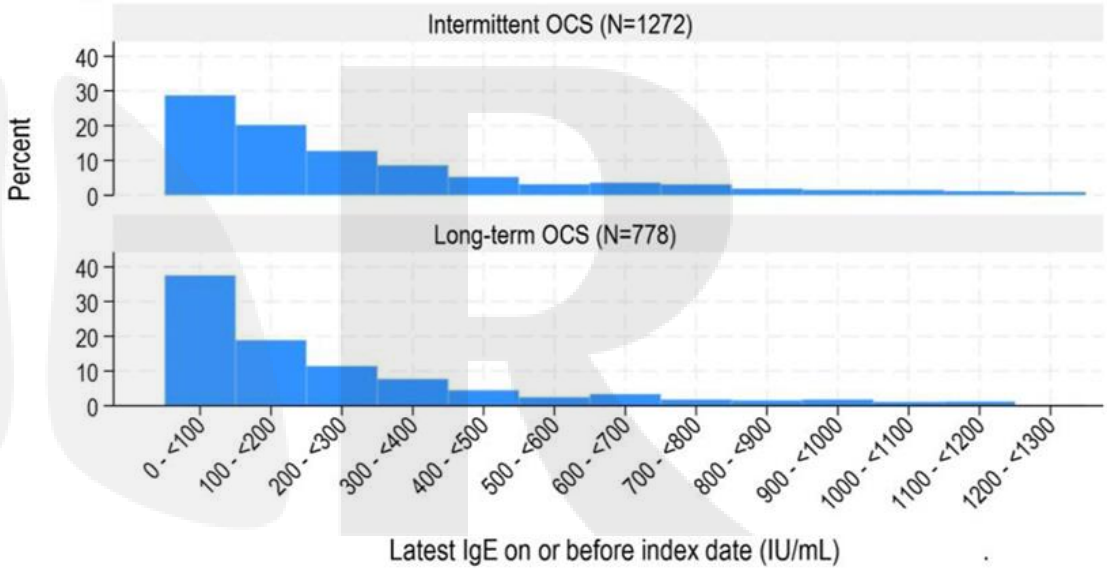
Median BEC was **lower** in the long-term OCS vs intermittent OCS group (**310** vs **400 cells/µL**; *p* <0.001).

Intermittent: OCS use for ≤90 days; Long-term: OCS use for >90 days
BEC = Blood eosinophil count; OCS = Oral corticosteroids
Schleich F et al. Biomarker profile and disease burden associated with intermittent and long-term oral corticosteroid use in patients with severe asthma prior to biologic initiation in real-life (STAR). *World Allergy Organ J* 2025;18:101066

Pre-biologic FeNO and IgE according to OCS use



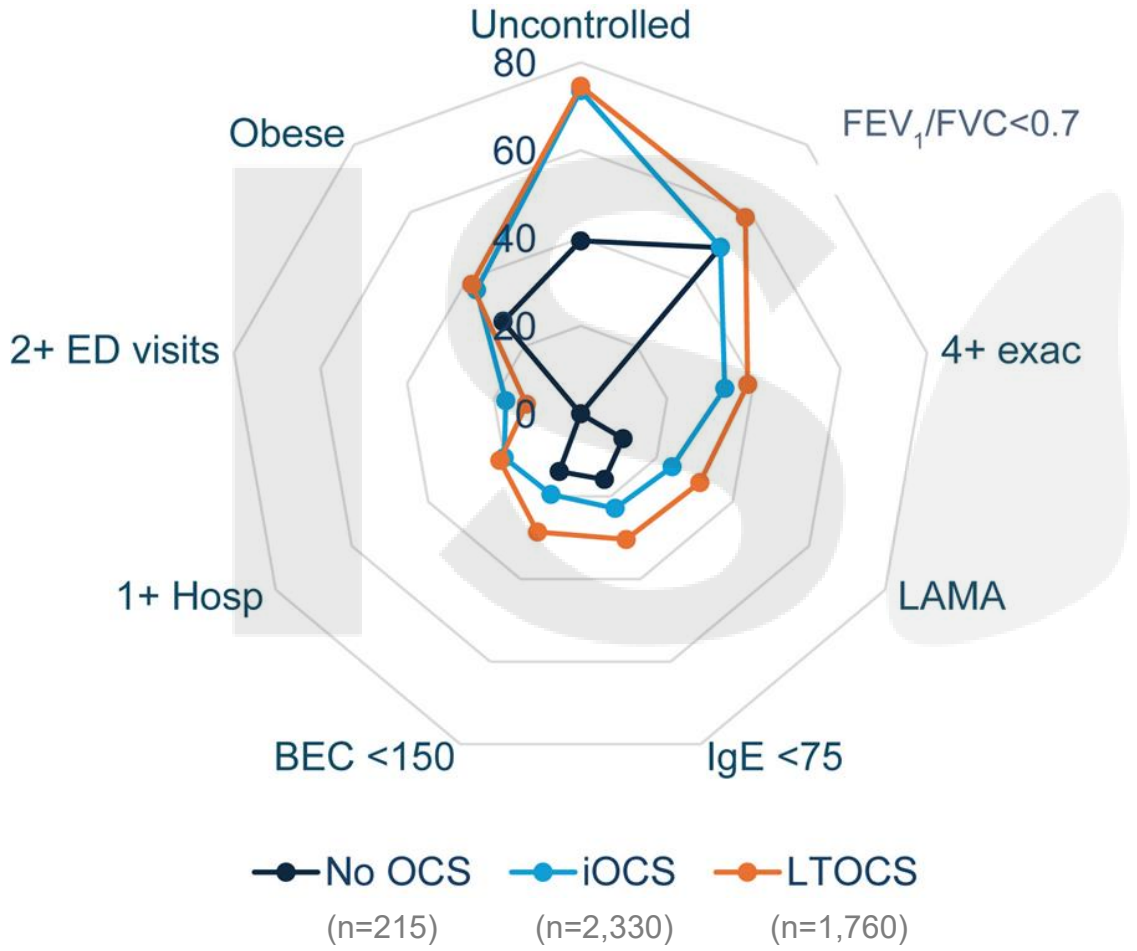
Median **FeNO** was significantly **higher** in long-term OCS vs intermittent OCS group (**40** vs **34 ppb**; *p* <0.001).



Median **IgE** was significantly **lower** in the long-term OCS vs intermittent OCS group (**154** vs **206 IU**; *p* <0.001).

Intermittent: OCS use for ≤90 days; Long-term: OCS use for >90 days
FeNO = Fractional exhaled nitric oxide; IgE = Immunoglobulin E; OCS = Oral corticosteroids
Schleich F et al. Biomarker profile and disease burden associated with intermittent and long-term oral corticosteroid use in patients with severe asthma prior to biologic initiation in real-life (STAR). *World Allergy Organ J* 2025;18:101066

Severe asthma phenotypes by pattern of OCS use

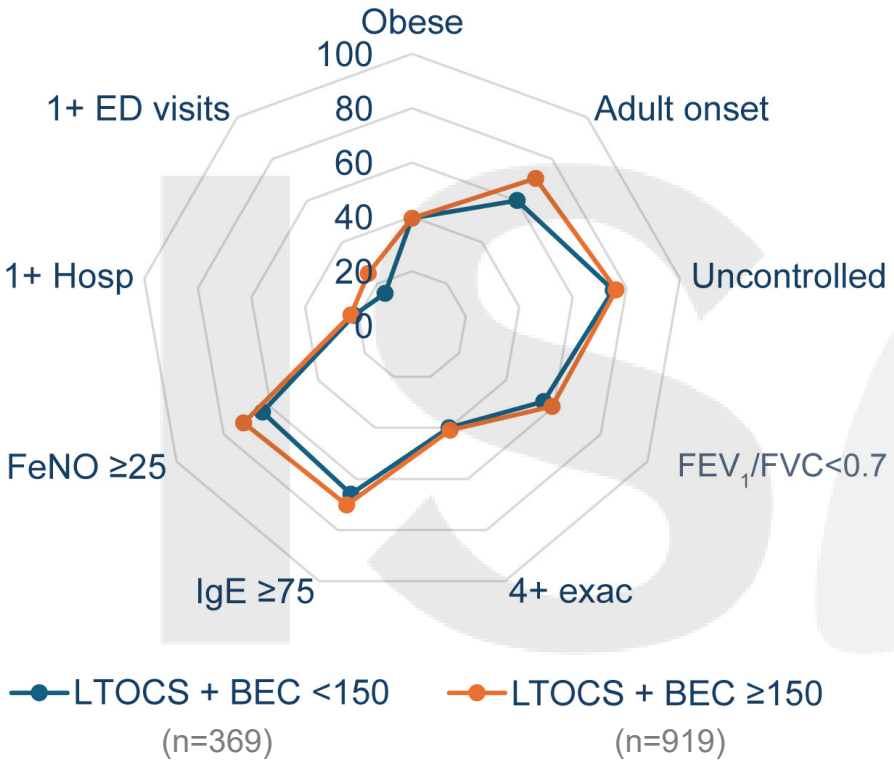


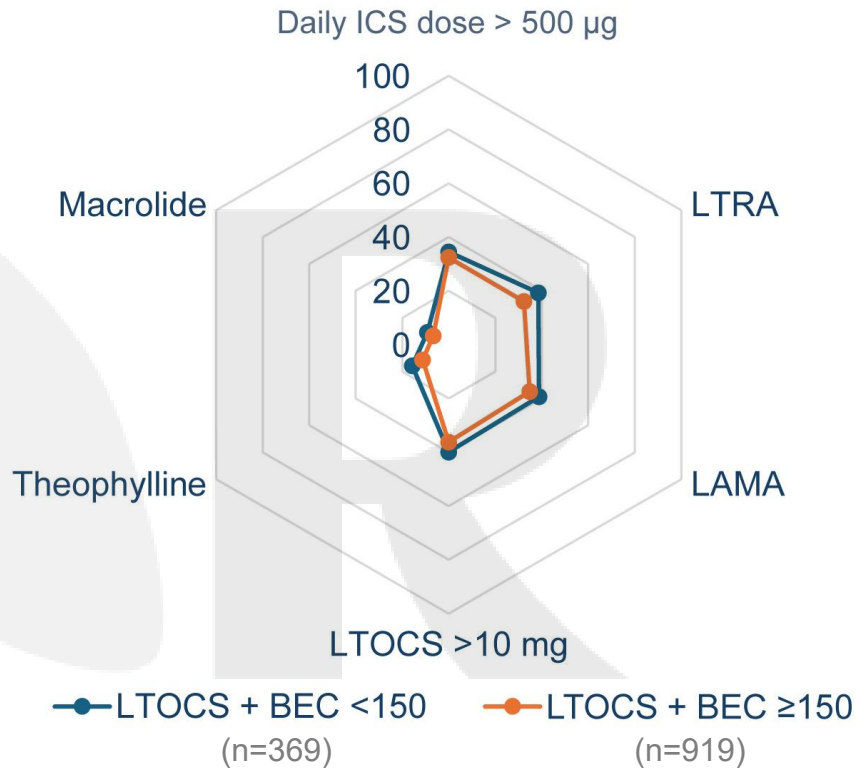
Intermittent and long-term OCS users were more likely than non-OCS users to have:

- BMI ≥30
- Uncontrolled asthma
- Impaired FEV_1
- ≥4 exacerbations
- Received LAMA add-on therapy
- Been hospitalized
- Visited the ED for asthma

iOCS = Intermittent OCS use (for ≤90 days); LTOCS = Long-term OCS use (for >90 days). Denominators for variables in the figure may vary depending on data availability.
BEC = Blood eosinophil count; ED Emergency department; FVC = Forced vital capacity; FEV_1 = Forced expiratory volume in 1 second; IgE = Immunoglobulin E; LAMA = Long-acting muscarinic antagonists; OCS = Oral corticosteroids
Schleich F et al. Biomarker profile and disease burden associated with intermittent and long-term oral corticosteroid use in patients with severe asthma prior to biologic initiation in real-life (STAR). *World Allergy Organ J* 2025;18:101066

Disease characteristics of LTOCS users by BEC





- The low BEC group had **younger asthma onset** (26.5 vs 29.9 yrs; p = 0.021) and **longer asthma duration** (26.0 vs 23.2 yrs; p = 0.036).
- **Disease burden remained high** among LTOCS users, irrespective of BEC.

Denominators for variables in the figures may vary depending on data availability.
BEC = Blood eosinophil count; ED: Emergency department; FeNO = Fractional exhaled nitric oxide; FEV1 = Forced expiratory volume in 1 second; FVC = Forced vital capacity; IgE = Immunoglobulin E; LTOCS = Long-term oral corticosteroids; LAMA = Long-acting muscarinic antagonists; LTRA = Leukotriene receptor antagonists

Schleich F et al. Biomarker profile and disease burden associated with intermittent and long-term oral corticosteroid use in patients with severe asthma prior to biologic initiation in real-life (STAR). *World Allergy Organ J* 2025;18:101066

Clinical implications for LTOCS users with low BEC

Biologic prescribing criteria worldwide (BACS[1])

BEC

- Mepolizumab: 64% of countries use BEC ≥300 cells/µL
- Benralizumab: 43% of countries use BEC ≥300 cells/µL
- Reslizumab: 67% of countries use BEC ≥400 cells/µL
- Dupilumab: 55% of countries use BEC ≥150 cells/µL

Background OCS use

- 0% (reslizumab) to 21% (omalizumab) of countries use LTOCS

Unmet need of LTOCS users with low BEC (STAR[2])

Disease burden:

- LTOCS users with low BEC were as likely as those with high BEC to have uncontrolled asthma, exacerbations and irreversible airflow obstruction

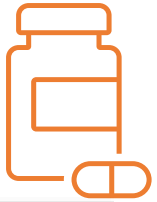
Clinical implications:

- Biologic access criteria should consider LTOCS users with low BEC (<150 cells/µL)

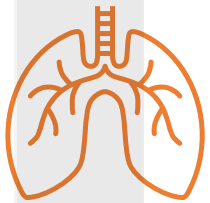
BACS = Biologic accessibility score; BEC = Blood eosinophil count; LTOCS = Long-term oral corticosteroids

[1]Porsbjerg C et al. Global Variability in Administrative Approval Prescription Criteria for Biologic Therapy in Severe Asthma. *JACI: In Practice* 2022;10(5):1202-1216. [2]Schleich F et al. Biomarker profile and disease burden associated with intermittent and long-term oral corticosteroid use in patients with severe asthma prior to biologic initiation in real-life (STAR). *World Allergy Organ J* 2025;18:101066

Conclusions



OCS (intermittent and long-term) affect BEC distribution.



Disease burden remained high among LTOCS users, irrespective of BEC.

OCS use should be considered when characterizing severe asthma.
Earlier phenotyping (prior to initiation of LTOCS) is recommended.

Biologic access criteria should consider LTOCS users with low BEC,
who have high disease burden but do not qualify for most biologics.

BEC = Blood eosinophil count; LTOCS = Long-term oral corticosteroids; OCS = Oral corticosteroids

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