

CONCLUSION

This review highlights the predominance of mixed model structures, particularly Markov-decision tree analyses, in evaluating the economic implications of biologics and surgical interventions for chronic rhinosinusitis with nasal polyps; however, further comprehensive studies are needed to validate these findings

INTRODUCTION

- Chronic rhinosinusitis with nasal polyps (CRSwNP) is a prevalent inflammatory disease affecting the sinuses and nasal cavity<sup>1</sup>
- Symptoms of the disease include obstruction of the nasal passage, decreased sense of smell, nasal discharge, and disturbed sleep<sup>2</sup>
- CRSwNP is often accompanied by other diseases of the respiratory tract such as asthma and bronchiectasis<sup>3</sup>
- The disease, although easy to diagnose, is characterized by several unmet needs such as poor knowledge of the disease etiology and its association with several asthma types<sup>3</sup>
- Due to the limited treatment options and high rate of recurrence, CRSwNP imposes a significant economic burden on patients' lives<sup>3</sup>
- Economic evaluations (EE) and health technology assessments (HTAs) are crucial in informing healthcare decisions

OBJECTIVE

- To gain an understanding of the economic model structures utilized globally in the published EE of adult patients with CRSwNP through the conduct of a systematic literature review (SLR)

METHODS

- This review followed the standard methodology for conducting an SLR as per guidelines provided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)<sup>4</sup>
- Key biomedical databases (Embase<sup>®</sup> and PubMed<sup>®</sup>) and global HTAs were searched from database inception to December 2024 to identify all published relevant EEs conducted in CRSwNP.
- Figure 1** presents the pre-specified eligibility criteria for this SLR
- Each publication was reviewed by two independent reviewers with conflicts resolved by a third reviewer

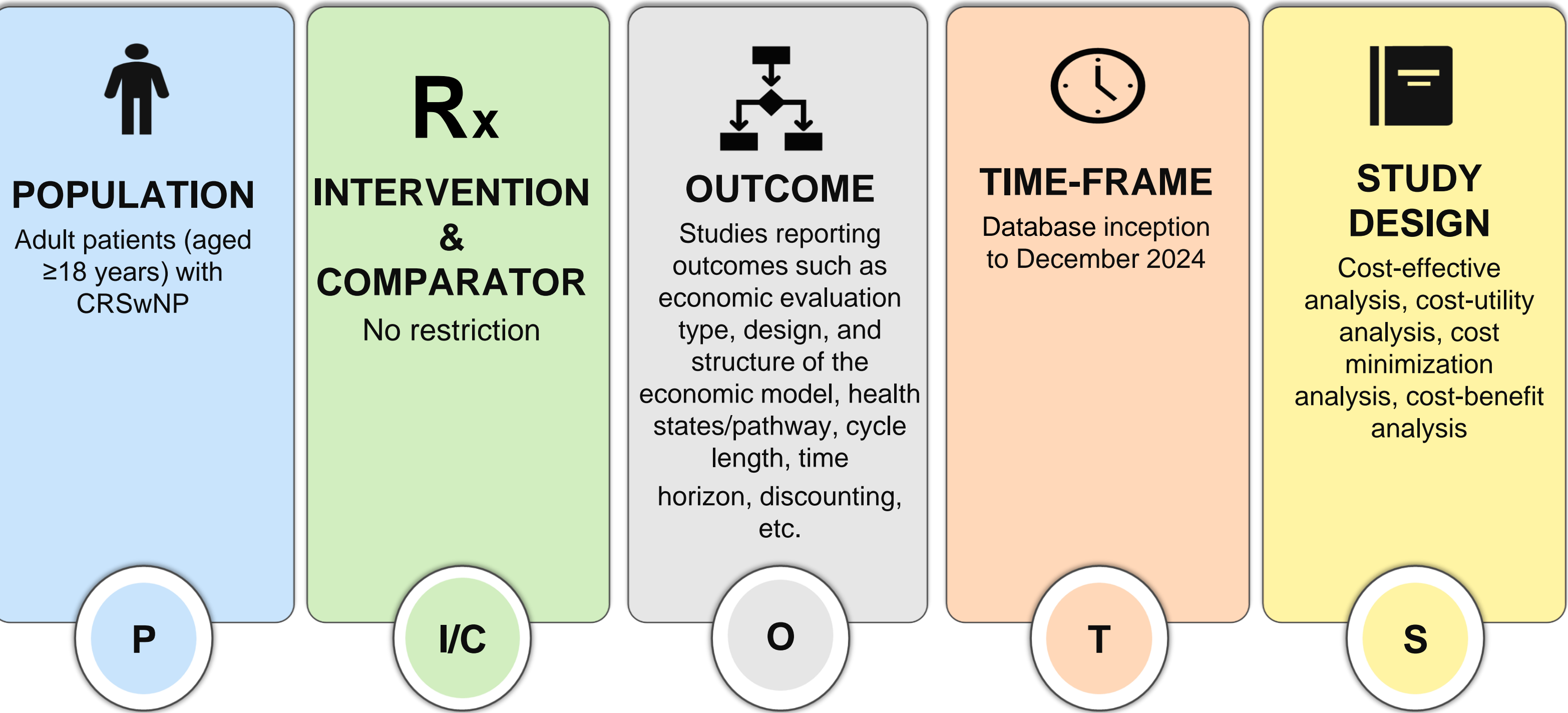
RESULTS

- Of 356 citations screened, a total of 13 studies met the inclusion criteria
- Figure 2 and Figure 3** present the flow of studies and characteristics of the included EEs, respectively
- The studies evaluated biologics (i.e., dupilumab, n=5; omalizumab, n=1; mepolizumab, n=1) and surgical interventions such as elective sinus surgery (ESS, n=2), ESS + endoscopic frontal sinusotomy (n=1), and endoscopic polypectomy in clinic (n=2) from the perspective of third-party payers in the United States (n=7), Canada (n=4), Colombia (n=1), and Italy (n=1)
- Three studies each utilized a 10-year, 36-year, and lifetime horizon, whereas one study each had a 5-year, 30-year, and 35-year horizon. The time horizon was not reported in one study
- Cycle lengths varied between 6 to 24 months, with the majority of the EEs utilizing a 1-year cycle length

References

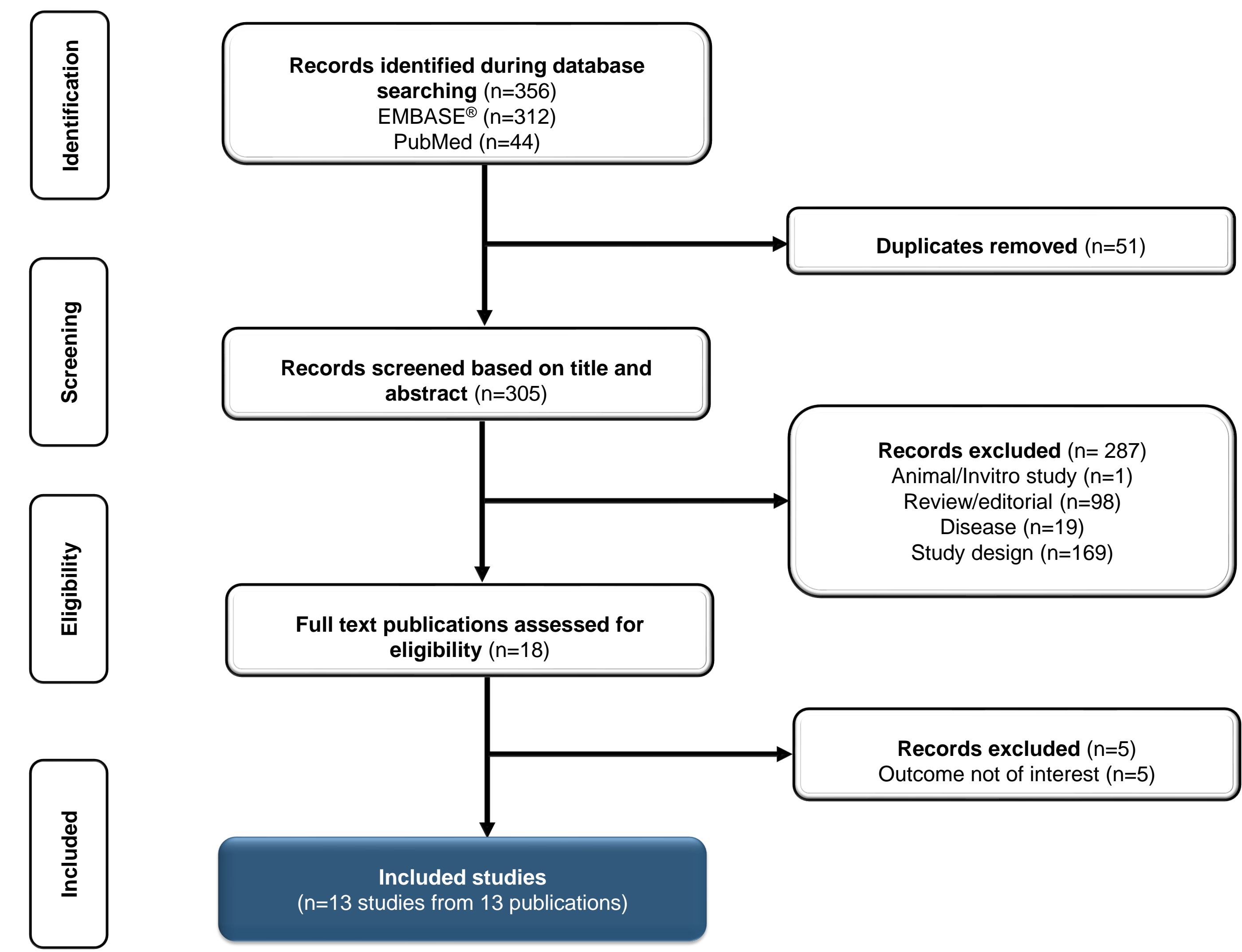
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5. Scangas GA et al., *Int Forum Allergy Rhinol.*, 7(11)

Figure 1: Pre-defined PICOS eligibility criteria



CRSwNP: Chronic Rhinosinusitis with Nasal Polyps

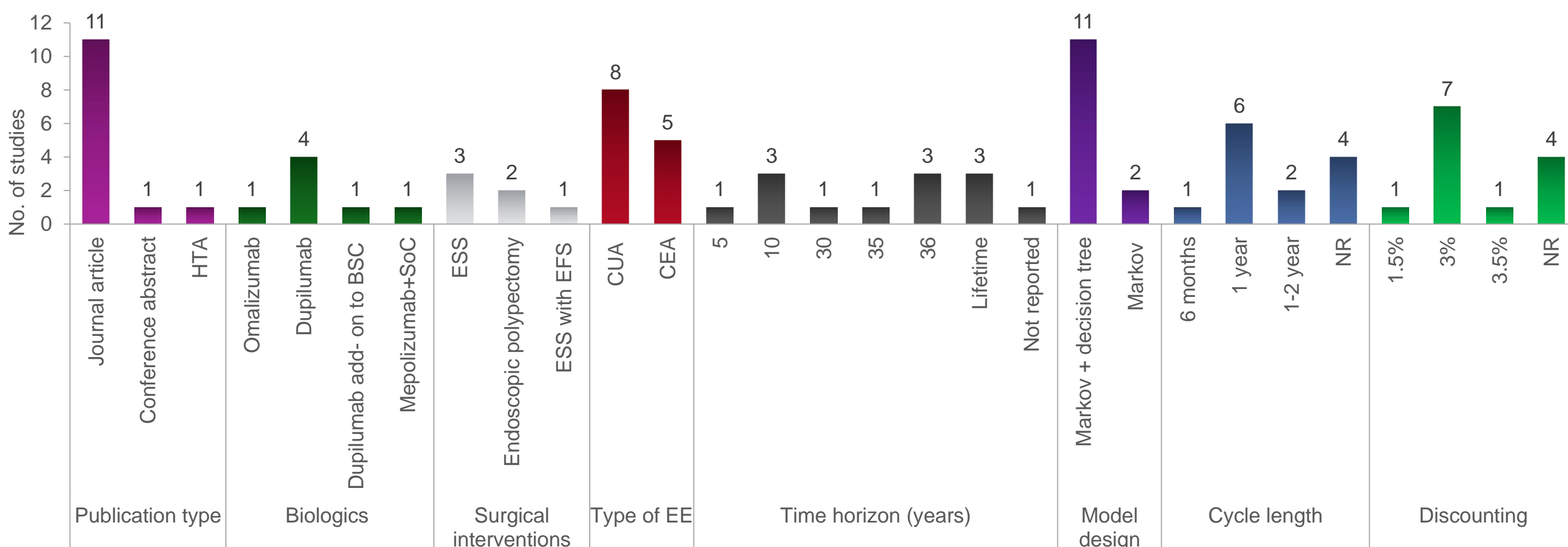
Figure 2: Flow of studies in the SLR



- A discount rate of 3.0% was applied to the costs and outcomes in the majority of studies (seven of 13), whereas one study each reported a discount of 1.5% and 3.5%. Information regarding discounting was not reported in four studies
- The majority of the EEs used a mixed-model approach, such as Markov-decision tree analysis (11 of 13), followed by Markov model (n=2) to determine the cost-effectiveness of different treatment strategies

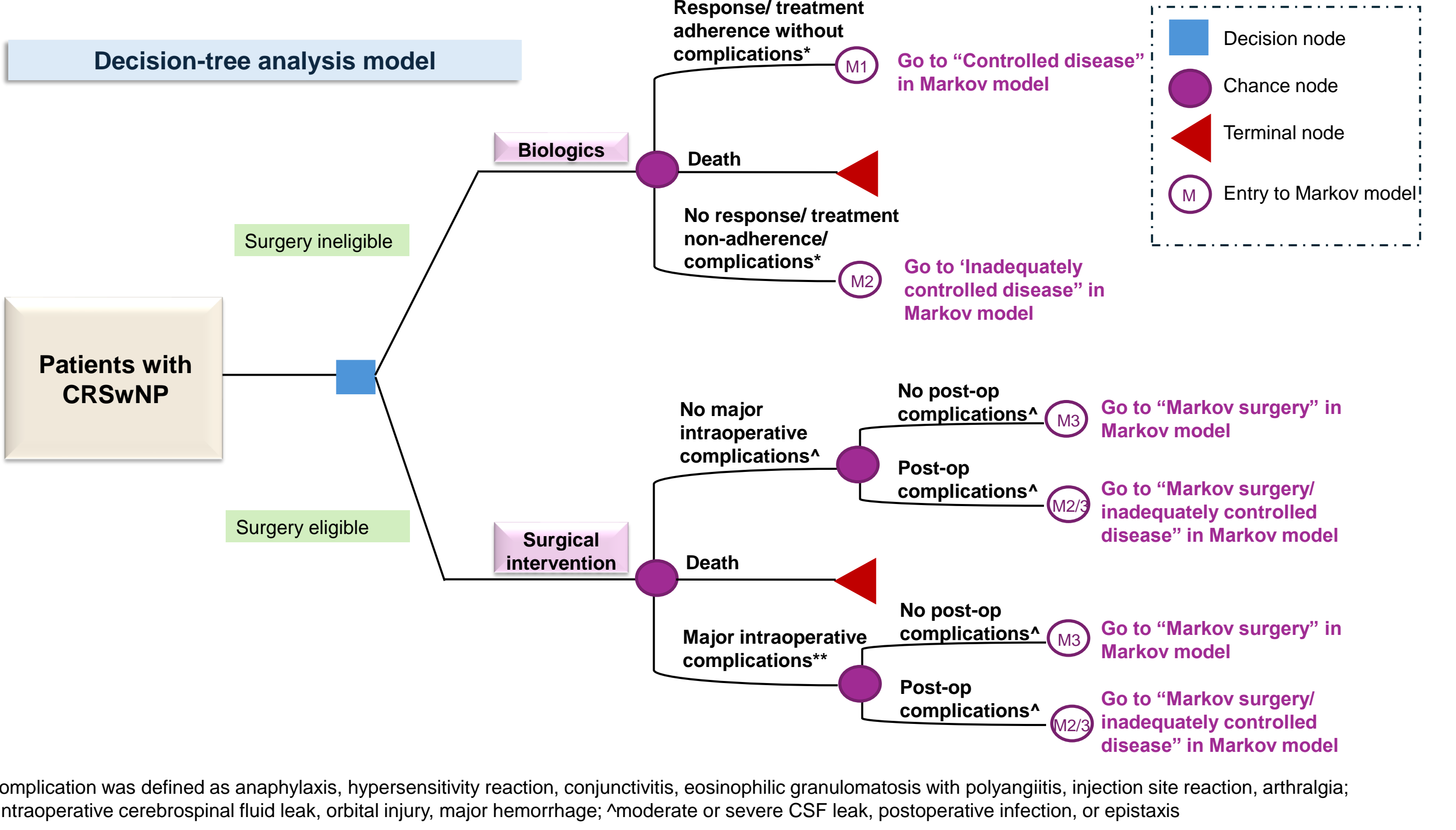
- In the mixed-model approach, each cohort moves through the branches of the decision-tree model, followed by entry into the Markov model at the terminal node of each branch.<sup>5</sup> The structure of the model is depicted in **Figure 4**
- The health states reported in the Markov model included “controlled disease”, “inadequately controlled disease”, “surgery,” “post-operative complications”, and “death”. Further, in the decision-tree analysis model, the health states reported were “responders”, “non-responders”, “no intra-/post-operative complications”, “intra-/post-operative complications,” and “death.”

Figure 3: Characteristics of the included economic evaluations



BSC: Basic Supportive Care; CEA: Cost-effectiveness Analysis; CUA: Cost-utility Analysis; EFS: Endoscopic Frontal Sinusotomy; ESS: Elective Sinus Surgery; NR: Not Reported; SoC: Standard of Care

Figure 4: Combined hypothetical model structure for Markov decision-tree analysis model from included publications



\*complication was defined as anaphylaxis, hypersensitivity reaction, conjunctivitis, eosinophilic granulomatosis with polyangiitis, injection site reaction, arthralgia; \*\*intraoperative cerebrospinal fluid leak, orbital injury, major hemorrhage; \*moderate or severe CSF leak, postoperative infection, or epistaxis

Sponsorship

This research is conducted solely by the authors without any collaboration from other institutes or pharmaceutical/biotech companies

Disclosures

PR, SA, RA, BS and GK, the authors, declare that they have no conflict of interest