

CONCLUSION

- Overall, omalizumab and elective sinus surgery emerged as cost-effective treatments for chronic rhinosinusitis with nasal polyps
- Mepolizumab combined with standard care was not cost-effective in Canada. Further comprehensive analyses are required to confirm these results

INTRODUCTION

- Chronic rhinosinusitis with nasal polyps (CRSwNP) is a prevalent inflammatory disease affecting the sinuses and nasal cavity¹
- Symptoms of the disease include obstruction of the nasal passage, decreased sense of smell, nasal discharge, and disturbed sleep²
- CRSwNP is often accompanied by other diseases of the respiratory tract such as asthma and bronchiectasis³
- 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 types³
- Due to the limited treatment options and high rate of recurrence, CRSwNP imposes a significant economic burden on patients' lives³
- Economic evaluations (EE) and health technology assessments (HTAs) are crucial in informing healthcare decisions

OBJECTIVE

- A systematic literature review (SLR) was conducted to identify studies evaluating the cost-effectiveness of healthcare interventions in adult patients with CRSwNP

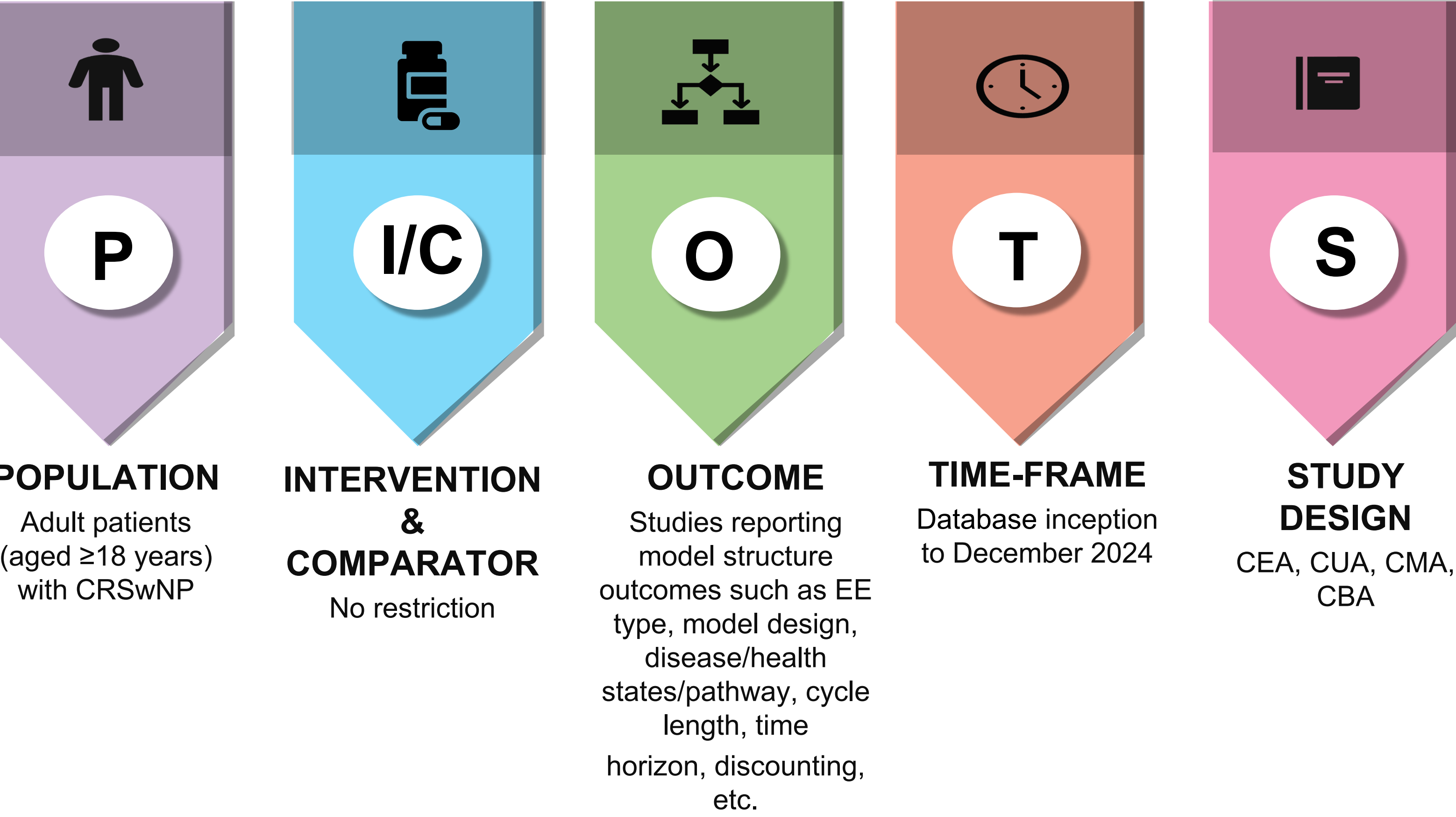
METHODS

- This SLR followed the standard methodology for conducting SLR as per guidelines provided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)⁴ and HTA agencies
- Key biomedical databases (Embase[®] and PubMed[®]) and global HTA bodies 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

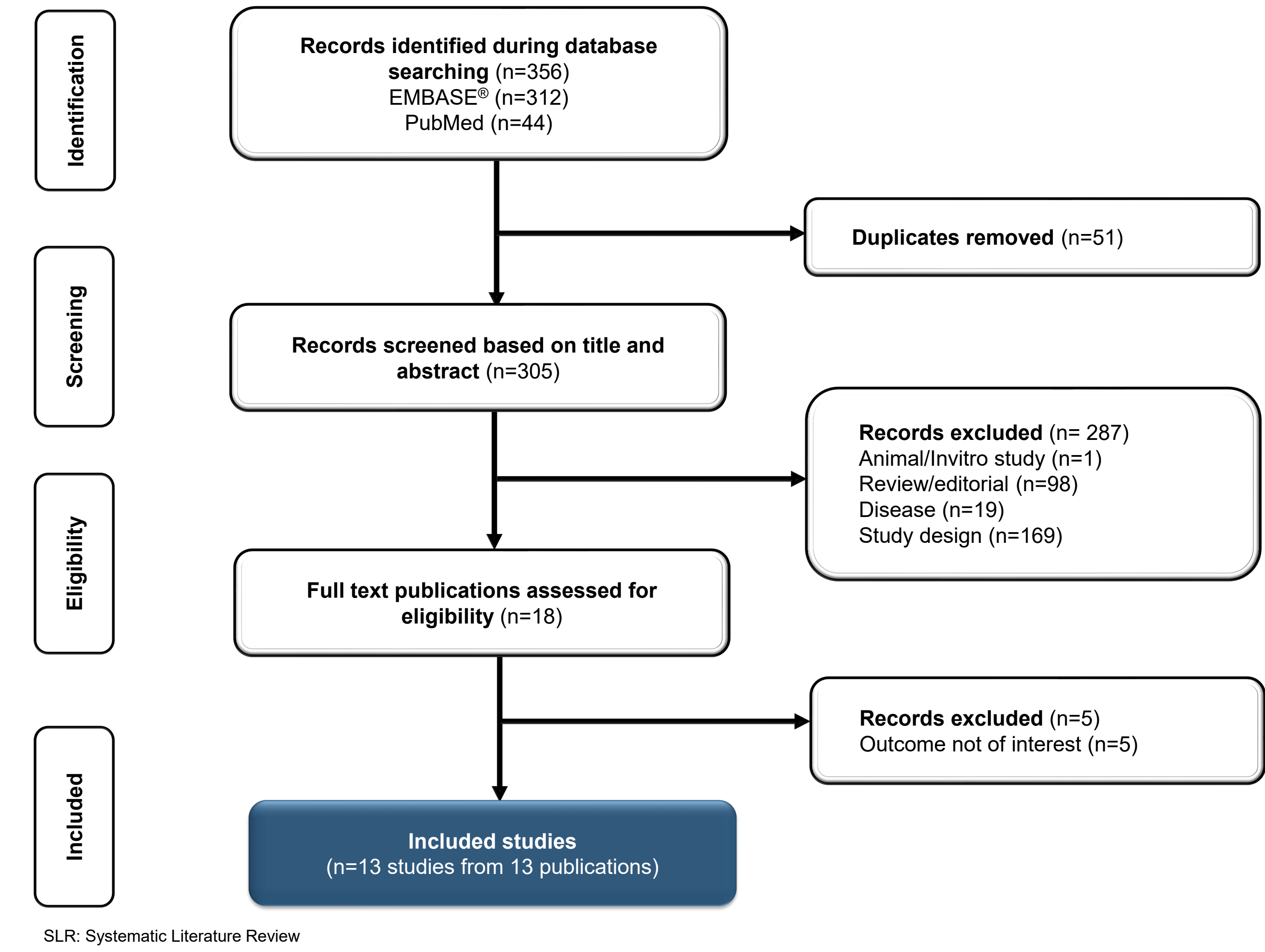
- Of 356 citations screened, a total of 13 studies met the inclusion criteria
- Figure 2** presents the flow of studies and characteristics of the included EEs, respectively
- The studies evaluated biologics (i.e., dupilumab, n=5; omalizumab, n=1; mepolizumab, n=1) and surgical interventions such as elective sinus surgery (ESS, n=2), ESS + endoscopic frontal sinusotomy (n=1), and endoscopic polypectomy in clinic, EPIC (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)
- The time horizon of the included studies ranged from 10 years to a lifetime, whereas the cycle lengths varied between 6 to 24 months, with the majority of the EEs utilizing a 1-year cycle length
- Discounting was applied to the costs and outcomes in most studies (seven of 13), which ranged between 1.5% to 3.5%

Figure 1: Pre-defined PICOS eligibility criteria



CRSwNP: Chronic Rhinosinusitis with Nasal Polyps; CBA: Cost-benefit analysis; CEA: Cost-effectiveness analysis; CMA: Cost-minimization analysis; CUA: Cost-utility analysis; EE: Economic evaluation

Figure 2: Flow of studies in the SLR

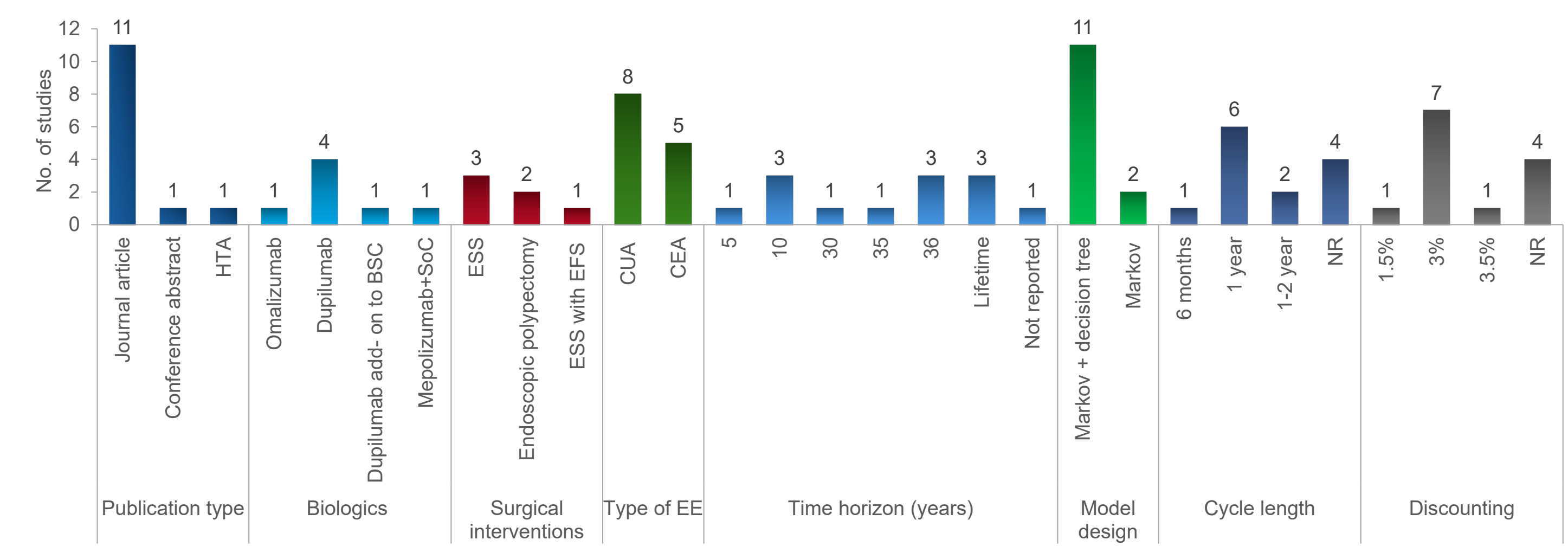


SLR: Systematic Literature Review

- The majority of the EEs used a mixed-model approach, such as Markov decision-tree analysis (11 of 13), followed by the Markov model (n=2) to determine the cost-effectiveness of different treatment strategies
- A summary of the results of the economic evaluation are provided in **Table 1**

- Across the 13 studies, omalizumab emerged as cost-effective compared to other biologics (**Table 1**)
- When surgeries were compared to biologics or medical therapy, ESS was found to be cost-effective in six studies (**Table 1**)
- Among the different surgical options, EPIC emerged as cost-effective option compared to ESS ± endoscopic frontal sinusotomy (**Table 1**)
- Furthermore, a Canadian HTA revealed that mepolizumab combined with standard of care was not cost-effective at a willingness-to-pay threshold of \$50,000 per QALY when compared to standard of care alone

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

Table 1: Summary of the results of the economic evaluation

Study name	Country	Intervention	Comparator	Incremental cost	Incremental QALYs	ICUR	WTP	Cost-effective
Yong 2023	Canada	OMA	MEP	-CAD\$48,866	0.21	Dominated by OMA	CAD\$50,000	Yes (OMA)
			DUP	-CAD\$39,039	-0.17	CAD\$235,305/QALY		
Corso 2022	Italy	DUP + BSC	BSC	€22,283	1.02	€21,817/QALY	€25,000–€40,000	Yes (DUP)
CADTH: : Mepolizumab (Nucala)	Canada	MEP	SoC	--	--	\$380,251/QALY	CAD\$50,000	No
Arjun 2022	US	DUP + ESS	ESS	US\$174,615	0.253	Dominated by ESS	--	Yes (ESS)
Scangas 2021	US	DUP	ESS	US\$485,983	-0.85	Dominated by ESS	\$100,000	Yes (ESS)
Leidy 2022	Columbia	DUP	ESS	US\$124,572	-2.73	Dominated by ESS	--	Yes (ESS)
		ESS + EFS	ESS	US\$1,869	0.03	\$62,310/QALY		
Scangas 2018	US	ESS	Medical therapy	US\$12,065	1.34	\$9,004/QALY	\$50,000	Yes (ESS)
Scangas 2016	US	ESS	Medical therapy	US\$10,579	1.86	\$5,687.41/QALY	\$50,000	Yes (ESS)
		DUP	SoC	US\$132,016	1.08	\$273,181.32/QALY		
Michael 2021	US	ESS + ASA	SoC	-US\$126	0.34	Dominant	\$150,000	Yes (ESS)
		ESS + ASA + DUP	SoC	US\$67,108	0.84	\$135,517.33/QALY		
Kumar 2020	Canada	EPIC	ESS	-CAD\$5,992	0.79	Dominated by EPIC	CAD\$50,000	Yes (EPIC)
Scangas 2017	US	ESS*	Medical therapy	US\$12,911	1.07	\$12,066/QALY	\$50,000	Yes (ESS)
		ESS**	Medical therapy	US\$11,421	1.55	\$7,369/QALY		
Rudmik 2015	Canada	EPIC	ESS	-US\$15,754	-0.24	\$65 641/QALY	\$30,000-\$50,000	No
Velez 2018	US	ESS	EDS-FLU	US\$4,810	0	Dominated by EDS-FLU	\$50,000	Yes (EDS-FLU)

*CRSwNP patients with asthma; **CRSwNP patients without asthma; ASA: Acetylsalicylic acid desensitization; BSC: Basic Supportive Care; CADTH: Canadian Agency of Drugs and Technologies in Health; DUP: Dupilumab; EDS-FLU: The exhalation delivery system with fluticasone; EFS: Endoscopic Frontal Sinusotomy; EPIC: Endoscopic polypectomy in clinic; ESS: Elective Sinus Surgery; ICER: Incremental cost-effectiveness ratio; ICUR: Incremental cost-utility ratio; MEP: Mepolizumab; OMA: Omalizumab; QALY: Quality-adjusted life years; SoC: Standard of Care; US: United States

References

- Yong M et al., *Allergy Asthma Clin Immunol*, 19 (1)
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This research is conducted solely by the authors without any collaboration from other institutes or pharmaceutical/biotech companies

Disclosures

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