

Comparison of Real-world Safety and Effectiveness of Mepolizumab and Benralizumab in the Management of Severe Asthma: a Systematic Review

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Background

- Asthma is a serious global health problem, characterized by airway inflammation, and associated with progressive decline in lung function, poor quality of life (QoL), and increased healthcare costs¹
- Severe asthma is defined by GINA as asthma that remains uncontrolled despite adherence with maximal optimized high-dose ICS-LABA (inhaled corticosteroids - long-acting beta agonist) treatment and management of contributory factors, or that worsens when high dose treatment is decreased²
- Severe asthma qualifies for targeted treatment against biological mediators of asthma such as IgE (omalizumab), IL-4/ IL-3 (dupilumab), IL-5 (mepolizumab, benralizumab), or other processes such as TSLP (thymic stromal lymphopoietin: tezepelumab)^{2,3}
- The two monoclonal antibodies that target IL-5, mepolizumab and benralizumab, have proven efficacy and safety in the management of severe asthma wherein multiple randomized controlled trials (RCTs) have demonstrated a considerable improvement in lung function, reducing exacerbations, and reducing eosinophil count³⁻⁵
- While direct head-to-head clinical trials are not reported between these two drugs, a 2022 network meta-analysis of RCTs concluded that mepolizumab and benralizumab have similar efficacy and safety⁶
- We were interested to examine if these two drugs have similar efficacy and safety profile when used to manage patients with severe asthma in real-world settings as well

Objective

- To compare the clinical and humanistic outcomes associated with mepolizumab and benralizumab in the management of severe asthma in real-world settings

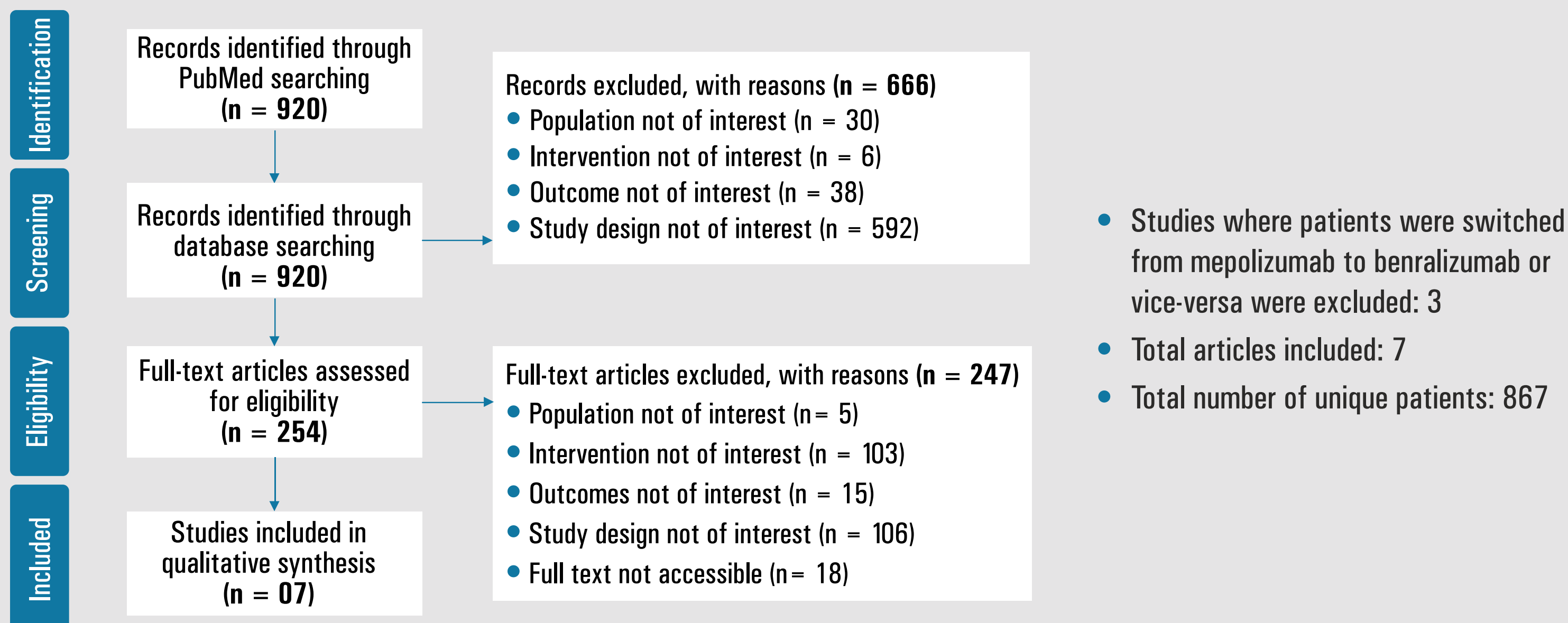
Methodology

Eligibility Criteria

Facet	Inclusion
Population	Patients with severe asthma
Intervention, comparators	Studies comparing mepolizumab and benralizumab
Outcomes	Clinical: Efficacy Outcomes <ul style="list-style-type: none"> Rate of asthma exacerbations FEV 1 Time to first asthma exacerbation FeNO FVC PEF
	Clinical: Safety Outcomes <ul style="list-style-type: none"> Mortality (all cause and treatment - related) Treatment-related adverse events (all degrees) Safety related treatment discontinuations/ withdrawals
Outcomes	Humanistic Outcomes <ul style="list-style-type: none"> AQLQ Sickness Impact Profile AQL-5D EQ-5D SF-6D HUI - 3 ACQ SGRQ
	Study design <ul style="list-style-type: none"> Observational, RWE studies; we excluded RCTs and non-primary studies (such as reviews, editorials, case reports, etc)

FEV1: forced expiratory volume in 1 second; FeNO: fractional exhaled nitric oxide; FVC: forced vital capacity; PEF: peak expiratory flow; AQLQ: asthma quality of life questionnaire; AQL-5D: asthma quality of life utility index-5 dimensions; EQ-5D: EuroQol- 5 dimension; SF-6D: short-form six-dimension; HUI-3: health utilities index; ACQ: asthma control questionnaire; SGRQ: 8-question St Georges respiratory questionnaire; RWE: real-world evidence; RCTs: randomized controlled trials

Results

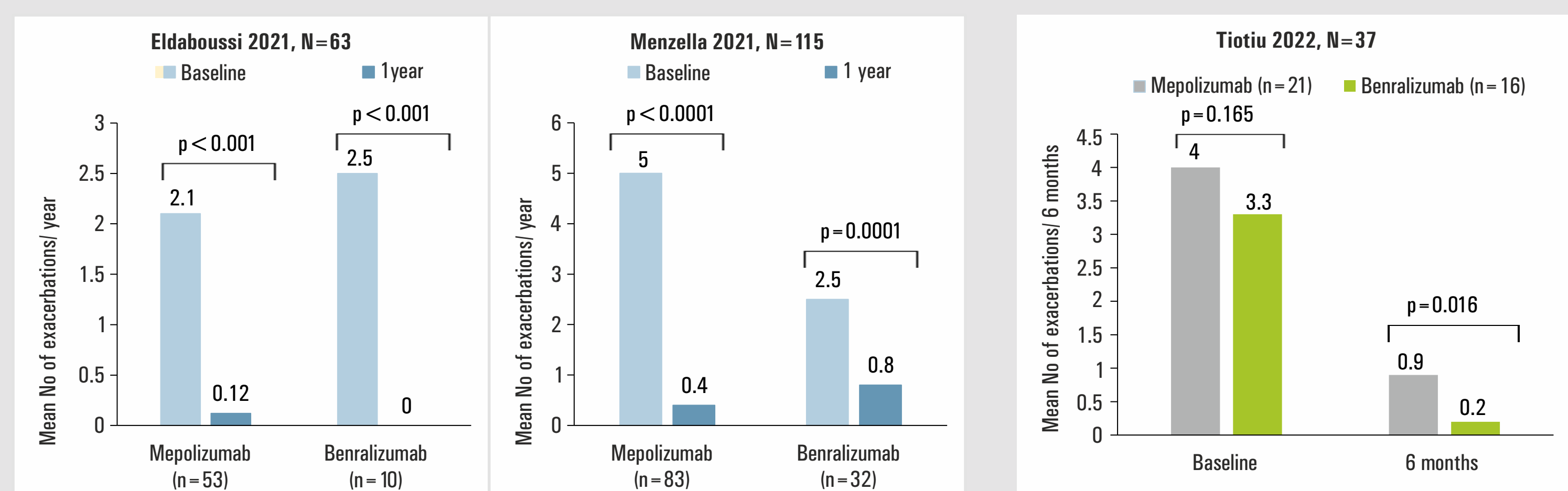


Key features of included studies

No	Study Name	Study design	Study setting	Data source	Sample size	Mean (SD) Age: mepolizumab	Mean (SD) Age: benralizumab	Male, N (%)	Female, N (%)	Patient profile	Mepolizumab (SD) dosage details	Benralizumab (SD) dosage details	Outcomes evaluated
1	Tiotiu 2022	Retrospective observational	Multi-center	Hospital data	72	53 (11)	56 (11)	42	30	Patients with severe allergic asthma with nasal polyps	NR	NR	E
2	Kimura 2021	Retrospective observational	NR	Insurance claims	355	53.1 (13.4)	51.4 (11.1)	158	197	Patients with asthma receiving at least 1 asthma biologic	300 mg Q4W	1 st 3 injections: 30 mg Q4W / 1b 30 mg Q8W*	E
3	Bergantini 2020	Prospective observational	Single-center	Survey data	28	56.3 (11.8)	50.5 (16.1)	17	11	Patients with severe eosinophilic asthma	100 mg Q4W*	100 mg Q8W	E
4	Voelker 2020	Retrospective observational	Single-center	EHRs	63	NR	NR	26	37	Patients with severe, refractory asthma	100 mg Q4W*	NR	E, S
5	AlShareef 2022	Retrospective observational	Single-center	Hospital data	53	53.8 (17.6)	46 (13.9)	26	27	Patients with severe asthma	NR	NR	E, PRO
6	Eldaboussi 2021	Retrospective observational	Multi-center	Hospital data	97	47.1 (14.4)	48.2 (15.3)	30	67	Adult patients with severe eosinophilic asthma	100 mg Q4W*	1 st 3 injections: 30 MG Q4W / 1b 30 mg Q8W*	E, S
7	Menzella 2021	Retrospective observational	Multi-center	Hospital data	199	57.2 (12.1)	57.1(12.5)	79	120	Patients with severe, refractory asthma	NR	NR	E, S, PRO

Note: * Dosage as recommended by the USFDA. SD: Subcutaneous; E: Efficacy; S: Safety; PRO: Patient-reported outcomes; EHRs: Electronic health records; Q4W: once every 4 weeks; Q8W: once every 8 weeks

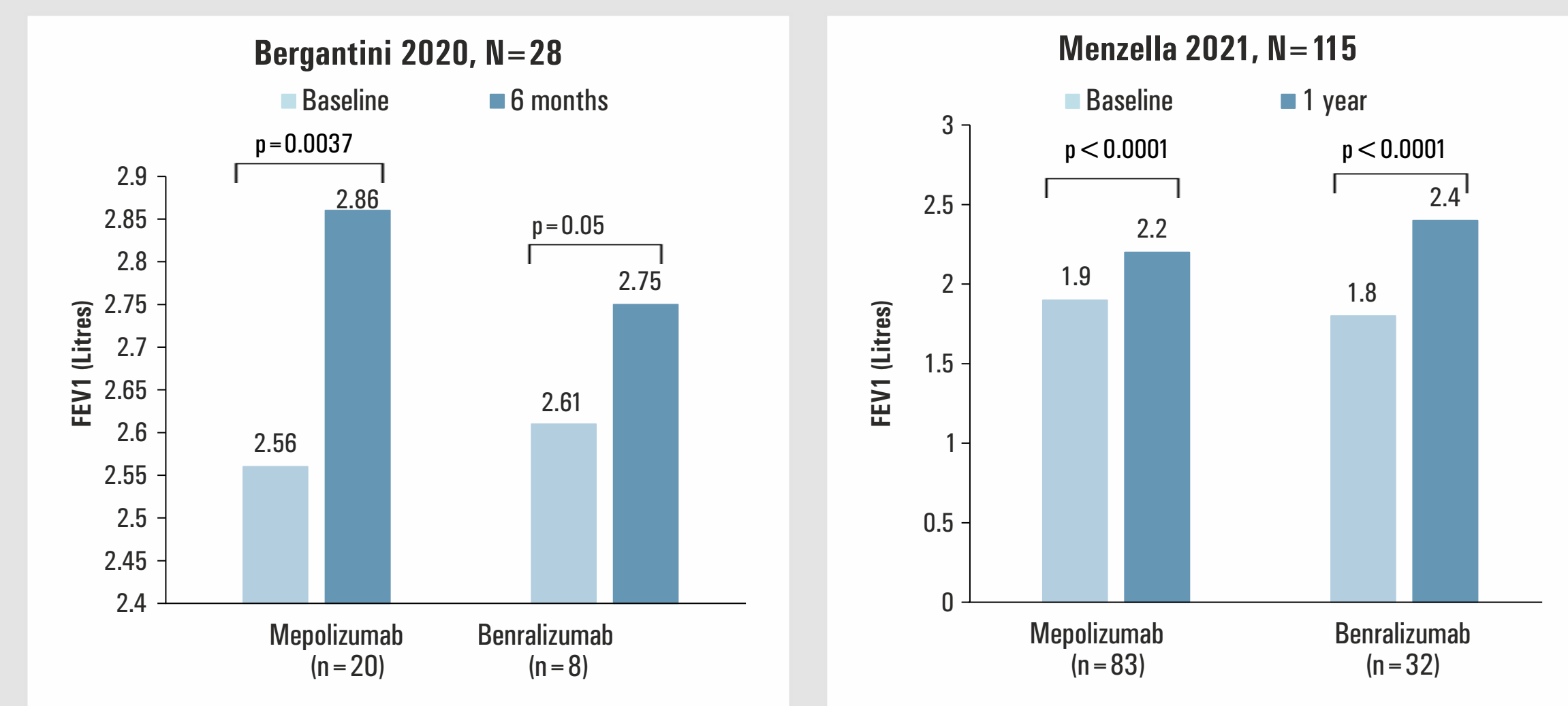
Asthma exacerbations (3 studies)



Eldaboussi 2021 and Menzella 2021 reported significant reductions in asthma exacerbations with both the drugs after 1 year of treatment

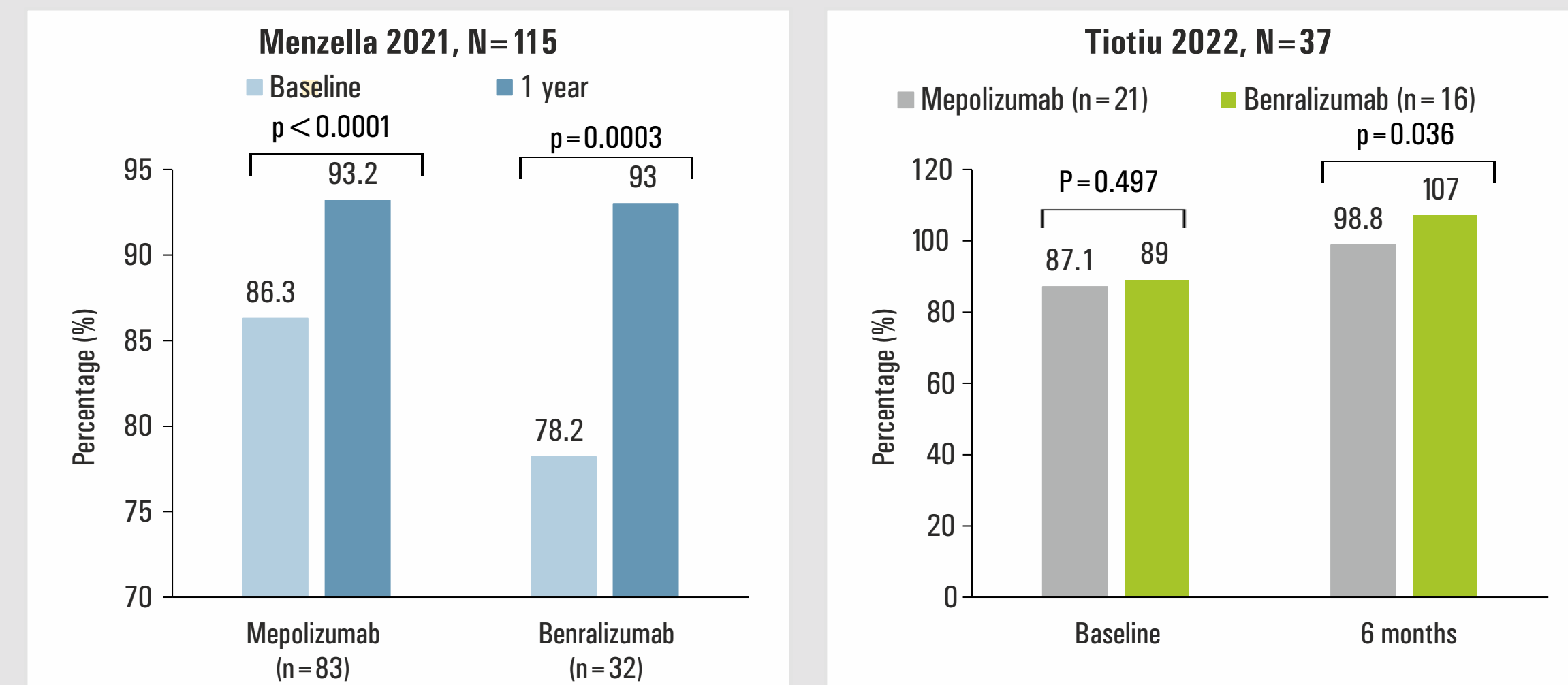
Tiotiu 2022 reported significantly greater reductions in the number of asthma exacerbations after 6 months of treatment with benralizumab

FEV1 (2 studies)



Bergantini 2020 and Menzella 2021 reported significant improvements in FEV1 with both the drugs after 6 months and 1 year of treatment respectively

FVC (2 studies)



Menzella 2021 reported significant improvements in FVC with both drugs after 1 year of treatment

Tiotiu 2022 reported significant greater improvement in FVC at 6 months with benralizumab vs mepolizumab

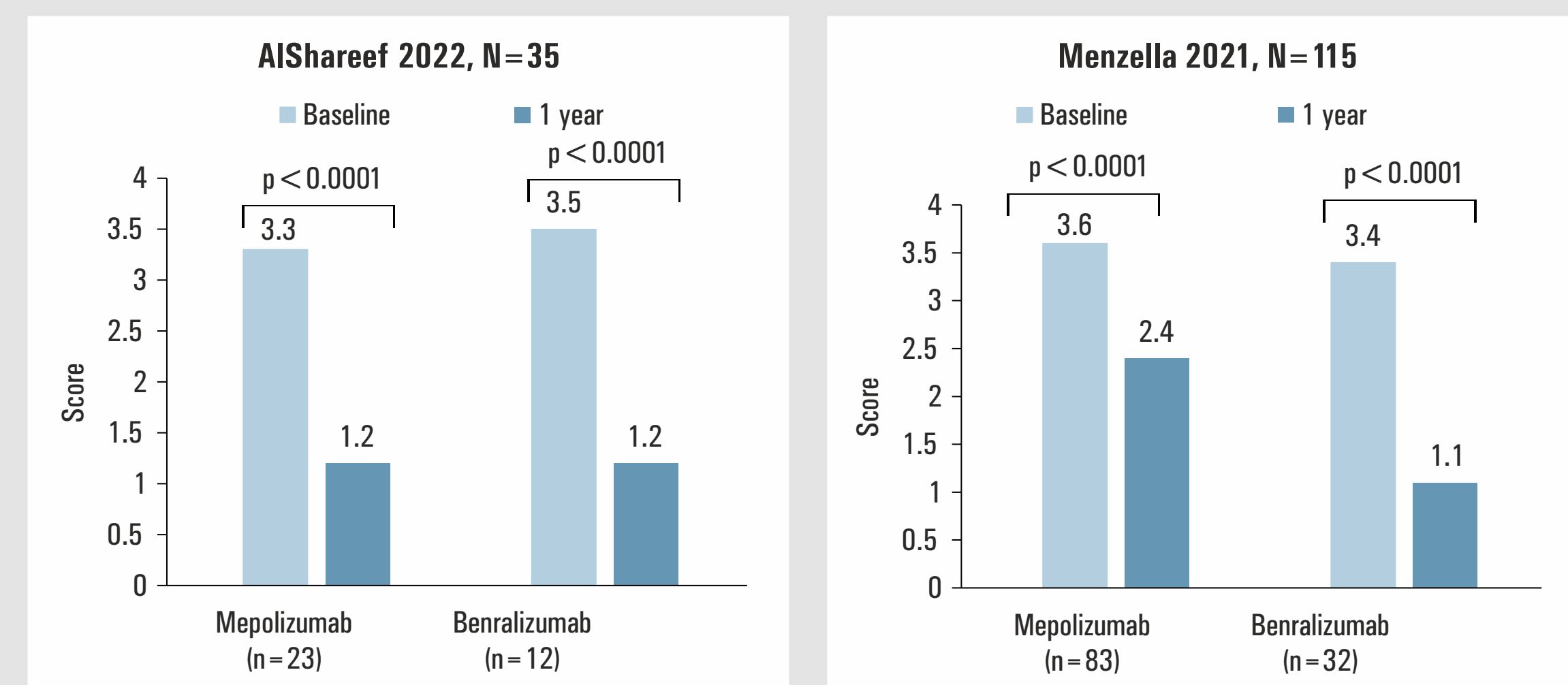
FEV1/FVC ratio (1 study)

- Tiotiu 2022 reported an improvement in FEV1/FVC with both mepolizumab and benralizumab after 6 months of treatment; the difference was not statistically significant (3.1% vs 6.5%; p=0.17)

Safety (3 studies)

- Two studies (Eldaboussi 2021, Menzella 2021) did not report any new safety concerns/adverse events
- Voelker 2020 reported safety-related treatment discontinuation of mepolizumab in one patient

ACQ Score (2 studies; lower score indicates better asthma control)



AlShareef 2022 and Menzella 2021 reported significant improvements in asthma control through reductions in ACQ score with both the drugs after 1 year of treatment

AQLQ Score (1 study; higher score indicates better QoL)

- Menzella 2021 reported increase in AQLQ score with both drugs after one year of treatment. Greater QoL improvement was noted with benralizumab, but statistical significance was not reported

Discussion

- This systematic review captures real-world data from observational studies evaluating comparative effectiveness and safety of mepolizumab and benralizumab in patients with severe asthma
- Among real-world studies included in this review, all seven studies evaluated effectiveness outcomes, three studies evaluated safety outcomes and two studies evaluated humanistic outcomes
- Both mepolizumab and benralizumab improved lung function (as noted with increases in FEV1, FVC, FEV1/FVC), and reduced asthma exacerbations and eosinophil counts; both the MABs improved QoL as measured by an increase in AQLQ scores, and a significant decrease in the ACQ score
- In line with the results of a 2022 network meta-analysis of RCTs, our systematic review found minimal differences between mepolizumab and benralizumab in terms of effect on asthma exacerbations, FEV1, FVC, FEV1/FVC, ACQ score and AQLQ score in the real world setting⁶
- We observed a lack of uniformity in the metrics used to assess real-world effectiveness in the included studies

Limitations

- Search was limited to PubMed; databases like Embase were not included
- Only English language publications were searched

Conclusion

- In real-world settings, both mepolizumab and benralizumab are safe and effective in the management of severe asthma
- We found minimal differences between mepolizumab and benralizumab in terms of effect on asthma exacerbations, FEV1, FVC, FEV1/FVC, ACQ score and AQLQ score

References

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