

## B.1 Clinical search literature search strategy

Searches were constructed using a PICO framework where population (P) terms were combined with Intervention (I) and in some cases Comparison (C) terms. Outcomes (O) are rarely used in search strategies for interventions as these concepts may not be well described in title, abstract or indexes and therefore difficult to retrieve. Search filters were applied to the search where appropriate.

**Table 7: Database date parameters and filters used**

Database	Dates searched	Search filter used
Medline (OVID)	1946 - 14 October 2020	Exclusions Randomised controlled trials Systematic review studies Observational studies
Embase (OVID)	1974 - 14 October 2020	Exclusions Randomised controlled trials Systematic review studies Observational studies
The Cochrane Library (Wiley)	Cochrane Reviews to 2020 Issue 10 of 12 CENTRAL to 2020 Issue 10 of 12	None

### Medline (Ovid) search terms

1.	exp Heart Valve Diseases/
2.	exp heart valves/
3.	((primary or secondary) adj valv* disease*).ti,ab.
4.	((valv* or flap* or leaflet*) adj1 (heart or cardiac) adj (disease* or disorder* or failure or failed or dysfunction* or insufficien* or repair* or replace* or damage* or leak*)).ti,ab.
5.	((mitral or aortic or tricuspid or pulmon*) adj (valv* or flap* or leaflet*) adj (disease* or disorder* or failure or failed or dysfunction* or insufficien* or repair* or replace* or damage* or leak*)).ti,ab.
6.	((mitral or aortic or tricuspid or pulmon*) adj3 (prolapse or regurgitation or stenosis or atresia or insufficienc*)).ti,ab.
7.	Heart Valve Prosthesis/
8.	((mechanical or artificial or prosthe* or bioprosathe* or biological or tissue) adj (valv* or flap* or leaflet*)).ti,ab.
9.	valve-in-valve.ti,ab.
10.	(transcatheter adj2 (valve or valves)).ti,ab.
11.	exp Heart Murmurs/

12.	((heart or cardiac) adj murmur*).ti,ab.
13.	or/1-12
14.	letter/
15.	editorial/
16.	news/
17.	exp historical article/
18.	Anecdotes as Topic/
19.	comment/
20.	case report/
21.	(letter or comment*).ti.
22.	or/14-21
23.	randomized controlled trial/ or random*.ti,ab.
24.	22 not 23
25.	animals/ not humans/
26.	exp Animals, Laboratory/
27.	exp Animal Experimentation/
28.	exp Models, Animal/
29.	exp Rodentia/
30.	(rat or rats or mouse or mice).ti.
31.	or/24-30
32.	13 not 31
33.	limit 32 to English language
34.	(exp child/ or exp pediatrics/ or exp infant/) not (exp adolescent/ or exp adult/ or exp middle age/ or exp aged/)
35.	33 not 34
36.	exp Natriuretic Peptide, Brain/
37.	Biomarker*.ti,ab.
38.	((brain or b-type) adj2 natriuretic peptide*).ti,ab.
39.	(bnp or nt-probnp or nt-pro bnp or nt-bnp).ti,ab.
40.	exp Echocardiography/
41.	(Echo* or transoesophageal or transesophageal or transthoracic or TOE or TEE or TTE).ti,ab.
42.	exp Electrocardiography/
43.	(electrocardio* or ECG or EKG).ti,ab.
44.	exp Tomography, X-Ray computed/
45.	(comput* adj2 tomograp*).ti,ab.
46.	(CT adj3 (cine or CAT or scan* or x ray* or xray* or imag*)).ti,ab.
47.	exp Magnetic Resonance Imaging/
48.	((magnetic or nuclear) adj2 resonance adj3 imag*).ti,ab.
49.	((cardiac or cardiovascular) adj mr).ti,ab.
50.	(mri* or nmr* or cmr*).ti,ab.
51.	patient reported outcome measures/
52.	("patient reported outcome measures" or PROM*).ti,ab.
53.	(euroqol* or eq5d* or eq 5*).ti,ab.
54.	("minnesota living with heart failure questionnaire" or MLHFQ or MLWHF).ti,ab.

55.	("Veterans Specific Activity Questionnaire" or VSAQ).ti,ab.
56.	(clinic* adj2 (assess* or general or special* or valve* or monitor* or examin*)).ti,ab.
57.	Exercise tolerance/ or Exercise Test/
58.	((physical* or exercise* or fitness) adj5 (fit* or train* or therap* or activ* or strength or endur* or exert* or capacit* or tolera* or test*)).ti,ab.
59.	(stress test adj2 (cardiac or ECG)).ti,ab.
60.	bruce protocol.ti,ab.
61.	or/36-60
62.	Meta-Analysis/
63.	exp Meta-Analysis as Topic/
64.	(meta analy* or metanaly* or metaanaly* or meta regression).ti,ab.
65.	((systematic* or evidence*) adj3 (review* or overview*)).ti,ab.
66.	(reference list* or bibliograph* or hand search* or manual search* or relevant journals).ab.
67.	(search strategy or search criteria or systematic search or study selection or data extraction).ab.
68.	(search* adj4 literature).ab.
69.	(medline or pubmed or cochrane or embase or psychlit or psychlit or psychinfo or psycinfo or cinahl or science citation index or bids or cancerlit).ab.
70.	cochrane.jw.
71.	((multiple treatment* or indirect or mixed) adj2 comparison*).ti,ab.
72.	or/62-71
73.	randomized controlled trial.pt.
74.	controlled clinical trial.pt.
75.	randomi#ed.ti,ab.
76.	placebo.ab.
77.	randomly.ti,ab.
78.	Clinical Trials as topic.sh.
79.	trial.ti.
80.	or/73-79
81.	Epidemiologic studies/
82.	Observational study/
83.	exp Cohort studies/
84.	(cohort adj (study or studies or analys* or data)).ti,ab.
85.	((follow up or observational or uncontrolled or non randomi#ed or epidemiologic*) adj (study or studies or data)).ti,ab.
86.	((longitudinal or retrospective or prospective or cross sectional) and (study or studies or review or analys* or cohort* or data)).ti,ab.
87.	Controlled Before-After Studies/
88.	Historically Controlled Study/
89.	Interrupted Time Series Analysis/
90.	(before adj2 after adj2 (study or studies or data)).ti,ab.
91.	or/81-90
92.	35 and 61 and (72 or 80 or 91)

### Embase (Ovid) search terms

1.	exp valvular heart disease/
2.	exp heart valve/
3.	((primary or secondary) adj valv* disease*).ti,ab.
4.	((valv* or flap* or leaflet*) adj1 (heart or cardiac) adj (disease* or disorder* or failure or failed or dysfunction* or insufficien* or repair* or replace* or damage* or leak*).ti,ab.
5.	((mitral or aortic or tricuspid or pulmon*) adj (valv* or flap* or leaflet*) adj (disease* or disorder* or failure or failed or dysfunction* or insufficien* or repair* or replace* or damage* or leak*).ti,ab.
6.	((mitral or aortic or tricuspid or pulmon*) adj3 (prolapse or regurgitation or stenos?s or atresia or insufficienc*).ti,ab.
7.	exp heart valve prosthesis/
8.	((mechanical or artificial or prosthe* or bioprosthe* or biological or tissue) adj (valv* or flap* or leaflet*).ti,ab.
9.	valve-in-valve.ti,ab.
10.	(transcatheter adj2 (valve or valves)).ti,ab.
11.	exp heart murmur/
12.	((heart or cardiac) adj murmur*).ti,ab.
13.	or/1-12
14.	letter.pt. or letter/
15.	note.pt.
16.	editorial.pt.
17.	Case report/ or Case study/
18.	(letter or comment*).ti.
19.	or/14-18
20.	randomized controlled trial/ or random*.ti,ab.
21.	19 not 20
22.	animal/ not human/
23.	Nonhuman/
24.	exp Animal Experiment/
25.	exp Experimental animal/
26.	Animal model/
27.	exp Rodent/
28.	(rat or rats or mouse or mice).ti.
29.	or/21-28
30.	13 not 29
31.	limit 30 to English language
32.	(exp child/ or exp pediatrics/) not (exp adult/ or exp adolescent/)
33.	31 not 32
34.	exp brain natriuretic peptide/
35.	Biomarker*.ti,ab.
36.	((brain or b-type) adj2 natriuretic peptide*).ti,ab.
37.	(bnp or nt-probnp or nt-pro bnp or nt-bnp).ti,ab.
38.	exp Echocardiography/
39.	(Echo* or transoesophageal or transesophageal or transthoracic or TOE or TEE or TTE).ti,ab.
40.	exp electrocardiography/

41.	(electrocardio* or ECG or EKG).ti,ab.
42.	exp x-ray computed tomography/
43.	(comput* adj2 tomograp*).ti,ab.
44.	(CT adj3 (cine or CAT or scan* or x ray* or xray* or imag*)).ti,ab.
45.	exp nuclear magnetic resonance imaging/
46.	((magnetic or nuclear) adj2 resonance adj3 imag*).ti,ab.
47.	((cardiac or cardiovascular) adj mr).ti,ab.
48.	(mri* or nmr* or cmr*).ti,ab.
49.	exp patient-reported outcome/
50.	("patient reported outcome measure*" or PROM*).ti,ab.
51.	(euroqol* or eq5d* or eq 5*).ti,ab.
52.	("minnesota living with heart failure questionnaire" or MLHFQ or MLWHF).ti,ab.
53.	("Veterans Specific Activity Questionnaire" or VSAQ).ti,ab.
54.	(clinic* adj2 (assess* or general or special* or valve* or monitor* or examin*)).ti,ab.
55.	Exercise tolerance/ or Exercise Test/
56.	((physical* or exercise* or fitness) adj5 (fit* or train* or therap* or activ* or strength or endure* or exert* or capacit* or tolera* or test*)).ti,ab.
57.	(stress test adj2 (cardiac or ECG)).ti,ab.
58.	bruce protocol.ti,ab.
59.	or/34-58
60.	systematic review/
61.	meta-analysis/
62.	(meta analy* or metanaly* or metaanaly* or meta regression).ti,ab.
63.	((systematic or evidence) adj3 (review* or overview*)).ti,ab.
64.	(reference list* or bibliograph* or hand search* or manual search* or relevant journals).ab.
65.	(search strategy or search criteria or systematic search or study selection or data extraction).ab.
66.	(search* adj4 literature).ab.
67.	(medline or pubmed or cochrane or embase or psychlit or psyclit or psychinfo or psycinfo or cinahl or science citation index or bids or cancerlit).ab.
68.	cochrane.jw.
69.	((multiple treatment* or indirect or mixed) adj2 comparison*).ti,ab.
70.	or/60-69
71.	random*.ti,ab.
72.	factorial*.ti,ab.
73.	(crossover* or cross over*).ti,ab.
74.	((doubl* or singl*) adj blind*).ti,ab.
75.	(assign* or allocat* or volunteer* or placebo*).ti,ab.
76.	crossover procedure/
77.	single blind procedure/
78.	randomized controlled trial/
79.	double blind procedure/
80.	or/71-79
81.	Clinical study/

82.	Observational study/
83.	family study/
84.	longitudinal study/
85.	retrospective study/
86.	prospective study/
87.	cohort analysis/
88.	follow-up/
89.	cohort*.ti,ab.
90.	88 and 89
91.	(cohort adj (study or studies or analys* or data)).ti,ab.
92.	((follow up or observational or uncontrolled or non randomi#ed or epidemiologic*) adj (study or studies or data)).ti,ab.
93.	((longitudinal or retrospective or prospective or cross sectional) and (study or studies or review or analys* or cohort* or data)).ti,ab.
94.	(before adj2 after adj2 (study or studies or data)).ti,ab.
95.	or/81-87,90-94
96.	33 and 59 and (70 or 80 or 95)

#### Cochrane Library (Wiley) search terms

#1.	MeSH descriptor: [Heart Valve Diseases] explode all trees
#2.	MeSH descriptor: [Heart Valves] explode all trees
#3.	((primary or secondary) NEXT valv* disease*):ti,ab
#4.	((valv* or flap* or leaflet*) near/1 (heart or cardiac) NEXT (disease* or disorder* or failure or failed or dysfunction* or insufficien* or repair* or replace* or damage* or leak*)):ti,ab
#5.	((mitral or aortic or tricuspid or pulmon*) NEXT (valv* or flap* or leaflet*) NEXT (disease* or disorder* or failure or failed or dysfunction* or insufficien* or repair* or replace* or damage* or leak*)):ti,ab
#6.	((mitral or aortic or tricuspid or pulmon*) NEAR/3 (prolapse or regurgitation or stenosis or atresia or insufficienc*)):ti,ab
#7.	MeSH descriptor: [Heart Valve Prosthesis] explode all trees
#8.	((mechanical or artificial or prosthe* or bioprosthe* or biological or tissue) NEXT (valv* or flap* or leaflet*)):ti,ab
#9.	valve-in-valve:ti,ab
#10.	(transcatheter NEAR/2 (valve or valves)):ti,ab
#11.	MeSH descriptor: [Heart Murmurs] explode all trees
#12.	((heart or cardiac) NEXT murmur*):ti,ab
#13.	(or #1-#12)
#14.	MeSH descriptor: [Natriuretic Peptide, Brain] explode all trees
#15.	Biomarker*:ti,ab
#16.	((brain or b-type) near/2 natriuretic peptide*):ti,ab
#17.	(bnp or nt-probnp or nt-pro bnp or nt-bnp):ti,ab
#18.	MeSH descriptor: [Echocardiography] explode all trees
#19.	(electrocardio* or ECG or EKG):ti,ab
#20.	MeSH descriptor: [Tomography, X-Ray Computed] explode all trees
#21.	(comput* near/2 tomograp*):ti,ab
#22.	(CT near/3 (cine or CAT or scan* or x ray* or xray* or imag*)):ti,ab

#23.	MeSH descriptor: [Magnetic Resonance Imaging] explode all trees
#24.	((magnetic or nuclear) near/2 resonance near/3 imag*):ti,ab
#25.	((cardiac or cardiovascular) near/1 mr):ti,ab
#26.	(mri* or nmr* or cmr*):ti,ab
#27.	MeSH descriptor: [Patient Reported Outcome Measures] explode all trees
#28.	("patient reported outcome measures" or PROM):ti,ab
#29.	(euroqol* or eq5d* or eq 5*):ti,ab
#30.	("minnesota living with heart failure questionnaire" or MLHFQ or MLWHF):ti,ab
#31.	("Veterans Specific Activity Questionnaire" or VSAQ):ti,ab
#32.	(clinic* near/2 (assess* or general or special* or valve or monitor* or examin*)):ti,ab
#33.	MeSH descriptor: [Exercise Tolerance] explode all trees
#34.	MeSH descriptor: [Exercise Test] explode all trees
#35.	((physical* or exercise* or fitness) near/5 (fit* or train* or therap* or activ* or strength or endur* or exert* or capac* or tolera* or test*)):ti,ab
#36.	("stress test" near/2 (cardiac or ECG)):ti,ab
#37.	bruce protocol:ti,ab
#38.	(OR #14-#37)
#39.	#13 and #38