Cost-Effectiveness Analysis of Dupilumab, Mepolizumab and Benralizumab for Severe Eosinophilic Asthma With Blood Eosinophil Count ≥300 cells/µL in the Brazilian Private Healthcare Perspective

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INTRODUCTION

- In Brazil, three immunobiologicals are available for the treatment of severe eosinophilic asthma: dupilumab, mepolizumab and benralizumab.
- Although drug cost of biologics are different, there might be some differences in the magnitude of effect for preventing asthma exacerbations, highlighting the need of a cost-effectiveness analysis to compare these treatment options.

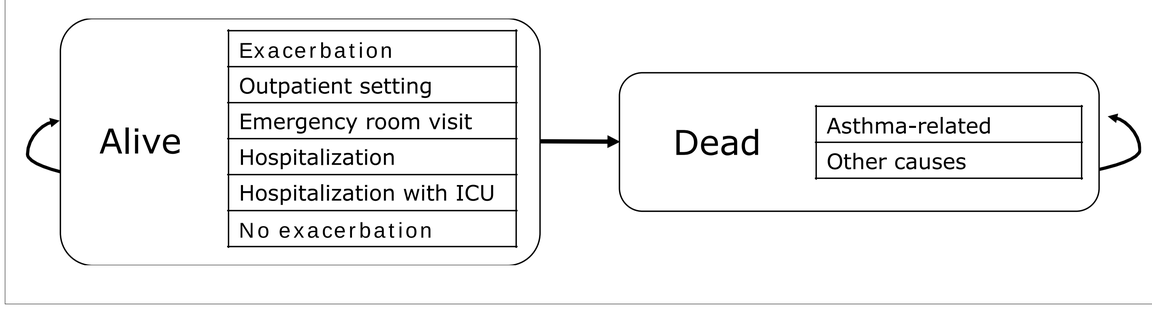
OBJECTIVE

- **Compare the cost-utility of dupilumab, mepolizumab and benralizumab for the treatment of patients with severe eosinophilic asthma using ICS-LABA with baseline blood eosinophil count ≥ 300 cells/µL and ≥ 3 episodes of asthma exacerbation, or systemic corticosteroid-maintenance, in the previous year, in the Brazilian private healthcare perspective.**

METHODS

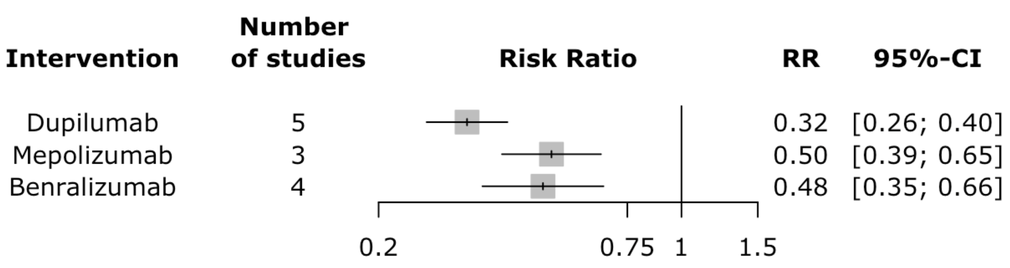
- Lifetime horizon Markov model (4 weeks cycles) was used to conduct cost-utility analysis (Figure 1).

Figure 1: Markov states.



- Demographic and clinical data were obtained from ProAr Brazilian cohort of asthma patients (mean age: 51.6 years; female: 81.6%; exacerbation rate: 5.5/year).[1]
- Baseline utility was 0.74, with disutility of -0.018 for moderate exacerbation (no hospitalization) and -0.027 for severe exacerbation (with hospitalization).[2,3]
- We conducted three independent systematic reviews to assess the effectiveness of each intervention compared to standard of care (SOC) for the population of interest (Figure 2).

Figure 2: Reduction of asthma exacerbation.



Random-effects metanalysis with inverse variance method and DerSimonian-Laird estimator for tau^2.
RR: risk ratio; 95%-CI: 95% confidence interval.

- Considering the Brazilian private healthcare perspective, the following costs were used: treatment (including immunobiologicals and drug administration), costs related to the disease (i.e., clinical visits) and complication management (i.e., hospitalization).
- Reference costs were from 31st August 2021, with USD 1.00 equivalent to BRL 5.1427.
  - Cost of immunobiologicals (*Câmara de Regulação do Mercado de Medicamentos* – CMED, PF 18%) – Dupilumab (2x200mg or 2x300mg): USD 1,565; Mepolizumab – USD 1,489 (1x100mg, considering market share of 25% syringe and 75% pen); Benralizumab – USD 2,490 (1x30mg).
- Five percent yearly discount rate was applied for costs and effectiveness, as recommended.[4] Uncertainties were assessed with probabilistic sensitivity analysis (PSA).

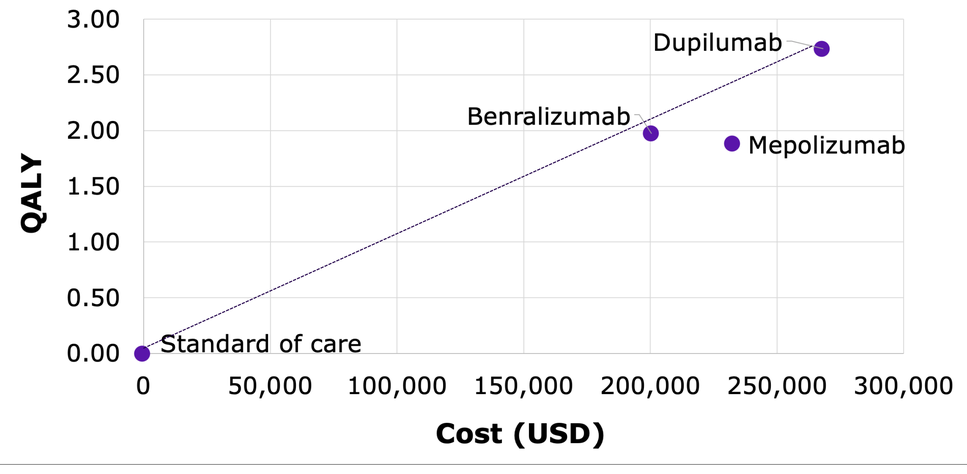
RESULTS

- Total costs and QALY: USD 5,410 and 6.34 with SOC; USD 205,955 and 8.31 with benralizumab; USD 238,254 and 8.22 with mepolizumab; and USD 273,594 and 9.07 with dupilumab.
- Incremental cost-utility ratio (ICUR) for base case and PSA (median (95% credible intervals [95%CrI]) are presented in Figure 3 and Table 1.

Table 1: Results of base case and PSA.

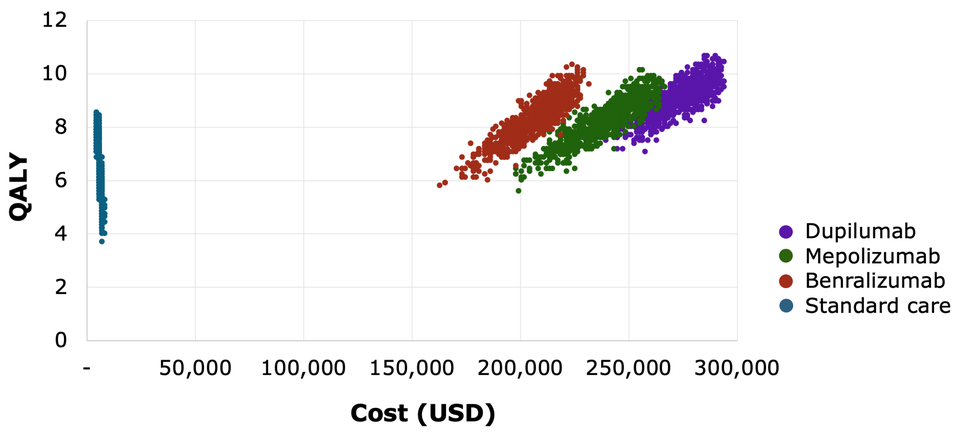
Comparison	Base case - ICUR	PSA – ICUR (95% CrI)
Mepolizumab vs. SOC	USD 123,687/QALY	USD 129,595/QALY (80.308 – 223,818)
Benralizumab vs. SOC	USD 101,698/QALY	USD 107,193/QALY (65,163 – 191,159)
Dupilumab vs. SOC	USD 98,040/QALY	USD 101,592/QALY (68,395 – 156,646)
Benralizumab vs. Mepolizumab	USD -361,088/QALY (strong dominance)	USD -29,929/QALY (-934,247 – 1,406,785)
Dupilumab vs. Mepolizumab	USD 41,433/QALY (extended dominance)	USD 42,969/QALY (29,948 – 119,609)
Dupilumab vs. Benralizumab	USD 88,592/QALY (extended dominance)	USD 93,419/QALY (43,964 – 443,120)

Figure 3: Results of base case.



- Dupilumab presented extended dominance over mepolizumab in 98% and over benralizumab in 59% simulations of PSA (Figure 4).

Figure 4: Results of probabilistic sensitivity analysis.



DISCUSSION

- Supported by these analyses, in June 2022, the Brazilian National Regulatory Agency for Private Health Insurance and Plans (ANS) included dupilumab in the list of drugs covered by health insurance plans.

CONCLUSIONS

- **Dupilumab is cost-effective when compared to benralizumab and mepolizumab, presenting extended dominance over these two immunobiologicals.**

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DISCLOSURES **Taminato A, Barbosa A, Magro FJB, Federico P, Prioli RNT, Goldflus S** — Sanofi employees. **Migliavaca CB, Falavigna M** — Received honoraria from Sanofi for study conduction.

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