

SUPPLEMENTAL MATERIAL

Supplemental Table 1. PRISMA-NMA checklist.

Section / Topic	Item #	Checklist Item	Page #
TITLE			
Title	1	Identify the report as a systematic review incorporating a network meta-analysis (or related form of meta-analysis).	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: Background: main objectives Methods: data sources; study eligibility criteria, participants, and interventions; study appraisal; and synthesis methods, such as network meta-analysis. Results: number of studies and participants identified; summary estimates with corresponding confidence/credible intervals; treatment rankings may also be discussed. Authors may choose to summarize pairwise comparisons against a chosen treatment included in their analyses for brevity. Discussion/Conclusions: limitations; conclusions and implications of findings. Other: primary source of funding; systematic review registration number with registry name.	4
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known, including mention of why a network meta-analysis has been conducted.	5
Objectives	4	Provide an explicit statement of questions being addressed, with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	5

METHODS

Protocol and registration	5	Indicate whether a review protocol exists and if and where it can be accessed (e.g., Web address); and, if available, provide registration information, including registration number.	5
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale. Clearly describe eligible treatments included in the treatment network, and note whether any have been clustered or merged into the same node (with justification).	6
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	6
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	6
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	6
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	6
Geometry of the network	S1	Describe methods used to explore the geometry of the treatment network under study and potential biases related to it. This should include how the evidence base has been graphically summarized for presentation, and what characteristics were compiled and used to describe the evidence base to readers.	6
Risk of bias within individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	6

Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means). Also describe the use of additional summary measures assessed, such as treatment rankings and surface under the cumulative ranking curve (SUCRA) values, as well as modified approaches used to present summary findings from meta-analyses.	7
Planned methods of analysis	14	Describe the methods of handling data and combining results of studies for each network meta-analysis. This should include, but not be limited to: • Handling of multi-arm trials; • Selection of variance structure; • Selection of prior distributions in Bayesian analyses; and • Assessment of model fit.	7
Assessment of Inconsistency	S2	Describe the statistical methods used to evaluate the agreement of direct and indirect evidence in the treatment network(s) studied. Describe efforts taken to address its presence when found.	7
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	7
Additional analyses	16	Describe methods of additional analyses if done, indicating which were pre-specified. This may include, but not be limited to, the following: • Sensitivity or subgroup analyses; • Meta-regression analyses; • Alternative formulations of the treatment network; and • Use of alternative prior distributions for Bayesian analyses (if applicable).	7

RESULTS†

Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	7-8
Presentation of network structure	S3	Provide a network graph of the included studies to enable visualization of the geometry of the treatment network.	8
Summary of network geometry	S4	Provide a brief overview of characteristics of the treatment network. This may include commentary on the abundance of trials and randomized patients for the different interventions and pairwise comparisons in the network, gaps of evidence in the treatment network, and potential biases reflected by the network structure.	8
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	9
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment.	9
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: 1) simple summary data for each intervention group, and 2) effect estimates and confidence intervals. Modified approaches may be needed to deal with information from larger networks.	9
Synthesis of results	21	Present results of each meta-analysis done, including confidence/credible intervals. In larger networks, authors may focus on comparisons versus a particular comparator (e.g. placebo or standard care), with full findings presented in an appendix. League tables and forest plots may be considered to summarize pairwise comparisons. If additional summary measures were explored (such as treatment rankings), these should also be presented.	9
Exploration for inconsistency	S5	Describe results from investigations of inconsistency. This may include such information as measures of model fit to compare consistency and inconsistency models, P values from statistical tests, or summary of inconsistency estimates from different parts of the treatment network.	9

Risk of bias across studies	22	Present results of any assessment of risk of bias across studies for the evidence base being studied.	9
Results of additional analyses	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression analyses, alternative network geometries studied, alternative choice of prior distributions for Bayesian analyses, and so forth).	9

DISCUSSION

Summary of evidence	24	Summarize the main findings, including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy-makers).	10
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review level (e.g., incomplete retrieval of identified research, reporting bias). Comment on the validity of the assumptions, such as transitivity and consistency. Comment on any concerns regarding network geometry (e.g., avoidance of certain comparisons).	12
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	13

FUNDING

Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review. This should also include information regarding whether funding has been received from manufacturers of treatments in the network and/or whether some of the authors are content experts with professional conflicts of interest that could affect use of treatments in the network.	2
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PICOS= Population, Intervention, Comparators, Outcomes, Study Design.

* Text in italics indicates wording specific to reporting of network meta-analyses that has been added to guidance from the PRISMA statement.

† Authors may wish to plan for use of appendices to present all relevant information in full detail for items in this section.

Supplemental Table 2. Full electronic search strategy.

Database	Search query	Results
PubMed	("aortic stenosis" OR "aortic valve stenosis") AND ("TAVI" OR "TAVR" OR "transcatheter aortic valve" OR "SAVR" OR "surgery") AND ("balloon-expandable" OR "self-expandable" OR "small annulus" OR "intra-annular")	1,676
Embase	("aortic stenosis" OR "aortic valve stenosis") AND ("TAVI" OR "TAVR" OR "transcatheter aortic valve" OR "SAVR" OR "surgery") AND ("balloon-expandable" OR "self-expandable" OR "small annulus" OR "intra-annular")	2,525
CENTRAL	("aortic stenosis" OR "aortic valve disease") AND ("TAVI" OR "TAVR" OR "SAVR" OR "surgery") AND ("balloon-expandable" OR "self-expandable" OR "small annulus" OR "intra-annular")	250

The last search was run on August 2025

Supplemental Table 3. Outcome definitions

Definition	Number of studies
VARC 1	1 Study (Deeb)
VARC 2	5 studies (Choice, Hase, Kalogeras, Smart, Mauri)
VARC 3	13 (Ahmad, Baudó, Guimaraes, Hioki, Yamamoto, Itachi, Korniyeva, Opera, TAVI Small, Swiss TAVI, Matsushiro, Surtavi, Sà)
PARTNER Endpoint Definitions According to the Clinical Events Committee Charter	1 study (Partner)

Supplemental Table 4. GRADE evaluation of quality of evidence.

Number of studies	Study Design	Risk of Bias	Inconsistency	Incoherence	Indirectness	Imprecision	Overall Quality
Severe patient prosthesis mismatch							
18	5 RCT 13 OS	Not serious	Not serious	Serious	Not serious	Not serious	⊕⊕⊕
							Moderate
All-cause death							
18	5 RCT 13 OS	Not serious	Not serious	Serious	Not serious	Not serious	⊕⊕⊕
							Moderate
Mean gradients							
14	5 RCT 9 OS	Not serious	Very serious	Not serious	Not serious	Not serious	⊕⊕
							Low
Haemodynamic structural valve dysfunction							
9	2 RCT 7 OS	Not serious	Serious	Serious	Not serious	Not serious	⊕⊕⊕
							Moderate
Moderate patient prosthesis mismatch							
20	7 RCT 13 OS	Not serious	Very serious	Not serious	Not serious	Not serious	⊕⊕
							Low
18	5 RCT 13 OS	Not serious	Serious	Not serious	Not serious	Not serious	⊕⊕⊕
							Moderate
Moderate to severe patient prosthesis mismatch							
22	7 RCT 15 OS	Not serious	Serious	Not serious	Not serious	Not serious	⊕⊕⊕
							Moderate
Major bleeding							

14	6 RCT 8 OS	Not seriou s	Serious	Serious	Not serious	Serious	⊕⊕
							Low
Major vascular events							
15	5 RCT 10 OS	Not seriou s	Serious	Not serious	Not serious	Very Serious	⊕⊕
							Low
Permanent pacemaker implantation							
16	4 RCT 12 OS	Not seriou s	Serious	Not serious	Not serious	Very Serious	⊕⊕
							Low
Stroke							
14	6 RCT 8 OS	Not seriou s	Not serious	Serious	Not serious	Serious	⊕⊕⊕
							Moderat e
Heart failure hospitalization							
7	3 RCT 4 OS	Not seriou s	Not serious	Not serious	Serious	Serious	⊕⊕
							Low
Valve reintervention							
8	5 RCT 3 OS	Not seriou s	Not serious	Serious	Not serious	Very serious	⊕⊕
							Low

Abbreviations. OS=Observational Study; RCT=Randomized Controlled Trial.

Supplemental Table 5. Direct and indirect comparisons in the main analysis.

Severe Prosthesis–Patient Mismatch					
	SAV	BE	IAV	SAVR	SUCRA
SAV	–	0.38 (0.27 to 0.52)	0.53 (0.32 to 0.87)	0.31 (0.20 to 0.48)	1.00
BE	2.64 (1.91 to 3.65)	–	1.40 (0.85 to 2.30)	0.82 (0.51 to 1.31)	0.30
IAV	1.89 (1.15 to 3.11)	0.72 (0.44 to 1.18)	–	0.59 (0.31 to 1.11)	0.62
SAVR	3.23 (2.07 to 5.03)	1.22 (0.76 to 1.96)	1.71 (0.90 to 3.23)	–	0.08
Heterogeneity: $\tau^2 = 0.0651$; $\tau = 0.2552$; $I^2 = 23.9\%$ (0.0%–58.2%).					
All cause death					
	SAV	BE	IAV	SAVR	SUCRA
SAV	–	0.88 (0.74 to 1.06)	0.82 (0.61 to 1.09)	0.80 (0.52 to 1.25)	0.89
BE	1.13 (0.95 to 1.35)	–	0.92 (0.69 to 1.24)	0.91 (0.57 to 1.46)	0.48
IAV	1.23 (0.92 to 1.63)	1.08 (0.81 to 1.46)	–	0.98 (0.58 to 1.66)	0.30
SAVR	1.24 (0.80 to 1.93)	1.10 (0.69 to 1.77)	1.02 (0.60 to 1.71)	–	0.33
Heterogeneity: $\tau^2 = 0$; $\tau = 0$; $I^2 = 0\%$ (0.0%–55.0%).					
Hemodynamic Structural Valve Dysfunction (SVD)					

	SAV	BE	IAV	SAVR	SUCRA
SAV	–	0.23 (0.11–0.48)	1.00 (0.26–3.90)	0.23 (0.05–1.16)	0.82
BE	4.44 (2.08–9.45)	–	4.44 (1.10–17.98)	1.02 (0.17–6.07)	0.17
IAV	1.00 (0.26–3.90)	0.23 (0.06–0.91)	–	0.23 (0.03–1.90)	0.80
SAVR	4.35 (0.86–21.89)	0.98 (0.16–5.84)	4.35 (0.53–35.97)	–	0.21
Heterogeneity: $\tau^2 = 0.09$; $I^2 = 52.4\%$ (95% CI: 0%–78.8%).					
Moderate PPM					
	SAV	BE	IAV	SAVR	SUCRA
SAV	–	0.42 (0.29–0.62)	0.46 (0.24–0.89)	0.42 (0.21–0.85)	0.99
BE	2.36 (1.62–3.45)	–	0.92 (0.47–1.80)	1.00 (0.47–2.13)	0.30
IAV	2.16 (1.12–4.17)	1.09 (0.56–2.15)	–	1.10 (0.43–2.82)	0.40
SAVR	2.37 (1.18–4.76)	1.00 (0.47–2.11)	0.91 (0.35–2.34)	–	0.31
Heterogeneity: $\tau^2 = 0.36$; $I^2 = 83.5\%$ (95% CI: 74.9%–89.2%).					
Paravalvular Leak					
	SAV	BE	IAV	SAVR	SUCRA

SAV	–	1.72 (0.99 to 2.99)	1.46 (0.46 to 4.71)	8.38 (1.85 to 37.93)	0.10
BE	0.58 (0.33 to 1.01)	–	0.85 (0.24 to 3.00)	4.88 (1.04 to 22.94)	0.53
IAV	0.68 (0.21 to 2.19)	1.17 (0.33 to 4.12)	–	5.72 (0.86 to 38.28)	0.39
SAVR	0.12 (0.03 to 0.54)	0.20 (0.04 to 0.96)	0.17 (0.03 to 1.17)	–	0.98
Heterogeneity: $\tau^2 = 0.4415$; $\tau = 0.6644$; $I^2 = 42.6\%$ (2.6%–66.2%).					
Indexed Effective Orifice Area					
	SAV	BE	IAV	SAVR	SUCRA
SAV	–	0.18 (0.11 a 0.24)	0.06 (–0.05 a 0.17)	0.27 (0.16 a 0.37)	0.98
BE	–0.18 (–0.24 a –0.11)	–	–0.12 (–0.23 a –0.01)	0.09 (–0.02 a 0.20)	0.68
IAV	–0.06 (–0.17 a 0.05)	0.12 (0.01 a 0.23)	–	0.21 (0.06 a 0.35)	0.29
SAVR	–0.27 (–0.37 a –0.16)	–0.09 (–0.20 a 0.02)	–0.21 (–0.35 a –0.06)	–	0.04
Heterogeneity: $\tau^2 = 0.0090$; $\tau = 0.0946$; $I^2 = 92\%$ (88.6%–94.4%).					
Transvalvular Gradients					
	SAV	BE	IAV	SAVR	SUCRA

SAV	–	–4.72 (–5.92 to –3.52)	–2.01 (–4.17 to 0.15)	–5.85 (–8.04 to –3.65)	0.98
BE	4.72 (3.52 to 5.92)	–	2.71 (0.48 to 4.94)	–1.13 (–3.40 to 1.15)	0.28
IAV	2.01 (–0.15 to 4.17)	–2.71 (–4.94 to –0.48)	–	–3.84 (–6.85 to –0.83)	0.67
SAVR	5.85 (3.65 to 8.04)	1.13 (–1.15 to 3.40)	3.84 (0.83 to 6.85)	–	0.05
Heterogeneity: $\tau^2 = 1.4505$; $\tau = 1.2044$; $I^2 = 85\%$ (78.2%–89.7%).					
Major Bleeding					
	SAV	BE	IAV	SAVR	SUCRA
SAV	–	1.20 (0.83 to 1.75)	1.20 (0.67 to 2.16)	0.97 (0.61 to 1.54)	0.33
BE	0.83 (0.57 to 1.20)	–	0.99 (0.54 to 1.84)	0.80 (0.48 to 1.34)	0.71
IAV	0.83 (0.46 to 1.49)	1.00 (0.54 to 1.84)	–	0.80 (0.39 to 1.65)	0.65
SAVR	1.03 (0.65 to 1.65)	1.25 (0.75 to 2.08)	1.25 (0.61 to 2.57)	–	0.31
Heterogeneity: $\tau^2 = 0.1150$; $\tau = 0.3391$; $I^2 = 51.7\%$ [4.0%; 75.7%].					
Major vascular events					
	SAV	BE	IAV	SAVR	SUCRA

SAV	–	1.28 (0.83 to 1.98)	1.09 (0.49 to 2.42)	5.08 (2.11 to 12.27)	0.18
BE	0.78 (0.51 to 1.21)	–	0.85 (0.37 to 1.97)	3.97 (1.65 to 9.60)	0.50
IAV	0.91 (0.41 to 2.02)	1.17 (0.51 to 2.70)	–	4.65 (1.46 to 14.85)	0.32
SAVR	0.20 (0.08 to 0.47)	0.25 (0.10 to 0.61)	0.22 (0.07 to 0.69)	–	1.00

Heterogeneity: $\tau^2 = 0.2210$; $\tau = 0.4701$; $I^2 = 49.8\%$ [2.6%; 74.1%].

Permanent pacemaker implantation

	SAV	BE	IAV	SAVR	SUCRA
SAV	–	1.41 (0.98 to 2.04)	0.95 (0.51 to 1.75)	2.31 (1.06 to 5.02)	0.21
BE	0.71 (0.49 to 1.02)	–	0.67 (0.35 to 1.28)	1.63 (0.69 to 3.86)	0.66
IAV	1.06 (0.57 to 1.95)	1.49 (0.78 to 2.85)	–	2.44 (0.91 to 6.56)	0.19
SAVR	0.43 (0.20 to 0.94)	0.61 (0.26 to 1.45)	0.41 (0.15 to 1.10)	–	0.94

Heterogeneity: $\tau^2 = 0.2129$; $\tau = 0.4614$; $I^2 = 67.5\%$ [42.0%; 81.8%]

Stroke

	SAV	BE	IAV	SAVR	SUCRA
SAV	–	1.36 (0.80 to 2.30)	1.49 (0.64 to 3.50)	1.29 (0.60 to 2.78)	0.19

BE	0.74 (0.43 to 1.25)	–	1.10 (0.43 to 2.81)	0.95 (0.39 to 2.32)	0.61
IAV	0.67 (0.29 to 1.57)	0.91 (0.36 to 2.33)	–	0.86 (0.28 to 2.70)	0.67
SAVR	0.78 (0.36 to 1.68)	1.05 (0.43 to 2.58)	1.16 (0.37 to 3.63)	–	0.53
Heterogeneity: $\tau^2 = 0.2025$; $\tau = 0.4500$; $I^2 = 39.6\%$ [0.0%; 70.3%]					
Heart failure hospitalizations					
	SAV	BE	IAV	SAVR	SUCRA
SAV	–	0.87 (0.62 to 1.21)	0.94 (0.58 to 1.52)	NA	0.70
BE	1.15 (0.83 to 1.60)	–	1.09 (0.64 to 1.83)	NA	0.29
IAV	1.06 (0.66 to 1.71)	0.92 (0.55 to 1.56)	–	NA	0.51
SAVR	NA	NA	NA	-	NA
Heterogeneity: $\tau^2 = 0$; $\tau = 0$; $I^2 = 0\%$ [0.0%; 79.2%]					
Valve re interventions					
	SAV	BE	IAV	SAVR	SUCRA
SAV	–	1.01 (0.32 to 3.21)	NA	2.39 (0.19 to 30.16)	0.36
BE	0.99 (0.31 to 3.12)	–	NA	2.43 (0.25 to 23.20)	0.38
IAV	NA	NA	-	NA	NA

SAVR	0.41 (0.04 to 3.93)	0.42 (0.03 to 5.27)	NA	–	0.76
Heterogeneity: $\tau^2 = 0$; $\tau = 0$; $I^2 = 0\%$ [0.0%; 84.7%]					

Supplemental Table 6. Node-split analysis for inconsistency.

	W [%]	IRR [95% CI]	P _{inconsistency}
Severe Prosthesis-Patient Mismatch			
Balloon Expandable vs Intra Annular Self Expandable			0.533
Direct	74	1.54 (0.86–2.74)	
Indirect	26	1.07 (0.41–2.82)	
Network	100	1.40 (0.85–2.30)	
Balloon Expandable vs Supra Annular Self Expandable			0.065
Direct	86	2.34 (1.65–3.32)	
Indirect	14	5.64 (2.37–13.45)	
Network	100	2.64 (1.91–3.65)	
Balloon Expandable vs Surgical Aortic Valve Replacement			0.558
Direct	49	0.71 (0.36–1.39)	
Indirect	51	0.94 (0.49–1.81)	
Network	100	0.82 (0.51–1.31)	
Intra Annular Self Expandable vs Supra Annular Self Expandable			0.139
Direct	72	2.39 (1.33–4.31)	
Indirect	28	1.04 (0.41–2.65)	
Network	100	1.89 (1.15–3.11)	
Surgical Aortic Valve Replacement vs Supra Annular Self Expandable			0.669

Direct	70	3.03 (1.78–5.15)	
Indirect	30	3.74 (1.68–8.34)	
Network	100	3.23 (2.07–5.03)	
All-cause death			
Balloon Expandable vs Intra Annular Self Expandable			0.049
Direct	71	1.12 (0.79–1.59)	
Indirect	29	0.58 (0.34–1.00)	
Network	100	0.92 (0.69–1.24)	
Balloon Expandable vs Supra Annular Self Expandable			0.139
Direct	97	1.11 (0.92–1.33)	
Indirect	3	2.50 (0.86–7.22)	
Network	100	1.13 (0.95–1.35)	
Intra Annular Self Expandable vs Supra Annular Self Expandable			0.037
Direct	79	1.43 (1.04–1.97)	
Indirect	21	0.68 (0.36–1.27)	
Network	100	1.23 (0.92–1.63)	
Hemodynamic Structural Valve Dysfunction (SVD)			
Balloon Expandable vs Intra Annular Self Expandable			0.272
Direct	45	10.50 (1.31–83.85)	

Indirect	55	2.18 (0.33–14.42)	
Network	100	4.44 (1.10–17.98)	
Balloon Expandable vs Supra Annular Self Expandable			0.272
Direct	92	3.92 (1.78–8.62)	
Indirect	8	18.91 (1.28–280.50)	
Network	100	4.44 (2.08–9.45)	
Intra Annular Self Expandable vs Supra Annular Self Expandable			0.272
Direct	63	1.80 (0.32–10.05)	
Indirect	37	0.37 (0.04–3.44)	
Network	100	1.00 (0.26–3.89)	
Moderate Prosthesis-Patient Mismatch			
Balloon Expandable vs Intra Annular Self Expandable			0.477
Direct	55	0.88 (0.35–2.18)	
Indirect	45	1.44 (0.52–3.95)	
Network	100	1.09 (0.56–2.15)	
Balloon Expandable vs Supra Annular Self Expandable			0.004
Direct	93	2.63 (1.78–3.90)	
Indirect	7	0.59 (0.15–2.40)	
Network	100	2.36 (1.62–3.45)	

Balloon Expandable vs Surgical Aortic Valve Replacement			0.346
Direct	37	0.62 (0.18–2.14)	
Indirect	63	1.31 (0.51–3.36)	
Network	100	1.00 (0.47–2.11)	
Intra Annular Self Expandable vs Supra Annular Self Expandable			0.931
Direct	72	2.12 (0.98–4.59)	
Indirect	28	2.27 (0.65–7.92)	
Network	100	2.16 (1.12–4.17)	
Surgical Aortic Valve Replacement vs Supra Annular Self Expandable			0.355
Direct	89	2.11 (1.01–4.42)	
Indirect	11	5.96 (0.75–47.26)	
Network	100	2.37 (1.18–4.76)	
Paravalvular Leak			
Balloon Expandable vs Intra Annular Self Expandable			0.508
Direct	27	0.42 (0.04–4.83)	
Indirect	73	1.10 (0.25–4.76)	
Network	100	0.85 (0.24–2.99)	
Balloon Expandable vs Supra Annular Self Expandable			0.800
Direct	96	0.57 (0.32–1.01)	
Indirect	4	0.82 (0.06–11.60)	

Network	100	0.58 (0.33–1.01)	
Balloon Expandable vs Surgical Aortic Valve Replacement			0.305
Direct	44	12.26 (1.18–127.86)	
Indirect	56	2.40 (0.31–18.80)	
Network	100	4.88 (1.04–22.94)	
Intra Annular Self Expandable vs Supra Annular Self Expandable			0.431
Direct	88	0.57 (0.17–1.99)	
Indirect	12	2.44 (0.08–71.73)	
Network	100	0.68 (0.21–2.19)	
Surgical Aortic Valve Replacement vs Supra Annular Self Expandable			0.670
Direct	77	0.14 (0.03–0.80)	
Indirect	23	0.07 (0.00–1.53)	
Network	100	0.12 (0.03–0.54)	
Major Bleeding			
Balloon Expandable vs Intra Annular Self Expandable			0.034
Direct	64	1.65 (0.77–3.54)	
Indirect	36	0.42 (0.15–1.15)	
Network	100	1.00 (0.54–1.84)	
Balloon Expandable vs Supra Annular Self Expandable			0.256

Direct	80	0.75 (0.49– 1.13)	
Indirect	26	1.28 (0.56– 2.96)	
Network	100	0.83 (0.57– 1.20)	
Balloon Expandable vs Surgical Aortic Valve Replacement			0.879
Direct	44	0.77 (0.36– 1.65)	
Indirect	56	0.83 (0.42– 1.65)	
Network	100	0.80 (0.48– 1.34)	
Intra Annular Self Expandable vs Supra Annular Self Expandable			0.047
Direct	79	1.12 (0.58– 2.16)	
Indirect	21	0.26 (0.07– 0.94)	
Network	100	0.83 (0.46– 1.49)	
Surgical Aortic Valve Replacement vs Supra Annular Self Expandable			0.879
Direct	71	1.01 (0.58– 1.76)	
Indirect	29	1.10 (0.46– 2.61)	
Network	100	1.03 (0.65– 1.65)	
Major vascular events			
Balloon Expandable vs Intra Annular Self Expandable			0.621
Direct	57	1.02 (0.34– 3.09)	
Indirect	43	0.67 (0.19– 2.41)	

Network	100	0.85 (0.37– 1.97)	
Balloon Expandable vs Supra Annular Self Expandable			0.613
Direct	92	0.81 (0.51– 1.27)	
Indirect	8	0.53 (0.11– 2.54)	
Network	100	0.78 (0.51– 1.21)	
Balloon Expandable vs Surgical Aortic Valve Replacement			0.706
Direct	53	3.39 (1.01– 11.38)	
Indirect	47	4.76 (1.32– 17.20)	
Network	100	3.97 (1.65– 9.60)	
Intra Annular Self Expandable vs Supra Annular Self Expandable			0.397
Direct	88	1.04 (0.45– 2.43)	
Indirect	12	0.37 (0.04– 3.50)	
Network	100	0.91 (0.41– 2.02)	
Surgical Aortic Valve Replacement vs Supra Annular Self Expandable			0.706
Direct	54	0.17 (0.05– 0.56)	
Indirect	46	0.24 (0.06– 0.86)	
Network	100	0.20 (0.08– 0.47)	
Permanent pacemaker implantation			
Balloon Expandable vs Intra Annular Self Expandable			0.321

Direct	55	0.90 (0.38– 2.16)	
Indirect	45	0.47 (0.18– 1.22)	
Network	100	0.67 (0.35– 1.28)	
Balloon Expandable vs Supra Annular Self Expandable			0.546
Direct	96	0.69 (0.47– 1.01)	
Indirect	4	1.21 (0.21– 7.11)	
Network	100	0.71 (0.49– 1.02)	
Intra Annular Self Expandable vs Supra Annular Self Expandable			0.665
Direct	80	0.99 (0.50– 1.96)	
Indirect	20	1.39 (0.35– 5.45)	
Network	100	1.06 (0.57– 1.95)	
Stroke			
Balloon Expandable vs Intra Annular Self Expandable			0.616
Direct	50	1.40 (0.37– 5.33)	
Indirect	50	0.87 (0.23– 3.25)	
Network	100	1.10 (0.43– 2.81)	
Balloon Expandable vs Supra Annular Self Expandable			0.019
Direct	94	0.63 (0.36– 1.08)	
Indirect	6	8.33 (1.02– 68.16)	

Network	100	0.74 (0.43–1.25)	
Balloon Expandable vs Surgical Aortic Valve Replacement			0.020
Direct	17	10.16 (1.13–91.14)	
Indirect	83	0.59 (0.22–1.57)	
Network	100	0.95 (0.39–2.32)	
Intra Annular Self Expandable vs Supra Annular Self Expandable			0.764
Direct	94	0.69 (0.29–1.67)	
Indirect	6	0.41 (0.01–11.59)	
Network	100	0.67 (0.29–1.57)	
Surgical Aortic Valve Replacement vs Supra Annular Self Expandable			0.020
Direct	88	1.08 (0.48–2.45)	
Indirect	12	0.06 (0.01–0.60)	
Network	100	0.78 (0.36–1.68)	
Heart Failure hospitalizations			
Balloon Expandable vs Intra Annular Self Expandable			0.585
Direct	74	1.18 (0.64–2.18)	
Indirect	26	0.85 (0.30–2.37)	
Network	100	1.09 (0.64–1.83)	
Intra Annular Self Expandable vs Supra Annular Self Expandable			0.585

Direct	93	1.10 (0.67–1.81)	
Indirect	7	0.64 (0.10–4.14)	
Network	100	1.06 (0.66–1.71)	
Valve reinterventions			
Balloon Expandable vs Intra Annular Self Expandable			NA
Direct	100	0.99 (0.31–3.12)	
Indirect	0	-	
Network	100	0.99 (0.31–3.12)	
Balloon Expandable vs Surgical Aortic Valve Replacement			NA
Direct	0	-	
Indirect	0	-	
Network	100	2.39 (0.19–30.16)	
Surgical Aortic Valve Replacement vs Supra Annular Self Expandable			NA
Direct	100	0.41 (0.04–3.93)	
Indirect	0	-	
Network	100	0.41 (0.04–3.93)	

	W [%]	MD [95% CI]	P _{inconsistency}
Indexed Effective Orifice Area			
Balloon Expandable vs Intra Annular Self Expandable			0.287
Direct	60	-0.16 (-0.31; -0.02)	
Indirect	40	-0.04 (-0.22; 0.14)	
Network	100	-0.11 (-0.23; 0.01)	

Balloon Expandable vs Supra Annular Self Expandable			0.793
Direct	86	-0.17 (-0.24; -0.10)	
Indirect	14	-0.15 (-0.33; 0.04)	
Network	100	-0.17 (-0.23; -0.11)	
Balloon Expandable vs Surgical Aortic Valve Replacement			0.031
Direct	43	0.18 (0.02; 0.34)	
Indirect	57	-0.05 (-0.19; 0.09)	
Network	100	0.05 (-0.05; -0.11)	
Intra Annular Self Expandable vs Supra Annular Self Expandable			0.040
Direct	69	-0.14 (-0.27; -0.01)	
Indirect	31	0.12 (-0.08; 0.32)	
Network	100	-0.06 (-0.17; 0.06)	
Surgical Aortic Valve Replacement vs Supra Annular Self Expandable			0.046
Direct	80	-0.17 (-0.28; -0.06)	
Indirect	20	-0.41 (-0.63; -0.20)	
Network	100	-0.22 (-0.32; -0.12)	
Transvalvular gradients			
Balloon Expandable vs Intra Annular Self Expandable			0.650
Direct	54	2.14 (-1.01; 5.30)	
Indirect	46	3.22 (-0.20; 6.64)	
Network	100	2.64 (0.32; 4.96)	
Balloon Expandable vs Supra Annular Self Expandable			0.08
Direct	89	4.96 (3.65; 6.28)	
Indirect	11	1.47 (-2.33; 5.26)	
Network	100	4.59 (3.35; 5.83)	
Balloon Expandable vs Surgical Aortic Valve Replacement			0.018

Direct	42	-3.20 (-6.56; 0.16)	
Indirect	58	2.14 (-0.75; 5.03)	
Network	100	-0.13 (-2.32; 2.06)	
Intra Annular Self Expandable vs Supra Annular Self Expandable			0.950
Direct	72	2.00 (-0.67; 4.66)	
Indirect	28	1.84 (-2.38; 6.06)	
Network	100	1.95 (-0.30; 4.20)	
Surgical Aortic Valve Replacement vs Supra Annular Self Expandable			0.036
Direct	78	3.56 (1.24; 5.88)	
Indirect	22	8.84 (4.47; 13.22)	
Network	100	4.72 (2.67; 6.77)	

Supplemental Table 7. Direct and indirect comparison in the sensitivity analysis including only RCT

Severe PPM					
	SAV	BE	IAV	SAVR	SUCRA
SAV	–	0.26 (0.12–0.56)	-	0.30 (0.18–0.50)	1.00
BE	3.80 (1.79–8.09)	–	-	1.14 (0.65–2.00)	0.16
IAV	-	-	-	-	-
SAVR	3.32 (2.00–5.51)	0.87 (0.50–1.53)	-	–	0.34
Heterogeneity: $\tau^2 = 0$; $\tau = 0$; $I^2 = 0\%$ (0.0%–84.7%).					
All cause death					
	SAV	BE	IAV	SAVR	SUCRA
SAV	–	0.94 (0.53–1.67)	–	0.82 (0.55–1.22)	0.71
BE	1.07 (0.60–1.90)	–	–	0.88 (0.45–1.72)	0.53
IAV	–	–	–	–	-
SAVR	1.22 (0.82–1.80)	1.14 (0.58–2.24)	–	–	0.26
Heterogeneity: $\tau^2 = 0$; $\tau = 0$; $I^2 = 0\%$ (0.0%–84.7%).					
Hemodynamic Structural Valve Dysfunction					

	SAV	BE	IAV	SAVR	SUCRA
SAV	–	0.10 (0.03–0.28)	–	0.31 (0.13–0.72)	1.00
BE	10.33 (3.57–29.90)	–	–	3.20 (0.83–12.41)	0.04
IAV	–	–	–	–	–
SAVR	3.22 (1.39–7.46)	0.31 (0.08–1.21)	–	–	0.50
Heterogeneity: $\tau^2 = 0.1903$; $\tau = 0.4362$; $I^2 = 45.9\%$.					
Moderate Prosthesis–Patient Mismatch					
	SAV	BE	IAV	SAVR	SUCRA
SAV	–	0.29 (0.21–0.40)	–	0.49 (0.36–0.67)	1.00
BE	3.48 (2.51–4.81)	–	–	1.72 (1.17–2.51)	0.00
IAV	–	–	–	–	–
SAVR	2.03 (1.49–2.75)	0.58 (0.40–0.85)	–	–	0.50
Heterogeneity: $\tau^2 = 0$; $\tau = 0$; $I^2 = 0\%$ (0.0%–84.7%).					

Paravalvular Leak					
	SAV	BE	IAV	SAVR	SUCRA
SAV		0.68 (0.49–0.95)	–	4.01 (1.02–15.72)	0.51
BE	1.46 (1.06–2.02)		–	5.86 (1.48–23.14)	0.01
IAV	–	–	–	–	–
SAVR	0.25 (0.06–0.98)	0.17 (0.04–0.67)	–	–	0.99
Heterogeneity: $\tau^2 = 0$; $\tau = 0$; $I^2 = 0\%$ (0.0%–79.2%).					
Indexed Effective Orifice Area (iEOA)					
	SAV	BE	IAV	SAVR	SUCRA
SAV		0.15 (–0.00 to 0.30)	–	0.19 (0.06 to 0.32)	0.85
BE	–0.15 (–0.30 to 0.00)		–	0.04 (–0.13 to 0.22)	0.64
IAV	–	–	–	–	–

SAVR	-0.19 (-0.32 to -0.06)	-0.04 (-0.12 to 0.13)	—	—	0.02
Heterogeneity: $\tau^2 = 0.0043$; $\tau = 0.0656$; $I^2 = 86.3\%$ (70.1%–93.7%).					
Mean Transvalvular Gradients					
	SAV	BE	IAV	SAVR	SUCRA
SAV	—	-4.52 (-7.96 to -1.08)	—	-3.97 (-6.95 to -0.99)	0.99
BE	4.52 (1.08 to 7.96)	—	—	0.54 (-3.34 to 4.44)	0.19
IAV	—	—	—	—	—
SAVR	3.97 (0.99 to 6.95)	-0.54 (-4.44 to 3.34)	—	—	0.30
Heterogeneity: $\tau^2 = 0.2946$; $\tau = 0.5427$; $I^2 = 50.2\%$ (0.0%–80.2%).					
Major Bleeding					
	SAV	BE	IAV	SAVR	SUCRA

SAV	–	1.29 (0.74– 2.22)	–	0.87 (0.57– 1.32)	0.61
BE	0.78 (0.45– 1.34)	–	–	0.68 (0.42– 1.10)	0.89
IAV	–	–	–	–	–
SAVR	1.15 (0.76– 1.75)	1.48 (0.91– 2.41)	–	–	0.00
Heterogeneity: $\tau^2 = 0.1001$; $\tau = 0.3164$; $I^2 = 61.7\%$ (0.0%–85.6%).					
Major Vascular Events					
	SAV	BE	IAV	SAVR	SUCRA
SAV	–	1.50 (0.47– 4.76)	–	5.55 (2.27– 13.54)	0.12
BE	0.67 (0.21– 2.13)	–	–	3.71 (1.77– 7.75)	0.38
IAV	–	–	–	–	–
SAVR	0.18 (0.07– 0.44)	0.27 (0.13– 0.56)	–	–	1.00

Heterogeneity: $\tau^2 = 0$; $\tau = 0$; $I^2 = 0\%$ (0.0%–89.6%).					
Permanent Pacemaker Implantation					
	SAV	BE	IAV	SAVR	SUCRA
SAV	–	0.71 (0.27–1.89)	–	2.26 (1.55–3.29)	0.38
BE	1.40 (0.53–3.71)	–	–	3.17 (1.29–7.77)	0.13
IAV	–	–	–	–	–
SAVR	0.44 (0.30–0.64)	0.32 (0.13–0.78)	–	–	1.00
Heterogeneity: $\tau^2 = 0$; $\tau = 0$; $I^2 = 0\%$ (0.0%–89.6%).					
Stroke					
	SAV	BE	IAV	SAVR	SUCRA
SAV	–	0.79 (0.32–1.94)	–	1.11 (0.57–2.15)	0.52

BE	1.27 (0.52–3.14)	–	–	1.41 (0.58–3.44)	0.31
IAV	–	–	–	–	–
SAVR	0.90 (0.46–1.75)	0.71 (0.29–1.73)	–	–	0.67
Heterogeneity: $\tau^2 = 0.1820$; $\tau = 0.4266$; $I^2 = 39.9\%$ (0.0%–77.8%).					
Heart Failure Hospitalizations					
	SAV	BE	IAV	SAVR	SUCRA
SAV		1.19 (0.60–2.34)	–	0.55 (0.25–1.23)	0.62
BE	0.84 (0.43–1.66)		–	0.46 (0.24–0.88)	0.84
IAV	–	–	–	–	–
SAVR	1.81 (0.82–4.03)	2.15 (1.13–4.10)	–	–	0.04
Heterogeneity: $\tau^2 = 0$; $\tau = 0$; $I^2 = 0\%$.					

Valve Reinterventions					
	SAV	BE	IAV	SAVR	SUCRA
SAV	–	1.53 (0.26–9.07)	–	2.22 (0.43–11.39)	0.25
BE	0.66 (0.11–3.90)	–	–	1.45 (0.13–16.34)	0.53
IAV	–	–	–	–	–
SAVR	0.45 (0.09–2.32)	0.69 (0.06–7.75)	–	–	0.72
Heterogeneity: $\tau^2 = 0$; $\tau = 0$; $I^2 = 0\%$ (0.0%–89.6%).					

Supplemental Table 8. Direct and indirect analysis in the sensitivity analysis including a definition of small annulus of <430 mm²

Severe PPM					
	SAV	BE	IAV	SAVR	SUCRA
SAV	–	0.41 (0.29–0.57)	1.01 (0.47–2.15)	0.53 (0.21–1.33)	0.80
BE	2.47 (1.75–3.49)	–	2.48 (1.18–5.21)	1.31 (0.53–3.25)	0.10
IAV	0.99 (0.47–2.12)	0.40 (0.19–0.85)	–	0.53 (0.17–1.67)	0.79
SAVR	1.88 (0.75–4.73)	0.76 (0.31–1.90)	1.90 (0.60–6.02)	–	0.32
Heterogeneity: $\tau^2 = 0$; $\tau = 0$; $I^2 = 0\%$ (0.0%–62.4%).					
All cause death					
	SAV	BE	IAV	SAVR	SUCRA
SAV	–	0.98 (0.79–1.20)	1.10 (0.58–2.08)	0.92 (0.38–2.23)	0.52
BE	1.03 (0.83–1.26)	–	1.13 (0.61–2.10)	0.94 (0.38–2.31)	0.44
IAV	0.91 (0.48–1.71)	0.88 (0.48–1.64)	–	0.83 (0.28–2.46)	0.63
SAVR	1.09 (0.45–2.65)	1.06 (0.43–2.61)	1.20 (0.41–3.56)	–	0.41
Heterogeneity: $\tau^2 = 0$; $\tau = 0$; $I^2 = 0\%$ (0.0%–62.4%).					

Hemodynamic Structural Valve Dysfunction					
	SAV	BE	IAV	SAVR	SUCRA
SAV	–	0.23 (0.11–0.48)	1.00 (0.26–3.90)	0.57 (0.08–3.91)	0.74
BE	4.44 (2.08–9.45)	–	4.44 (1.10–17.98)	2.54 (0.32–20.02)	0.03
IAV	1.00 (0.26–3.89)	0.23 (0.06–0.91)	–	0.57 (0.05–6.02)	0.81
SAVR	1.75 (0.26–11.97)	0.39 (0.05–3.12)	1.75 (0.17–18.46)	–	0.43
Heterogeneity: $\tau^2 = 0.5969$; $\tau = 0.7726$; $I^2 = 71.6\%$ (38.5%–86.9%).					
Moderate Prosthesis–Patient Mismatch					
	SAV	BE	IAV	SAVR	SUCRA
SAV	–	0.50 (0.36–0.70)	0.65 (0.34–1.24)	0.87 (0.30–2.55)	0.88
BE	2.00 (1.43–2.80)	–	1.30 (0.66–2.55)	1.75 (0.63–4.84)	0.06
IAV	1.54 (0.81–2.95)	0.77 (0.39–1.52)	–	1.35 (0.40–4.58)	0.36

SAVR	1.14 (0.39–3.34)	0.57 (0.21–1.58)	0.74 (0.22–2.51)	–	0.71
Heterogeneity: $\tau^2 = 0.1807$; $\tau = 0.4251$; $I^2 = 69.3\%$ (42.6%–83.5%).					
Paravalvular Leak					
	SAV	BE	IAV	SAVR	SUCRA
SAV	–	1.80 (0.83–3.88)	0.96 (0.19–4.86)	8.99 (0.25–323.16)	0.38
BE	0.56 (0.26–1.20)	–	0.54 (0.10–3.01)	5.00 (0.15–165.33)	0.30
IAV	1.04 (0.21–5.23)	1.86 (0.33–10.46)	–	9.32 (0.19–460.77)	0.49
SAVR	0.11 (0.00–4.00)	0.20 (0.01–6.61)	0.11 (0.00–5.30)	–	0.83
Heterogeneity: $\tau^2 = 0.7955$; $\tau = 0.8919$; $I^2 = 59.6\%$ (23.8%–78.6%).					
Indexed Effective Orifice Area (iEOA)					
	SAV	BE	IAV	SAVR	SUCRA

SAV	–	0.18 (0.12 to 0.24)	–0.02 (–0.14 to 0.09)	0.01 (–0.19 to 0.17)	0.37
BE	–0.18 (–0.35 to –0.12)	–	–0.20 (–0.32 to –0.09)	–0.17 (–0.36 to 0.02)	0.99
IAV	0.02 (–0.09 to 0.13)	0.20 (0.09 to 0.32)	–	0.03 (–0.18 to 0.24)	0.24
SAV R	–0.01 (–0.19 to 0.17)	0.17 (–0.02 to 0.36)	–0.03 (–0.24 to 0.18)	–	0.40
Heterogeneity: $\tau^2 = 0.0052$; $\tau = 0.0720$; $I^2 = 85.9\%$ (76.6%–91.5%).					
Mean Transvalvular Gradients					
	SAV	BE	IAV	SAVR	SUCRA
SAV	–	–4.60 (–9.16 to –0.04)	–1.15 (–3.69 to 1.39)	–0.01 (–4.33 to 4.33)	0.77
BE	4.60 (3.18 to 6.02)	–	3.45 (0.79 to 6.10)	4.60 (0.04 to 9.16)	0.01
IAV	1.15 (–1.39 to 3.69)	–3.45 (–6.10 to –0.79)	–	1.15 (–3.87 to 6.17)	0.50

SAVR	0.01 (-4.33 to -4.33)	-4.60 (-9.16 to -0.04)	-1.15 (-6.17 to 3.87)	–	0.71
Heterogeneity: $\tau^2 = 2.2176$; $\tau = 1.4892$; $I^2 = 89.9\%$ (84.6%–93.4%).					
Major Bleeding					
	SAV	BE	IAV	SAVR	SUCRA
SAV	–	1.11 (0.68–1.81)	0.98 (0.39–2.48)	0.60 (0.28–1.30)	0.59
BE	0.90 (0.55–1.48)	–	0.89 (0.34–2.31)	0.55 (0.26–1.17)	0.73
IAV	1.02 (0.40–2.58)	1.13 (0.43–2.94)	–	0.62 (0.19–1.97)	0.46
SAVR	1.65 (0.77–3.55)	1.83 (0.86–3.92)	1.62 (0.51–5.18)	–	0.
Heterogeneity: $\tau^2 = 0.1502$; $\tau = 0.3876$; $I^2 = 48.6\%$ (0.0%–79.6%).					
Major Vascular Events					
	SAV	BE	IAV	SAVR	SUCRA

SAV	–	1.57 (0.80– 3.06)	1.39 (0.25– 7.78)	10.96 (0.86– 140.08)	0.12
BE	0.64 (0.33– 1.25)	–	0.89 (0.14– 5.63)	7.00 (0.60– 81.80)	0.48
IAV	0.72 (0.13– 4.04)	1.13 (0.18– 7.17)	–	7.90 (0.36– 171.27)	0.44
SAV R	0.09 (0.01– 1.17)	0.14 (0.01– 1.67)	0.13 (0.01– 2.74)	–	0.96

Heterogeneity: $\tau^2 = 0.4397$; $\tau = 0.6631$; $I^2 = 67.7\%$ (23.3%–86.4%).

Permanent Pacemaker Implantation

	SAV	BE	IAV	SAVR	SUCRA
SAV	–	1.55 (1.08– 2.20)	0.51 (0.26– 1.02)	3.39 (1.47– 7.80)	0.33
BE	0.65 (0.45– 0.92)	–	0.33 (0.16– 0.69)	2.19 (0.96– 5.02)	0.67
IAV	1.95 (0.98– 3.88)	3.01 (1.44– 6.28)	–	6.59 (2.27– 19.17)	0.00

SAVR	0.30 (0.13–0.68)	0.46 (0.20–1.05)	0.15 (0.05–0.44)	–	1.00
Heterogeneity: $\tau^2 = 0.1088$; $\tau = 0.3298$; $I^2 = 46.8\%$ (0.0%–75.3%).					
Stroke					
	SAV	BE	IAV	SAVR	SUCRA
SAV	–	1.60 (0.89–2.89)	1.13 (0.32–4.01)	1.49 (0.48–4.57)	0.23
BE	0.62 (0.35–1.12)	–	0.71 (0.18–2.85)	0.93 (0.32–2.73)	0.70
IAV	0.88 (0.25–3.13)	1.42 (0.35–5.71)	–	1.31 (0.24–7.13)	0.44
SAVR	0.67 (0.22–2.06)	1.08 (0.37–3.17)	0.76 (0.14–4.13)	–	0.63
Heterogeneity: $\tau^2 = 0.1581$; $\tau = 0.3977$; $I^2 = 28.3\%$ (0.0%–69.1%).					
Heart Failure Hospitalizations					
	SAV	BE	IAV	SAVR	SUCRA

SAV	–	0.97 (0.65–1.43)	-	0.47 (0.24–0.94)	0.78
BE	1.04 (0.70–1.54)	–	-	0.49 (0.26–0.92)	0.71
IAV	-	–	–	–	-
SAV R	2.12 (1.07–4.20)	2.04 (1.09–3.83)	–	–	0.01
Heterogeneity: $\tau^2 = 0$; $\tau = 0$; $I^2 = 0\%$ (0.0%–79.2%).					
Valve Reinterventions					
	SAV	BE	IAV	SAVR	SUCRA
SAV	–	0.99 (0.31–3.12)	-	0.50 (0.05–5.40)	0.39
BE	1.01 (0.32–3.21)	–	-	0.51 (0.04–7.13)	0.41
IAV	-	-	–	–	-
SAV R	2.00 (0.19–21.58)	1.97 (0.14–27.70)	–	–	0.70

Heterogeneity: $\tau^2 = 0$; $\tau = 0$; $I^2 = 0\%$ (0.0%–89.6%).

Supplemental Table 9. Direct and indirect comparison in the sensitivity analysis excluding high risk patients

Severe PPM					
	SAV	BE	IAV	SAVR	SUCRA
SAV	–	0.43 (0.75–0.60)	0.56 (0.34–0.92)	0.31 (0.18–0.53)	0.99
BE	2.32 (1.64–3.28)	–	1.30 (0.79–2.13)	0.71 (0.26–1.13)	0.33
IAV	1.77 (1.08–2.91)	0.77 (0.46–1.25)	–	0.55 (0.26–1.13)	0.60
SAVR	3.22 (1.87–5.54)	1.38 (0.75–2.56)	1.81 (0.88–3.72)	–	0.05
Heterogeneity: $\tau^2 = 0$; $\tau = 0$; $I^2 = 0\%$ (0.0%–62.4%).					
All cause death					
	SAV	BE	IAV	SAVR	SUCRA
SAV	–	0.83 (0.68–1.01)	0.79 (0.59–1.06)	0.77 (0.42–1.43)	0.89
BE	1.19 (0.98–1.45)	–	0.95 (0.70–1.28)	0.93 (0.49–1.77)	0.41
IAV	1.25 (0.94–1.67)	1.04 (0.77–1.41)	–	0.97 (0.49–1.91)	0.32
SAVR	1.28 (0.69–2.35)	1.06 (0.56–2.02)	1.02 (0.52–2.00)	–	0.36
Heterogeneity: $\tau^2 = 0$; $\tau = 0$; $I^2 = 0\%$ (0.0%–62.4%).					

Hemodynamic Structural Valve Dysfunction					
	SAV	BE	IAV	SAVR	SUCRA
SAV	–	0.22 (0.10–0.47)	1.01 (0.26–3.80)	0.33 (0.10–1.09)	0.81
BE	4.41 (2.13–9.12)	–	4.46 (1.14–17.4)	1.46 (0.36–5.91)	0.10
IAV	1.00 (0.26–3.89)	0.22 (0.05–0.87)	–	0.33 (0.05–1.94)	0.79
SAVR	3.00 (0.91–9.81)	0.68 (0.17–2.74)	3.03 (0.51–17.9)	–	0.28
Heterogeneity: $\tau^2 = 0.5969$; $\tau = 0.7726$; $I^2 = 71.6\%$ (38.5%–86.9%).					
Moderate Prosthesis–Patient Mismatch					
	SAV	BE	IAV	SAVR	SUCRA
SAV	–	0.44 (0.30–0.65)	0.47 (0.24–0.91)	0.36 (0.15–0.82)	0.88
BE	2.24 (1.51–3.31)	–	1.05 (0.53–2.09)	0.81 (0.27–2.16)	0.06
IAV	2.11 (1.09–4.08)	0.94 (0.48–1.86)	–	0.76 (0.27–2.16)	0.36

SAVR	2.77 (1.21–6.34)	1.23 (0.52–2.93)	1.31 (0.46–3.71)	–	0.71
Heterogeneity: $\tau^2 = 0.1807$; $\tau = 0.4251$; $I^2 = 69.3\%$ (42.6%–83.5%).					
Paravalvular Leak					
	SAV	BE	IAV	SAVR	SUCRA
SAV	–	1.83 (0.86–5.72)	1.39 (0.36–5.29)	8.21 (0.94–71.32)	0.38
BE	0.54 (0.25–1.16)	–	0.75 (0.17–3.27)	4.46 (0.47–42.13)	0.30
IAV	0.72 (0.19–2.73)	1.32 (0.30–5.72)	–	5.90 (0.94–74.36)	0.49
SAVR	0.12 (0.01–1.05)	0.22 (0.02–2.11)	0.17 (0.01–2.13)	–	0.83
Heterogeneity: $\tau^2 = 0.7955$; $\tau = 0.8919$; $I^2 = 59.6\%$ (23.8%–78.6%).					
Indexed Effective Orifice Area (iEOA)					
	SAV	BE	IAV	SAVR	SUCRA
SAV	–	0.16 (0.09 to 0.23)	0.05 (–0.06 to 0.17)	0.17 (0.05 to 0.29)	0.06

BE	-0.16 (0.23 to -0.09)	–	-0.11 (–0.22 to 0.01)	0.01 (–0.12 to 0.14)	0.81
IAV	-0.05 (–0.17 to 0.06)	0.11 (–0.01 to 0.22)	–	0.12 (–0.05 to 0.28)	0.31
SAVR	-0.17 (–0.29 to -0.05)	-0.01 (–0.14 to 0.12)	–0.12 (–0.28 to 0.05)	–	0.82
Heterogeneity: $\tau^2 = 0.0052$; $\tau = 0.0720$; $I^2 = 85.9\%$ (76.6%–91.5%).					
Mean Transvalvular Gradients					
	SAV	BE	IAV	SAVR	SUCRA
SAV	–	–4.24 (–5.54 to –2.93)	–1.82 (–3.96 to 0.33)	–4.02 (–6.40 to –1.63)	0.98
BE	4.24 (2.93 to 5.54)	–	2.42 (0.20 to 4.64)	0.22 (–2.81 to 2.36)	0.15
IAV	1.82 (–0.33 to 3.96)	–2.42 (–4.64 to –0.20)	–	2.20 (–0.97 to 5.36)	0.65
SAVR	4.02 (1.63 to 6.40)	–0.22 (–2.36 to 2.81)	–2.20 (–5.36 to 0.97)	–	0.22

Heterogeneity: $\tau^2 = 2.2176$; $\tau = 1.4892$; $I^2 = 89.9\%$ (84.6%–93.4%).

Major Bleeding

	SAV	BE	IAV	SAVR	SUCRA
SAV	–	1.07 (0.59-1.93)	1.16 (0.55-2.46)	1.03 (0.44-2.38)	0.41
BE	0.93 (0.51-1.68)	–	1.08 (0.49-2.37)	0.96 (0.34-2.68)	0.51
IAV	0.85 (0.40-1.80)	0.91 (0.42-2.00)	–	0.88 (0.29-2.71)	0.61
SAVR	0.96 (0.42-2.23)	1.03 (0.37-2.88)	1.12 (0.36-3.46)	–	0.47

Heterogeneity: $\tau^2 = 0.1502$; $\tau = 0.3876$; $I^2 = 48.6\%$ (0.0%–79.6%).

Major Vascular Events

	SAV	BE	IAV	SAVR	SUCRA
SAV	–	1.08 (0.69-1.71)	1.01 (0.51-2.00)	4.96 (1.53-16.06)	0.28
BE	0.92 (0.58-1.44)	–	0.93 (0.45-1.94)	4.55 (1.29-16.04)	0.40

IAV	0.98 (0.49-1.94)	1.07 (0.51-2.23)	—	4.88 (1.25-18.97)	0.31
SAVR	0.20 (0.06-0.65)	0.22 (0.06-0.77)	0.20 (0.05-0.79)	—	0.99
Heterogeneity: $\tau^2 = 0.4397$; $\tau = 0.6631$; $I^2 = 67.7\%$ (23.3%–86.4%).					
Permanent Pacemaker Implantation					
	SAV	BE	IAV	SAVR	SUCRA
SAV	—	1.47 (0.89-2.42)	0.92 (0.46-1.83)	2.21 (0.89-5.47)	0.23
BE	0.67 (0.41-1.11)	—	0.62 (0.30-1.30)	1.50 (0.53-4.22)	0.68
IAV	1.08 (0.54-2.17)	1.60 (0.76-3.35)	—	2.40 (0.89-5.47)	0.19
SAVR	0.45 (0.18-1.12)	0.66 (0.23-1.87)	0.41 (0.13-1.30)	—	0.89
Heterogeneity: $\tau^2 = 0.1088$; $\tau = 0.3298$; $I^2 = 46.8\%$ (0.0%–75.3%).					
Stroke					
	SAV	BE	IAV	SAVR	SUCRA

SAV	—	1.43 (0.92-2.21)	1.51 (0.78-2.90)	1.21 (0.60-2.44)	0.15
BE	0.69 (0.45-1.08))	—	1.05 (0.50-2.90)	0.85 (0.37-1.93)	0.68
IAV	0.66 (0.34-1.27)	0.94 (0.45-2.00)	—	0.80 (0.31-2.09)	0.70
SAV R	0.82 (0.41-1.65)	1.17 (0.51-2.68)	1.24 (0.47-3.23)	—	0.46
Heterogeneity: $\tau^2 = 0.1581$; $\tau = 0.3977$; $I^2 = 28.3\%$ (0.0%–69.1%).					
Heart Failure Hospitalizations					
	SAV	BE	IAV	SAVR	SUCRA
SAV	—	0.86 (0.62-1.20)	0.94 (0.58-1.52)	0.66 (0.19-2.26)	0.71
BE	1.15 (0.83-1.60))	—	1.08 (0.64-1.83)	0.76 (0.21-2.72)	0.41
IAV	1.06 (0.65-1.71)	0.92 (0.54-1.55)	—	0.70 (0.19-2.63))	0.57
SAV R	1.5 (0.44-5.09)	1.30 (0.36-4.62)	1.41 (0.38-5.25)	—	0.30

Heterogeneity: $\tau^2 = 0$; $\tau = 0$; $I^2 = 0\%$ (0.0%–79.2%).

Valve Reinterventions

	SAV	BE	IAV	SAVR	SUCRA
SAV	—	1.01 (0.32-3.21)	-	2.24 (0.33-15.12)	0.34
BE	0.98 (0.31-3.11)	—	-	2.21 (0.23-20.53)	0.37
IAV	-	-	—	—	-
SAVR	0.44 (0.06-3.00))	0.45 (0.05-4.20)	—	—	0.77

Heterogeneity: $\tau^2 = 0$; $\tau = 0$; $I^2 = 0\%$ (0.0%–89.6%).

Supplemental Table 10. Sensitivity analysis including only studies with VARC-3 definitions

Severe Prosthesis–Patient Mismatch					
	SAV	BE	IAV	SAVR	SUCRA
SAV	–	0.43 (0.30–0.62)	0.57 (0.34–0.97)	0.28 (0.15–0.51)	0.99
BE	2.31 (1.60–3.33)	–	1.32 (0.79–2.23)	0.64 (0.33–1.26)	0.35
IAV	1.75 (1.04–2.95)	0.76 (0.45–1.27)	–	0.49 (0.22–1.07)	0.61
SAVR	3.58 (1.95–6.58)	1.55 (0.79–3.04)	2.05 (0.94–4.50)	–	0.05
Heterogeneity: $\tau^2 = 0.0780$; $\tau = 0.2792$; $I^2 = 27.7\%$.					
All cause death					
	SAV	BE	IAV	SAVR	SUCRA
SAV	–	0.90 (0.72–1.11)	0.84 (0.60–1.17)	0.63 (0.29–1.38)	0.85
BE	1.12 (0.90–1.38)	–	0.93 (0.67–1.31)	0.71 (0.31–1.59)	0.53
IAV	1.20 (0.86–1.67)	1.07 (0.76–1.50)	–	0.76 (0.32–1.77)	0.41
SAVR	1.58 (0.72–3.46)	1.42 (0.63–3.20)	1.32 (0.56–3.10)	–	0.20
Heterogeneity: $\tau^2 = 0$; $\tau = 0.1$; $I^2 = 13.7\%$ (0.0%–55.4%).					
Hemodynamic Structural Valve Dysfunction (SVD)					

	SAV	BE	IAV	SAVR	SUCRA
SAV		0.31 (0.16–0.60)	1.20 (0.38–3.78)	0.23 (0.07–0.73)	0.79
BE	3.24 (1.68–6.24)		3.87 (1.19–12.64)	0.74 (0.20–2.79)	0.22
IAV	0.84 (0.26–2.64)	0.26 (0.08–0.84)		0.19 (0.04–0.98)	0.86
SAVR	4.35 (1.38–13.72)	1.34 (0.36–5.05)	5.21 (1.03–26.46)	–	0.12
Heterogeneity: $\tau^2 = 0.26$; $\tau = 0.5$; $I^2 = 46.8\%$ (95% CI: 0%–78.9%).					
Moderate PPM					
	SAV	BE	IAV	SAVR	SUCRA
SAV	–	0.47 (0.29–0.75)	0.48 (0.24–0.98)	0.37 (0.15–0.89)	0.98
BE	2.15 (1.34–3.43)	–	1.04 (0.50–2.16)	0.79 (0.31–2.00)	0.38
IAV	2.07 (1.02–4.19)	0.96 (0.46–2.01)	–	0.76 (0.25–2.30)	0.42
SAVR	2.73 (1.12–6.64)	1.27 (0.50–3.25)	1.32 (0.44–4.00)	–	0.21
Heterogeneity: $\tau^2 = 0.42$; $\tau = 0.65$; $I^2 = 86.8\%$ (95% CI: 78.7%–91.8%).					
Paravalvular Leak					
	SAV	BE	IAV	SAVR	SUCRA

SAV	–	2.80 (1.59–4.94)	1.69 (0.72–3.98)	7.55 (1.26–45.25)	0.04
BE	0.36 (0.20–0.63)	–	0.60 (0.22–1.64)	2.70 (0.42–17.23)	0.66
IAV	0.59 (0.25–1.39)	1.66 (0.61–4.51)	–	4.47 (0.62–32.46)	0.37
SAVR	0.13 (0.02–0.79)	0.37 (0.06–2.37)	0.22 (0.03–1.62)	–	0.92
Heterogeneity: $\tau^2 = 0.01$; $\tau = 0.01$; $I^2 = 0\%$ (0%–56.2%). 6					
Indexed Effective Orifice Area					
	SAV	BE	IAV	SAVR	SUCRA
SAV	–	0.16 (0.08 to 0.23)	0.05 (-0.06 to 0.17)	0.23 (0.09 to 0.37)	0.93
BE	-0.16 (-0.23 to -0.08)	–	-0.11 (-0.22 to 0.01)	0.08 (-0.07 to 0.22)	0.29
IAV	-0.05 (-0.17 to 0.06)	0.11 (-0.01 to 0.22)	–	0.18 (0.00 to 0.36)	0.70
SAVR	-0.23 (-0.37 to -0.09)	-0.08 (-0.22 to 0.07)	-0.18 (-0.36 to -0.00)	–	0.07
Heterogeneity: $\tau^2 = 0.01$; $\tau = 0.1$; $I^2 = 93.8\%$ (90.8%–95.9%).					
Transvalvular Gradients					
	SAV	BE	IAV	SAVR	SUCRA
SAV	–	-4.13 (-5.49 to -2.78)	-1.80 (-3.71 to 0.11)	.5.61 (-8.12 to -3.09)	0.98

BE	4.14 (2.78 to 5.49)	–	2.33 (0.33 to 4.34)	-1.47 (-4.13 to 1.18)	0.29
IAV	1.80 (-0.11 to 3.72)	-2.33 (-4.34 to -0.33)	–	-3.81 (-6.90 to -0.71)	0.67
SAVR	5.61 (3.09 to 8.12)	1.47 (-1.18 to 4.13)	3.81 (0.71 to 6.90)	–	0.04

Heterogeneity: $\tau^2 = 1.53$; $\tau = 1.23$ $I^2 = 87.6\%$ (80.6%–92.1%).

Major Bleeding

	SAV	BE	IAV	SAVR	SUCRA
SAV	–	1.05 (0.56–1.97)	1.15 (0.56–2.39)	1.84 (0.60–5.63)	0.31
BE	0.96 (0.51–1.80)	–	1.10 (0.51–2.39)	1.76 (0.49–6.35)	0.38
IAV	0.87 (0.42–1.80)	0.91 (0.42–1.97)	–	1.60 (0.42–6.06)	0.49
SAVR	0.54 (0.18–1.66)	0.57 (0.16–2.06)	0.63 (0.17–2.38)	–	0.81

Heterogeneity: $\tau^2 = 0.22$; $\tau = 0.47$; $I^2 = 50.8\%$ [0%; 85.3%].

Major vascular events

	SAV	BE	IAV	SAVR	SUCRA
SAV	–	1.29 (0.74–2.26)	1.11 (0.46–2.70)	4.97 (1.18–20.83)	0.20
BE	0.78 (0.44–1.36)	–	0.86 (0.33–2.23)	3.85 (0.83–17.93)	0.49

IAV	0.90 (0.37–2.19)	1.16 (0.45–3.01)	–	4.48 (0.83–24.20)	0.33
SAVR	0.20 (0.05–0.84)	0.26 (0.06–1.21)	0.22 (0.04–1.21)	–	0.96
Heterogeneity: $\tau^2 = 0.30$; $\tau = 0.55$; $I^2 = 65.1\%$ [21.7%; 84.5%].					
Permanent pacemaker implantation					
	SAV	BE	IAV	SAVR	SUCRA
SAV	–	1.48 (0.92–2.39)	0.93 (0.47–1.83)	2.22 (0.71–6.91)	0.24
BE	0.67 (0.42–1.09)	–	0.62 (0.30–1.29)	1.49 (0.43–5.12)	0.70
IAV	1.08 (0.55–2.13)	1.60 (0.77–3.31)	–	2.39 (0.64–8.99)	0.20
SAVR	0.45 (0.14–1.41)	0.67 (0.20–2.30)	0.42 (0.11–1.57)	–	0.85
Heterogeneity: $\tau^2 = 0.27$; $\tau = 0.52$; $I^2 = 75.8\%$ [53.5%; 87.4%]					
Stroke					
	SAV	BE	IAV	SAVR	SUCRA
SAV	–	1.53 (0.84–2.79)	1.53 (0.69–3.39)	1.27 (0.46–3.53)	0.18
BE	0.65 (0.36–1.19)	–	1.00 (0.40–2.51)	0.83 (0.25–2.72)	0.67
IAV	0.65 (0.30–1.45)	1.00 (0.40–2.51)	–	0.83 (0.23–3.03)	0.65

SAVR	0.79 (0.28– 2.18)	1.20 (0.37– 3.92)	1.20 (0.33– 4.38)	–	0.48
Heterogeneity: $\tau^2 = 0.14$; $\tau = 0.38$; $I^2 = 33.2\%$ [0.0%; 73.1%]					
Heart failure hospitalizations					
	SAV	BE	IAV	SAVR	SUCRA
SAV	–	0.84 (0.58– 1.23)	0.93 (0.58– 1.51)	NA	0.71
BE	1.19 (0.82– 1.73)	–	1.11 (0.65– 1.90)	NA	0.27
IAV	1.07 (0.66– 1.73)	0.90 (0.53– 1.55)	–	NA	0.52
SAVR	NA	NA	NA	-	NA
Heterogeneity: $\tau^2 = 0$; $\tau = 0$; $I^2 = 0\%$ [0.0%; 89.6%]					
Valve re interventions					
	SAV	BE	IAV	SAVR	SUCRA
SAV	–	0.76 (0.17– 3.43)	NA	2.76 (0.11– 67.46)	0.45
BE	1.32 (0.29– 5.97)	–	NA	3.64 (0.11– 124.86)	0.30
IAV	NA	NA	–	NA	NA
SAVR	0.36 (0.01– 8.86)	0.27 (0.01– 9.42)	NA	–	0.75
Heterogeneity: $\tau^2 = 0$; $\tau = 0$; $I^2 = 0\%$ [0.0%; 84.7%]					

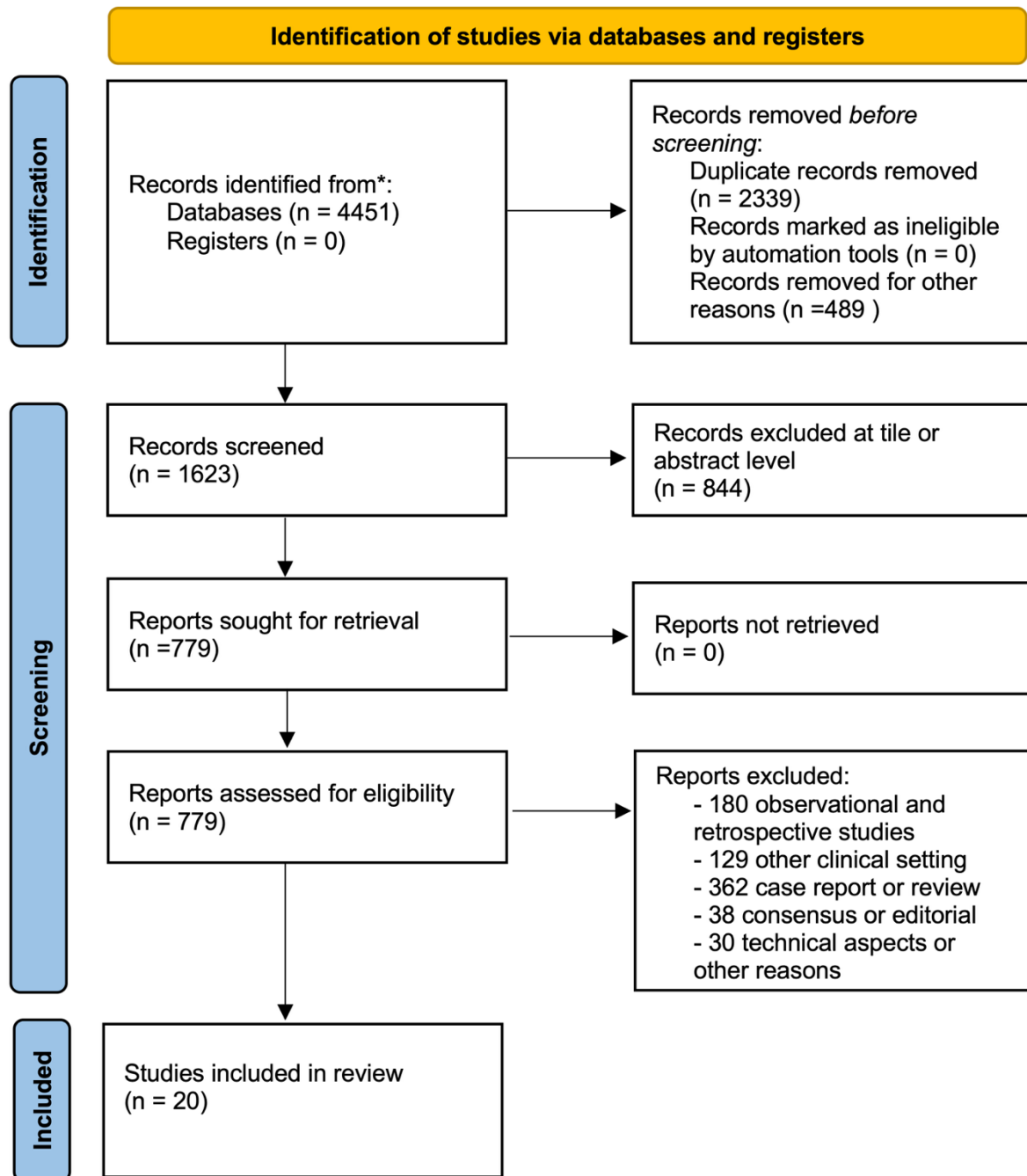
Supplemental Table 11. Random-effects meta-regression of moderate prosthesis-patient mismatch (PPM) on valve type, AVA, and BSA (reference: SAV). AVA, aortic valve area; BSA, body surface area; CI, confidence interval; SE, standard error.

Moderator	Estimate	SE	95% CI	z	p-value
Intercept (SAV, reference)	-6.2364	1.4606	-9.0992, -3.3737	-4.27	<0.0001
Valve type: BE vs SAV	1.0102	0.3423	0.3392, 1.6811	2.95	0.0032
Valve type: IAV vs SAV	0.7737	0.4055	-0.0210, 1.5684	1.91	0.0564
Valve type: SAVR vs SAV	0.9298	0.5285	-0.1061, 1.9657	1.76	0.0785
AVA, mean (cm ²)	-1.6523	1.2846	-4.1701, 0.8655	-1.29	0.1984
BSA, mean (m ²)	2.8665	0.9947	0.9168, 4.8161	2.88	0.0040

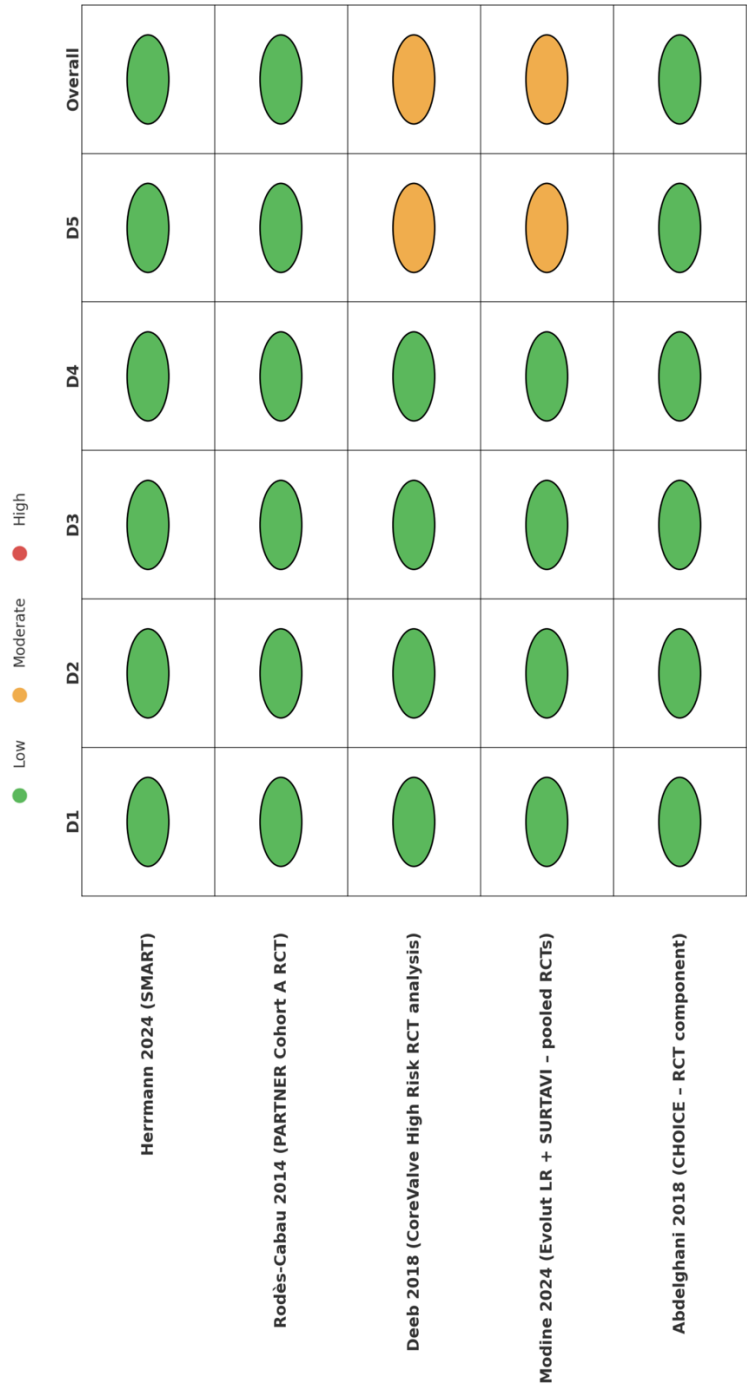
Supplemental Table 12. Random-effects meta-regression of severe prosthesis-patient mismatch (PPM) on valve type, AVA, and BSA (reference: SAV) AVA, aortic valve area; BSA, body surface area; CI, confidence interval; SE, standard error.

Moderator	Estimate	SE	95% CI	z	p-value
Intercept (SAV, reference)	-11.9975	1.5985	-15.1304, -8.8646	-7.51	<0.0001
Valve type: BE vs SAV	1.4204	0.3161	0.8009, 2.0399	4.49	<0.0001
Valve type: IAV vs SAV	0.6947	0.3587	-0.0084, 1.3977	1.94	0.0528
Valve type: SAVR vs SAV	0.9844	0.4271	0.1473, 1.8215	2.30	0.0212
AVA, mean (cm ²)	-3.6639	1.4439	-6.4938, -0.8339	-2.54	0.0112
BSA, mean (m ²)	6.4425	1.1318	4.2242, 8.6607	5.69	<0.0001

Supplemental Figure 1. Prisma Flowchart

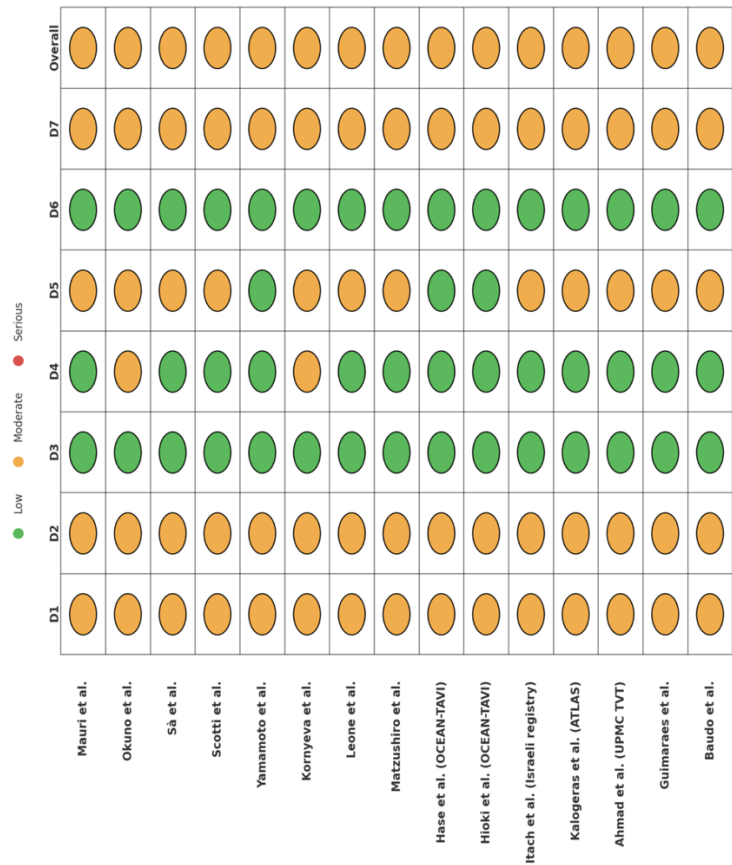


Supplemental Figure 2. Risk of bias according to Rob2.



D1 = Bias arising from the randomization process; D2 = Bias due to deviations from intended interventions; D3 = Bias due to missing outcome data; D4 = Bias in measurement of the outcome; D5 = Bias in selection of the reported result; Overall = Overall risk of bias

Supplemental Figure 3. Risk of Bias according to Robins I



D1 = Bias due to confounding; D2 = Bias in selection of participants into the study; D3 = Bias in classification of interventions; D4 = Bias due to deviations from intended interventions; D5 = Bias due to missing data; D6 = Bias in measurement of outcomes; D7 = Bias in selection of the reported result; Overall = Overall risk of bias

Supplemental Figure 4. Funnel plot across all outcomes

