National Clinical Guidelines Centre

Acute heart failure search strategy appendix

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Methods, evidence and recommendations

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Search strategies used for the acute heart failure guideline are outlined below and were run in accordance with the methodology in the NICE Guidelines Manual 2012.[1]

All searches were run up to 28th January 2014 unless otherwise stated. Any studies added to the databases after this date were not included unless specifically stated in the text. Where possible searches were limited to retrieve material published in English.

Table 1:   Database date parameters

Database	Dates searched
Medline	1946 – 28th January 2014
Embase	1980 – January 2014 (week 4)
The Cochrane Library	Cochrane Reviews to 2014 Issue 1 of 12 CENTRAL to 2013 Issue 12 of 12 DARE, HTA and NHSEED to 2013 Issue 4 of 4

Clinical searches

Searches for the **clinical reviews** were run in Medline (OVID), Embase (OVID) and the Cochrane Library (Wiley). Additional searches were run in HMIC (OVID) for one question. Usually, searches were constructed in the following way:

•   A PICO format was used for **intervention** searches where population (P) terms were combined with Intervention (I) and sometimes Comparison (C) terms. An intervention can be a drug, a procedure or a diagnostic test. Outcomes (O) are rarely used in search strategies for interventions. Search filters were also added to the search where appropriate.

•   A PEO format was used for **prognosis** searches where population (P) terms were combined with exposure (E) terms and sometimes outcomes (O). Search filters were added to the search where appropriate.

Health economics searches

Searches for the **health economic reviews** were run in Medline (Ovid), Embase (Ovid), the NHS Economic Evaluations Database (NHS EED), the Health Technology Assessment (HTA) database and the Health Economic Evaluation Database (HEED). Searches in NHS EED and HEED were constructed only using population terms. For Medline and Embase an economic filter (instead of a study type filter) was added to the same clinical search strategy. An additional search on valvular surgery was run using only intervention terms (A.4.2).

Searches for **quality of life** data were run in Medline (OVID) and Embase (OVID) by adding the filter in section A.2.5 to the population terms.

A.1   Population search strategies

The same population was used throughout the guideline with the following exceptions:

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- the questions on valvular surgery (A.3.13 & A.3.14) where no population was used
- the questions on non-invasive ventilation, diuretics and ultrafiltration and opiates (A3.5, A3.6 & A.3.8) and health economics searches where the population was expanded to include pulmonary oedema
- the question on natriuretic peptides (A.3.2) where the population was expanded to include dyspnea

A.1.1 Acute heart failure population

Medline search terms

1.	exp heart failure/
2.	cardiomyopathy, dilated/
3.	shock, cardiogenic/
4.	exp ventricular dysfunction/
5.	cardiac output, low/
6.	((heart or cardiac or myocardial) adj2 (failure or decompensation)).ti.
7.	((congestive or acute or decompensat*) adj2 "heart failure").ti,ab.
8.	((dilated or congestive) adj2 cardiomyopath*).ti.
9.	"cardiogenic shock".ti.
10.	((ventricular or ventricle*) adj2 (failure or insufficien* or dysfunction*)).ti.
11.	(("left ventricular" or "left ventricle") adj2 (failure or insufficien* or dysfunction*)).ti,ab.
12.	lvsd.ti,ab.
13.	or/1-12

Embase search terms

1.	*heart failure/ or acute heart failure/ or *cardiogenic shock/ or *diastolic dysfunction/ or *forward heart failure/ or *high output heart failure/ or *systolic dysfunction/
2.	*congestive cardiomyopathy/ or exp *congestive heart failure/
3.	exp *heart ventricle failure/
4.	((heart or cardiac or myocardial) adj2 (failure or decompensation)).ti.
5.	((congestive or acute or decompensat*) adj2 "heart failure").ti,ab.
6.	((dilated or congestive) adj2 cardiomyopath*).ti.
7.	"cardiogenic shock".ti.
8.	((ventricular or ventricle*) adj2 (failure or insufficien* or dysfunction*)).ti.
9.	(("left ventricular" or "left ventricle") adj2 (failure or insufficien* or dysfunction*)).ti,ab.
10.	lvsd.ti,ab.
11.	or/1-10

Cochrane search terms

#1.	MeSH descriptor: [Heart Failure] explode all trees
#2.	MeSH descriptor: [Cardiomyopathy, Dilated] explode all trees
#3.	MeSH descriptor: [Shock, Cardiogenic] explode all trees
#4.	MeSH descriptor: [Ventricular Dysfunction] explode all trees
#5.	MeSH descriptor: [Cardiac Output, Low] explode all trees
#6.	(heart or cardiac or myocardial) near/2 (failure or decompensation):ti
#7.	((congestive or acute or decompensat*) near/2 "heart failure"):ti,ab
#8.	(dilated or congestive) near/2 cardiomyopath*:ti
#9.	cardiogenic shock:ti

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#10.	(ventricular or ventricle*) near/2 (failure or insufficien* or dysfunction*):ti
#11.	(("left ventricle" or "left ventricular") near/2 (failure or insufficienc* or dysfunction*)):ti,ab
#12.	lvsd:ti,ab
#13.	#1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10 or #11 or #12

HMIC search terms

1.	exp cardiogenic shock/
2.	exp cardiac output/
3.	((heart or cardiac or myocardial) adj2 (failure or decompensation)).ti.
4.	((congestive or acute or decompensat*) adj2 "heart failure").ti,ab.
5.	((dilated or congestive) adj2 cardiomyopath*).ti.
6.	"cardiogenic shock".ti.
7.	((ventricular or ventricle*) adj2 (failure or insufficien* or dysfunction*)).ti.
8.	(("left ventricular" or "left ventricle") adj2 (failure or insufficien* or dysfunction*)).ti,ab.
9.	lvsd.ti,ab.
10.	or/1-9

A.1.2 Pulmonary oedema search terms

This population was used for the diuretics, ultrafiltration (A.3.6) and opiates (A.3.8) questions, and with a modification in the non-invasive ventilation question (A.3.5) see footnote.

Medline search terms

1.	*pulmonary edema/
2.	(cardiogenic adj2 (pulmonary oedema or pulmonary edema or lung edema or lung oedema)).ti,ab.[a]
3.	or/1-2

Embase search terms

1.	*lung edema/
2.	(cardiogenic adj2 (pulmonary edema or pulmonary oedema or lung edema or lung oedema)).ti,ab.[a]
3.	or/1-2

Cochrane search terms

#1	MeSH descriptor: [Pulmonary Edema] this term only
#2	cardiogenic near/2 ("pulmonary edema" or "pulmonary oedema" or "lung edema" or "lung oedema"):ti,ab[a]
#3	#1 or #2

A.1.3 Dyspnea population terms

Medline search terms

1.	dyspnea/di
2.	dyspnea/et

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[a] For the non-invasive ventilation question line 2 was replaced by this for Medline and Embase: (pulmonary oedema or pulmonary edema or lung edema or lung oedema).ti,ab. and by this for Cochrane: ("pulmonary edema" or "pulmonary oedema" or "lung edema" or "lung oedema"):ti,ab

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3.	((cadiac or cardio* or cardiac-related) adj3 dyspnea).ti,ab.
4.	or/1-3

Embase search terms

1.	dyspnea/di
2.	dyspnea/et
3.	((cadiac or cardio* or cardiac-related) adj3 dyspnea).ti,ab.
4.	or/1-3

Cochrane search terms

#1	MeSH descriptor: [Dyspnea] explode all trees and with qualifiers: [Diagnosis - DI]
#2	MeSH descriptor: [Dyspnea] explode all trees and with qualifiers: [Etiology - ET]
#3	(cadiac or cardio* or cardiac-related) near/3 dyspnea:ti,ab
#4	#1 or #2 or #3

A.2   Study filter search terms

A.2.1   Systematic review (SR) search terms

Medline search terms

1.	meta-analysis/
2.	meta-analysis as topic/
3.	(meta analy* or metanaly* or metaanaly* or meta regression).ti,ab.
4.	((systematic* or evidence*) adj2 (review* or overview*)).ti,ab.
5.	(reference list* or bibliograph* or hand search* or manual search* or relevant journals).ab.
6.	(search strategy or search criteria or systematic search or study selection or data extraction).ab.
7.	(search* adj4 literature).ab.
8.	(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.
9.	cochrane.jw.
10.	((multiple treatment* or indirect or mixed) adj2 comparison*).ti,ab.
11.	or/1-10

Embase search terms

1.	systematic review/
2.	meta-analysis/
3.	(meta analy* or metanaly* or metaanaly* or meta regression).ti,ab.
4.	((systematic or evidence) adj2 (review* or overview*)).ti,ab.
5.	(reference list* or bibliograph* or hand search* or manual search* or relevant journals).ab.
6.	(search strategy or search criteria or systematic search or study selection or data extraction).ab.
7.	(search* adj4 literature).ab.
8.	(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.
9.	cochrane.jw.
10.	((multiple treatment* or indirect or mixed) adj2 comparison*).ti,ab.
11.	or/1-10

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A.2.2 Randomised controlled studies (RCTs) search terms

Medline search terms

1.	randomized controlled trial.pt.
2.	controlled clinical trial.pt.
3.	randomi#ed.ab.
4.	placebo.ab.
5.	randomly.ab.
6.	clinical trials as topic.sh.
7.	trial.ti.
8.	or/1-7

Embase search terms

1.	random*.ti,ab.
2.	factorial*.ti,ab.
3.	(crossover* or cross over*).ti,ab.
4.	((doubl* or singl*) adj blind*).ti,ab.
5.	(assign* or allocat* or volunteer* or placebo*).ti,ab.
6.	crossover procedure/
7.	double blind procedure/
8.	single blind procedure/
9.	randomized controlled trial/
10.	or/1-9

A.2.3 Observational studies (OBS) search terms

Medline search terms

1.	epidemiologic studies/
2.	exp case control studies/
3.	exp cohort studies/
4.	cross-sectional studies/
5.	case control.ti,ab.
6.	(cohort adj (study or studies or analys*)).ti,ab.
7.	((follow up or observational or uncontrolled or non randomi#ed or nonrandomi#ed or epidemiologic*) adj (study or studies)).ti,ab.
8.	((longitudinal or retrospective or prospective or cross sectional) and (study or studies or review or analys* or cohort*)).ti,ab.
9.	or/1-8

Embase search terms

1.	clinical study/
2.	exp case control study/
3.	family study/
4.	longitudinal study/
5.	retrospective study/
6.	prospective study/
7.	cross-sectional study/
8.	cohort analysis/

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9.	follow-up/
10.	cohort*.ti,ab.
11.	9 and 10
12.	case control.ti,ab.
13.	(cohort adj (study or studies or analys*)).ti,ab.
14.	((follow up or observational or uncontrolled or non randomi#ed or nonrandomi#ed or epidemiologic*) adj (study or studies)).ti,ab.
15.	((longitudinal or retrospective or prospective or cross sectional) and (study or studies or review or analys* or cohort*)).ti,ab.
16.	or/1-8,11-15

A.2.4 Prognostic (PROG) studies search terms

Medline search terms

1.	predict.ti.
2.	(validat* or rule*).ti,ab.
3.	(predict* and (outcome* or risk* or model*)).ti,ab.
4.	((history or variable* or criteria or scor* or characteristic* or finding* or factor*) and (predict* or model* or decision* or identif* or prognos*)).ti,ab.
5.	decision*.ti,ab. and logistic models/
6.	(decision* and (model* or clinical*)).ti,ab.
7.	(prognostic and (history or variable* or criteria or scor* or characteristic* or finding* or factor* or model*)).ti,ab.
8.	(stratification or discrimination or discriminate or c statistic or "area under the curve" or AUC or calibration or indices or algorithm or multivariable).ti,ab.
9.	ROC curve/
10.	or/1-9

Embase search terms

1.	predict.ti.
2.	(validat* or rule*).ti,ab.
3.	(predict* and (outcome* or risk* or model*)).ti,ab.
4.	((history or variable* or criteria or scor* or characteristic* or finding* or factor*) and (predict* or model* or decision* or identif* or prognos*)).ti,ab.
5.	decision*.ti,ab. and statistical model/
6.	(decision* and (model* or clinical*)).ti,ab.
7.	(prognostic and (history or variable* or criteria or scor* or characteristic* or finding* or factor* or model*)).ti,ab.
8.	(stratification or discrimination or discriminate or c statistic or "area under the curve" or AUC or calibration or indices or algorithm or multivariable).ti,ab.
9.	receiver operating characteristic/
10.	or/1-9

A.2.5 Health economics (HE) search terms

Medline search terms

1.	economics/
2.	value of life/
3.	exp "costs and cost analysis"/

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4.	exp economics, hospital/
5.	exp economics, medical/
6.	economics, nursing/
7.	economics, pharmaceutical/
8.	exp "fees and charges"/
9.	exp budgets/
10.	budget*.ti,ab.
11.	cost*.ti.
12.	(economic* or pharmaco?economic*).ti.
13.	(price* or pricing*).ti,ab.
14.	(cost* adj2 (effective* or utilit* or benefit* or minimi* or unit* or estimat* or variable*)).ab.
15.	(financ* or fee or fees).ti,ab.
16.	(value adj2 (money or monetary)).ti,ab.
17.	or/1-16

Embase search terms

1.	health economics/
2.	exp economic evaluation/
3.	exp health care cost/
4.	exp fee/
5.	budget/
6.	funding/
7.	budget*.ti,ab.
8.	cost*.ti.
9.	(economic* or pharmaco?economic*).ti.
10.	(price* or pricing*).ti,ab.
11.	(cost* adj2 (effective* or utilit* or benefit* or minimi* or unit* or estimat* or variable*)).ab.
12.	(financ* or fee or fees).ti,ab.
13.	(value adj2 (money or monetary)).ti,ab.
14.	or/1-13

A.2.6   Quality of life (QOL) search terms

Medline search terms

1.	quality-adjusted life years/
2.	sickness impact profile/
3.	(quality adj2 (wellbeing or well-being)).ti,ab.
4.	sickness impact profile.ti,ab.
5.	disability adjusted life.ti,ab.
6.	(qal* or qtime* or qwb* or daly*).ti,ab.
7.	(euroqol* or eq5d* or eq 5d*).ti,ab.
8.	(qol* or hql* or hqol* or h qol* or hrqol* or hr qol*).ti,ab.
9.	(health utility* or utility score* or disutilit*).ti,ab.
10.	(hui or hui1 or hui2 or hui3).ti,ab.
11.	health* year* equivalent*.ti,ab.
12.	(hye or hyes).ti,ab.

13.	rosser.ti,ab.
14.	(willingness to pay or time tradeoff or time trade off or tto or standard gamble*).ti,ab.
15.	(sf36 or sf 36 or short form 36 or shortform 36 or shortform36).ti,ab.
16.	(sf20 or sf 20 or short form 20 or shortform 20 or shortform20).ti,ab.
17.	(sf12 or sf 12 or short form 12 or shortform 12 or shortform12).ti,ab.
18.	(sf8 or sf 8 or short form 8 or shortform 8 or shortform8).ti,ab.
19.	(sf6 or sf 6 or short form 6 or shortform 6 or shortform6).ti,ab.
20.	or/1-19

Embase search terms

1.	quality adjusted life year/
2.	"quality of life index"/
3.	short form 12/ or short form 20/ or short form 36/ or short form 8/
4.	sickness impact profile/
5.	(quality adj2 (wellbeing or well-being)).ti,ab.
6.	sickness impact profile.ti,ab.
7.	disability adjusted life.ti,ab.
8.	(qal* or qtime* or qwb* or daly*).ti,ab.
9.	(euroqol* or eq5d* or eq 5d*).ti,ab.
10.	(qol* or hql* or hqol* or h qol* or hrqol* or hr qol*).ti,ab.
11.	(health utility* or utility score* or disutilit*).ti,ab.
12.	(hui or hui1 or hui2 or hui3).ti,ab.
13.	health* year* equivalent*.ti,ab.
14.	(hye or hyes).ti,ab.
15.	rosser.ti,ab.
16.	(willingness to pay or time tradeoff or time trade off or tto or standard gamble*).ti,ab.
17.	(sf36 or sf 36 or short form 36 or shortform 36 or shortform36).ti,ab.
18.	(sf20 or sf 20 or short form 20 or shortform 20 or shortform20).ti,ab.
19.	(sf12 or sf 12 or short form 12 or shortform 12 or shortform12).ti,ab.
20.	(sf8 or sf 8 or short form 8 or shortform 8 or shortform8).ti,ab.
21.	(sf6 or sf 6 or short form 6 or shortform 6 or shortform6).ti,ab.
22.	or/1-21

A.2.7   Excluded studies search terms

The following study designs and publication types were removed from retrieved results using the NOT operator.

Medline search terms

1.	letter/
2.	editorial/
3.	news/
4.	exp historical article/
5.	anecdotes as topic/
6.	comment/
7.	case report/
8.	(letter or comment*).ti.

9.	or/1-8
10.	randomized controlled trial/ or random*.ti,ab.
11.	9 not 10
12.	animals/ not humans/
13.	exp animals, laboratory/
14.	exp animal experimentation/
15.	exp models, animal/
16.	exp rodentia/
17.	(rat or rats or mouse or mice).ti.
18.	or/11-17

Embase search terms

1.	letter.pt. or letter/
2.	note.pt.
3.	editorial.pt.
4.	case report/ or case study/
5.	(letter or comment*).ti.
6.	or/1-5
7.	randomized controlled trial/ or random*.ti,ab.
8.	6 not 7
9.	exp animal/ not human/
10.	nonhuman/
11.	exp experimental animal/
12.	exp animal experiment/
13.	exp animal model/
14.	exp rodent/
15.	(rat or rats or mouse or mice).ti.
16.	or/8-15

A.3 Searches by specific questions

Diagnosis, assessment and monitoring

A.3.1 Echocardiography

In adults with suspected acute heart failure does echocardiography early compared to later echocardiography in addition to standard investigations (using ECG, chest x-ray and blood tests) improve outcome?

Search constructed by combining the columns in the following table using the AND Boolean operator

Population	Intervention / exposure	Comparison	Study filter used	Date parameters
Adults (aged 18 years or older) who have a diagnosis of acute heart failure, or have possible acute heart failure, or are being	Echocardiography	Standard investigations	None	See Table 1

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Population	Intervention / exposure	Comparison	Study filter used	Date parameters
investigated for acute heart failure.				

Medline search terms

1.	*echocardiography/ or exp echocardiography, doppler/ or exp echocardiography, three-dimensional/ or exp myocardial perfusion imaging/ or exp radionuclide ventriculography/
2.	echocardiograph*.ti,ab.
3.	angiograph*.ti,ab.
4.	*angiography/ or *angiocardiography/ or *angiography, digital subtraction/ or *aortography/ or *cineangiography/ or *coronary angiography/
5.	(angiograph* or angiocardiograph* or aortograph* or cineangiograph*).ti,ab.
6.	((cardiac or doppler) adj ultrasound).ti,ab.
7.	sonogram*.ti,ab.
8.	or/1-7
9.	*electrocardiography, ambulatory/ or *electrocardiography/
10.	(ECG or EKG).ti,ab.
11.	(("12" or twelve) adj2 lead).ti,ab.
12.	*radiography, thoracic/ or *mass chest x-ray/
13.	((chest or thoracic) adj (xray* or x-ray*)).ti,ab.
14.	(roentogra* or roentenogra* or roentnogra*).ti,ab.
15.	*hematologic tests/ or exp blood cell count/
16.	troponin/
17.	exp electrolytes/
18.	((cell or erythrocyte or reticulocyte or leukocyte or lymphocyte or platelet) adj (count or test)).ti,ab.
19.	((copeptin or troponin) adj test*).ti,ab.
20.	((electrolyte* or sodium or potassium or chloride or bicarbonate or urea or "creatinine anion gap" or glucose or "CKMB") adj2 test*).ti,ab.
21.	or/9-20
22.	8 and 21

Embase search terms

1.	exp doppler echocardiography/ or exp three dimensional echocardiography/ or *echocardiography/
2.	exp myocardial perfusion imaging/
3.	exp radioisotope ventriculography/
4.	echocardiograph*.ti,ab.
5.	angiograph*.ti,ab.
6.	*angiography/ or *digital subtraction angiography/
7.	*angiocardiography/
8.	*aortography/
9.	*cineangiography/
10.	(angiograph* or angiocardiograph* or aortograph* or cineangiograph*).ti,ab.
11.	((cardiac or doppler) adj ultrasound).ti,ab.
12.	sonogram*.ti,ab.
13.	or/1-12

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14.	*electrocardiography monitoring/ or *electrocardiography/ or *electrocardiogram/ or *ambulatory monitoring/
15.	(ECG or EKG).ti,ab.
16.	(("12" or twelve) adj2 lead).ti,ab.
17.	*thorax radiography/
18.	((chest or thoracic) adj (xray* or x-ray*)).ti,ab.
19.	(roentogra* or roentenogra* or roentnogra*).ti,ab.
20.	*blood examination/
21.	*blood cell count/
22.	exp *troponin/
23.	exp electrolyte/
24.	((cell or erythrocyte or reticulocyte or leukocyte or lymphocyte or platelet) adj (count or test)).ti,ab.
25.	((copeptin or troponin) adj test*).ti,ab.
26.	((electrolyte* or sodium or potassium or chloride or bicarbonate or urea or "creatinine anion gap" or glucose or "CKMB") adj2 test*).ti,ab.
27.	or/14-26
28.	13 and 27

Cochrane search terms

#1.	MeSH descriptor: [Echocardiography] explode all trees
#2.	MeSH descriptor: [Echocardiography, Doppler] explode all trees
#3.	MeSH descriptor: [Echocardiography, Three-Dimensional] explode all trees
#4.	MeSH descriptor: [Myocardial Perfusion Imaging] explode all trees
#5.	MeSH descriptor: [Radionuclide Ventriculography] explode all trees
#6.	echocardiograph*:ti,ab
#7.	angiograph*:ti,ab
#8.	MeSH descriptor: [Angiography] explode all trees
#9.	MeSH descriptor: [Angiocardiography] explode all trees
#10.	MeSH descriptor: [Angiography, Digital Subtraction] explode all trees
#11.	MeSH descriptor: [Aortography] explode all trees
#12.	MeSH descriptor: [Cineangiography] explode all trees
#13.	MeSH descriptor: [Coronary Angiography] explode all trees
#14.	(angiograph* or angiocardiograph* or aortograph* or cineangiograph*):ti,ab
#15.	((cardiac or doppler) next ultrasound):ti,ab
#16.	sonogram*:ti,ab
#17.	#1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10 or #11 or #12 or #13 or #14 or #15 or #16
#18.	MeSH descriptor: [Electrocardiography] explode all trees
#19.	MeSH descriptor: [Electrocardiography, Ambulatory] explode all trees
#20.	(ECG or EKG):ti,ab
#21.	(("12" or twelve) near/2 lead):ti,ab
#22.	MeSH descriptor: [Radiography, Thoracic] explode all trees
#23.	MeSH descriptor: [Mass Chest X-Ray] explode all trees
#24.	((chest or thoracic) next (xray* or x-ray*)):ti,ab
#25.	(roentogra* or roentenogra* or roentnogra*):ti,ab

<Please insert your copyright statement - one line of text entry only>

#26.	MeSH descriptor: [Hematologic Tests] explode all trees
#27.	MeSH descriptor: [Blood Cell Count] explode all trees
#28.	MeSH descriptor: [Troponin] explode all trees
#29.	MeSH descriptor: [Electrolytes] explode all trees
#30.	((cell or erythrocyte or reticulocyte or leukocyte or lymphocyte or platelet) next (count or test)):ti,ab
#31.	((copeptin or troponin) next test*):ti,ab
#32.	((electrolyte* or sodium or potassium or chloride or bicarbonate or urea or "creatinine anion gap" or glucose or "CKMB") near/2 test*):ti,ab
#33.	#18 or #19 or #20 or #21 or #22 or #23 or #24 or #25 or #26 or #27 or #28 or #29 or #30 or #31 or #32
#34.	#17 and #33

A.3.2   Natriuretic peptides

In people with suspected (or under investigation for) acute heart failure, is the addition of natriuretic peptides to the standard initial investigations (using ECG, chest x-ray and blood tests) more accurate compared to standard initial investigations, clinical judgement and each other?

Search constructed by combining the columns in the following table using the AND Boolean operator

Population	Intervention / exposure	Comparison	Study filter used	Date parameters
Adults (aged 18 years or older) who have a diagnosis of acute heart failure, or have possible acute heart failure, or are being investigated for acute heart failure or people with dyspnea.	Natriuretic peptides	n/a	None	See Table 1

Medline search terms

1.	exp *natriuretic peptides/
2.	(natriuretic adj2 peptide*).ti,ab.
3.	(natriuretic adj2 factor*).ti,ab.
4.	(BNP or ANP or pro-BNP or pro-ANP or pro BNP or pro ANP).ti,ab.
5.	or/1-4

Embase search terms

1.	exp *natriuretic factor/
2.	(natriuretic adj2 peptide*).ti,ab.
3.	(natriuretic adj2 factor*).ti,ab.
4.	(BNP or ANP or pro-BNP or pro-ANP or pro BNP or pro ANP).ti,ab.
5.	or/1-4

Cochrane search terms

#1.	MeSH descriptor: [Natriuretic Peptides] explode all trees
#2.	(natriuretic near/2 peptide*):ti,ab

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#3.	(natriuretic near/2 factor*):ti,ab
#4.	(BNP or ANP or pro-BNP or pro-ANP or pro BNP or pro ANP):ti,ab
#5.	#1 or #2 or #3 or #4

A.3.3 Invasive monitoring

Is the addition of invasive monitoring more clinically/cost-effective over and above non-invasive monitoring to improve outcome?

Search constructed by combining the columns in the following table using the AND Boolean operator

Population	Intervention / exposure	Comparison	Study filter used	Date parameters
Adults (aged 18 years or older) who have a diagnosis of acute heart failure, or have possible acute heart failure, or are being investigated for acute heart failure.	Invasive monitoring procedures	n/a	The following filters were used in Medline and Embase only: OBS, RCT, SR	See Table 1

Medline search terms

1.	exp *cardiac catheterization/
2.	catheterization, central venous/
3.	catheterization, swan-ganz/
4.	*pulmonary wedge pressure/
5.	(pulmonary arter* adj (catheter* or cannula* or line*)).ti,ab.
6.	swan-ganz*.ti,ab.
7.	(central venous adj3 (catheter* or cannula* or line*)).ti,ab.
8.	(internal jugular adj3 (catheter* or cannula* or line*)).ti,ab.
9.	(peripherally inserted central adj (catheter* or cannula* or line*)).ti,ab.
10.	((intra-arterial or intra arterial) adj (catheter* or cannula* or line*)).ti,ab.
11.	or/1-10

Embase search terms

1.	exp pulmonary artery catheter/
2.	*lung wedge pressure/
3.	exp *central venous catheter/
4.	*heart catheterization/
5.	swan-ganz*.ti,ab.
6.	(pulmonary arter* adj (catheter* or cannula* or line*)).ti,ab.
7.	(central venous adj3 (catheter* or cannula* or line*)).ti,ab.
8.	(internal jugular adj3 (catheter* or cannula* or line*)).ti,ab.
9.	(peripherally inserted central adj (catheter* or cannula* or line*)).ti,ab.
10.	((intra-arterial or intra arterial) adj (catheter* or cannula* or line*)).ti,ab.
11.	or/1-10

Cochrane search terms

| #1. | MeSH descriptor: [Catheterization, Swan-Ganz] explode all trees |

<Please insert your copyright statement - one line of text entry only>

#2.	MeSH descriptor: [Cardiac Catheterization] explode all trees
#3.	MeSH descriptor: [Catheterization, Central Venous] explode all trees
#4.	MeSH descriptor: [Pulmonary Wedge Pressure] explode all trees
#5.	swan next ganz*:ti,ab
#6.	(pulmonary arter* next (catheter* or cannula* or line*)):ti,ab
#7.	(central venous near/3 (catheter* or cannula* or line*)):ti,ab
#8.	(internal jugular near/3 (catheter* or cannula* or line*)):ti,ab
#9.	(internal jugular near/3 (catheter* or cannula* or line*)):ti,ab
#10.	((intra-arterial or intra arterial) next (catheter* or cannula* or line*)):ti,ab
#11.	#1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10

Treatment before stabilisation

A.3.4 Mechanical ventilation

What are the predictors of outcome in mechanically ventilated acute heart failure patients?

Search constructed by combining the columns in the following table using the AND Boolean operator

Population	Intervention / exposure	Comparison	Study filter used	Date parameters
Adults (aged 18 years or older) who have a diagnosis of acute heart failure, or have possible acute heart failure, or are being investigated for acute heart failure.	Mechanical ventilation	n/a	The following filters were used in Medline and Embase only: PROG, RCT, SR	See Table 1

Medline search terms

1.	exp respiration, artificial/
2.	exp ventilators, mechanical/
3.	exp intubation, intratracheal/
4.	exp respiratory insufficiency/
5.	(artificial adj2 (respir* or ventil*)).ti,ab.
6.	(ventil* adj2 (mechanical or assisted)).ti,ab.
7.	respiratory failure.ti,ab.
8.	high-frequency ventil*.ti,ab.
9.	negative-pressure ventil*.ti,ab.
10.	Intratracheal intub*.ti,ab.
11.	invasive ventil*.ti,ab.
12.	or/1-11
13.	((child* or adolescen* or school* or infant* or teen* or paediatric* or pediatric* or youth*) not adult*).ti.
14.	12 not 13

Embase search terms

1.	exp *artificial ventilation/
2.	exp *endotracheal intubation/

<Please insert your copyright statement - one line of text entry only>

3.	exp *respiratory failure/
4.	(artificial adj2 (respir* or ventil*)).ti,ab.
5.	(ventil* adj2 (mechanical or assisted)).ti,ab.
6.	respiratory failure.ti,ab.
7.	high-frequency ventil*.ti,ab.
8.	negative-pressure ventil*.ti,ab.
9.	invasive ventil*.ti,ab.
10.	endotracheal intub*.ti,ab.
11.	or/1-10
12.	((child* or adolescen* or school* or infant* or teen* or paediatric* or pediatric* or youth*) not adult*).ti.
13.	11 not 12

Cochrane search terms

#1.	MeSH descriptor: [Respiration, Artificial] explode all trees
#2.	MeSH descriptor: [Ventilators, Mechanical] explode all trees
#3.	MeSH descriptor: [Intubation, Intratracheal] explode all trees
#4.	MeSH descriptor: [Respiratory Insufficiency] explode all trees
#5.	(artificial near/2 (respir* or ventil*)):ti,ab
#6.	(ventil* near/2 (mechanical or assisted)):ti,ab
#7.	respiratory failure:ti,ab
#8.	high frequency ventil*:ti,ab
#9.	negative pressure ventil*:ti,ab
#10.	Intratracheal intub*:ti,ab
#11.	endotracheal intub*:ti,ab
#12.	invasive ventil*:ti,ab
#13.	#1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10 or #11 or #12

A.3.5 Non-invasive ventilation

In people with confirmed acute heart failure and cardiogenic pulmonary oedema is non-invasive positive pressure ventilation (CPAP and/or bilevel NIPPV) more clinical and cost effective than standard medical care alone to improve outcome?

Search constructed by combining the columns in the following table using the AND Boolean operator

Population	Intervention / exposure	Comparison	Study filter used	Date parameters
Adults (aged 18 years or older) who have a diagnosis of acute heart failure, or have possible acute heart failure, or are being investigated for acute heart failure or pulmonary oedema.	Non-invasive ventilation	n/a	The following filters were used in Medline and Embase only: RCT, SR	See Table 1

Medline search terms

1.	exp respiration, artificial/
2.	exp ventilators, mechanical/
3.	mechanical ventilation.ti,ab.
4.	assisted ventilation.ti,ab.
5.	artificial respiration.ti,ab.
6.	artificial ventilation.ti,ab.
7.	(respirator or respirators).ti,ab.
8.	(bipap or nippv or nppv or niv or niav or cpap or aprv or ippb or ippv or peep).ti,ab.
9.	positive pressure ventilation.ti,ab.
10.	pulmonary ventilation.ti,ab.
11.	non invasive ventilation.ti,ab.
12.	noninvasive ventilation.ti,ab.
13.	pressure support ventilation.ti,ab.
14.	positive end expiratory pressure.ti,ab.
15.	bi-level positive airway pressure.ti,ab.
16.	bilevel positive airway pressure.ti,ab.
17.	or/1-16

Embase search terms

1.	mechanical ventilation.ti,ab.
2.	assisted ventilation.ti,ab.
3.	artificial respiration.ti,ab.
4.	artificial ventilation.ti,ab.
5.	(respirator or respirators).ti,ab.
6.	(bipap or nippv or nppv or niv or niav or cpap or aprv or ippb or ippv or peep).ti,ab.
7.	positive pressure ventilation.ti,ab.
8.	pulmonary ventilation.ti,ab.
9.	non invasive ventilation.ti,ab.
10.	noninvasive ventilation.ti,ab.
11.	pressure support ventilation.ti,ab.
12.	positive end expiratory pressure.ti,ab.
13.	bi-level positive airway pressure.ti,ab.
14.	bilevel positive airway pressure.ti,ab.
15.	or/1-14

Cochrane search terms

#1.	respiration artificial
#2.	ventilators mechanical
#3.	(mechanical next ventilation)
#4.	(artificial next ventilation)
#5.	(assisted next ventilation)
#6.	(artificial next respiration)
#7.	(positive next pressure next ventilation)
#8.	(pulmonary next ventilat*)
#9.	respirator or respirators
#10.	(non next invasive next ventilation)

#11.	(noninvasive next ventilation)
#12.	(non-invasive next ventilation)
#13.	(pressure next support next ventilation)
#14.	(inspiratory next positive next pressure next ventilation)
#15.	(positive next end next expiratory next pressure)
#16.	(bi-level next positive next airway next pressure)
#17.	(bilevel next positive next airway next pressure)
#18.	bipap or nippv or nppv or niv or niav or cpap or aprv or ippb or ippv or peep
#19.	(mask next ventilation)
#20.	#1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10 or #11 or #12 or #13 or #14 or #15 or #16 or #17 or #18 or #19

A.3.6 Diuretics and ultrafiltration

Searches for the following two questions were run as one search:

- In patients with acute heart failure which diuretic administration strategy is the most clinically/cost-effective to improve outcome?
- In patients with acute heart failure is ultrafiltration more clinically/cost-effective than diuretic therapy alone or in addition to diuretic therapy to improve outcome?

Search constructed by combining the columns in the following table using the AND Boolean operator

Population	Intervention / exposure	Comparison	Study filter used	Date parameters
Adults (aged 18 years or older) who have a diagnosis of acute heart failure, or have possible acute heart failure, or are being investigated for acute heart failure or pulmonary oedema.	Diuretic therapy or ultrafiltration	n/a	The following filters were used in Medline and Embase only: RCT, SR	See Table 1

Medline search terms

1.	*diuretics/ or diuretics/ad or metolazone/ or amiloride/ or bendroflumethiazide/ or bumetanide/ or furosemide/ or hydrochlorothiazide/ or indapamide/
2.	diuretic*.ti.
3.	(metolazone or amiloride or bendroflumethiazide or bumetanide or furosemide or hydrochlorothiazide or indapamide or torasemide).ti,ab.
4.	exp *ultrafiltration/
5.	(ultrafilt* or hemofiltr* or aquapher*).ti,ab.
6.	or/1-5

Embase search terms

1.	*diuretic agent/
2.	diuretic agent/ad, po
3.	*metolazone/ or *thiazide diuretic agent/ or thiazide diuretic agent/ad, po
4.	*amiloride/ or *amiloride plus hydrochlorothiazide/ or *potassium sparing diuretic agent/ or

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	potassium sparing diuretic agent/ad, po
5.	*bendroflumethiazide/
6.	*bumetanide/ or *loop diuretic agent/ or loop diuretic agent/ad, po
7.	*furosemide/
8.	*hydrochlorothiazide/
9.	*indapamide/
10.	*torasemide/
11.	diuretic.ti.
12.	(metolazone or amiloride or bendroflumethiazide or bumetanide or furosemide or hydrochlorothiazide or indapamide or torasemide).ti,ab.
13.	exp *ultrafiltration/
14.	exp *hemofiltration/
15.	modified ultrafiltration/ or slow continuous ulfrafiltration/ or continuous hemofiltration/
16.	(ultrafilt* or hemofiltr* or aquapher*).ti,ab.
17.	or/1-16

Cochrane search terms

#1.	MeSH descriptor: [Diuretics] this term only and with qualifiers: [Administration & dosage - AD]
#2.	MeSH descriptor: [Metolazone] this term only
#3.	MeSH descriptor: [Amiloride] this term only
#4.	MeSH descriptor: [Bendroflumethiazide] this term only
#5.	MeSH descriptor: [Bumetanide] this term only
#6.	MeSH descriptor: [Furosemide] this term only
#7.	MeSH descriptor: [Hydrochlorothiazide] explode all trees
#8.	MeSH descriptor: [Indapamide] this term only
#9.	diuretic*:ti
#10.	(metolazone or amiloride or bendroflumethiazide or bumetanide or furosemide or hydrochlorothiazide or indapamide or torasemide):ti
#11.	((metolazone or amiloride or bendroflumethiazide or bumetanide or furosemide or hydrochlorothiazide or indapamide or torasemide or diuretic*) near/3 (oral or intravenous or bolus or infusion)):ti,ab
#12.	MeSH descriptor: [Ultrafiltration] explode all trees
#13.	(ultrafilt* or hemofiltr* or aquapher*):ti,ab
#14.	#1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10 or #11 or #12 or #13

A.3.7 Inotropric agents and vasopressors

Searches for the following three questions were run as one search:

- In patients with acute heart failure are inotropes more clinically/cost-effective than placebo to improve clinical outcomes?
- In patients with acute heart failure are vasopressors more clinically/cost-effective than placebo to improve clinical outcomes?
- In patients with acute heart failure are inotropes safe and clinically / cost effective compared to vasopressors to improve outcome?

Search constructed by combining the columns in the following table using the AND Boolean operator

Population	Intervention / exposure	Comparison	Study filter used	Date parameters

<Please insert your copyright statement - one line of text entry only>

Population	Intervention / exposure	Comparison	Study filter used	Date parameters
Adults (aged 18 years or older) who have a diagnosis of acute heart failure, or have possible acute heart failure, or are being investigated for acute heart failure.	Inotropic agents or vasopressors	n/a	The following filters were used in Medline and Embase only: RCT, SR	See Table 1

Medline search terms

1.	inotrope*.ti,ab.
2.	inotropic*.ti,ab.
3.	exp milrinone/
4.	exp enoximone/
5.	exp dobutamine/
6.	exp dopamine/
7.	(milrinone or primacor).ti,ab.
8.	(enoximone or perfan).ti,ab.
9.	(dobutamine or dopamine).ti,ab.
10.	(dopexamine or isoprenaline or dopacard).ti,ab.
11.	exp *epinephrine/
12.	exp *norepinephrine/
13.	exp *vasopressins/
14.	(adrenalin or epinephrine or anapen or epipen or jext).ti,ab.
15.	(noradrenaline or norepinephrine).ti,ab.
16.	(vasopressin* or pitressin).ti,ab.
17.	or/1-16

Embase search terms

1.	inotrope*.ti,ab.
2.	inotropic*.ti,ab.
3.	exp milrinone/
4.	exp enoximone/
5.	exp dobutamine/
6.	exp dopamine/
7.	(milrinone or primacor).ti,ab.
8.	(enoximone or perfan).ti,ab.
9.	(dobutamine or dopamine).ti,ab.
10.	(dopexamine or dopacard or isoprenaline).ti,ab.
11.	*adrenalin/
12.	*noradrenalin/
13.	*vasopressin/
14.	(adrenalin or epinephrine or anapen or epipen or jext).ti,ab.
15.	(noradrenaline or norepinephrine).ti,ab.
16.	(vasopressin* or pitressin).ti,ab.

<Please insert your copyright statement - one line of text entry only>

17.	or/1-16

Cochrane search terms

#1.	MeSH descriptor: [Milrinone] explode all trees
#2.	MeSH descriptor: [Enoximone] explode all trees
#3.	MeSH descriptor: [Dobutamine] explode all trees
#4.	(milrinone or primacor):ti,ab
#5.	(enoximone or perfan):ti,ab
#6.	(dobutamine or dopamine):ti,ab
#7.	(dopexamine or isoprenaline or dopacard):ti,ab
#8.	(inotrope* or inotropic*):ti,ab
#9.	MeSH descriptor: [Epinephrine] explode all trees
#10.	MeSH descriptor: [Norepinephrine] explode all trees
#11.	MeSH descriptor: [Vasopressins] explode all trees
#12.	(adrenalin or epinephrine or anapen or epipen or jext):ti,ab
#13.	(noradrenaline or norepinephrine):ti,ab
#14.	(vasopressin* or pitressin) .ti,ab.
#15.	#1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10 or #11 or #12 or #13 or #14

A.3.8 Opiates

In patients with acute heart failure are opiates as an adjunct to other first line therapies more clinically / cost effective compared to placebo and to other treatments alone?

Search constructed by combining the columns in the following table using the AND Boolean operator

Population	Intervention / exposure	Comparison	Study filter used	Date parameters
Adults (aged 18 years or older) who have a diagnosis of acute heart failure, or have possible acute heart failure, or are being investigated for acute heart failure or pulmonary oedema.	Opiates	n/a	None	See Table 1

Medline search terms

1.	exp morphine/
2.	(morphine* or diamorphine or opiate* or oramorph or duramorph or heroin or diamorf or diacetylmorphine).ti,ab.
3.	or/1-2

Embase search terms

1.	*morphine/ or *morphine sulfate/
2.	*diamorphine/
3.	(morphine* or diamorphine or opiate* or oramorph or duramorph or heroin or diamorf or diacetylmorphine).ti,ab.
4.	or/1-3

<Please insert your copyright statement - one line of text entry only>

Cochrane search terms

#1.	MeSH descriptor: [Morphine] explode all trees
#2.	(morphine* or diamorphine or opiate* or oramorph or duramorph or heroin or diamorf or diacetylmorphine):ti,ab
#3.	#1 or #2

A.3.9 Vasodilators

In patients with acute heart failure are vasodilators more clinically/cost-effective than placebo to improve clinical outcomes?

Search constructed by combining the columns in the following table using the AND Boolean operator

Population	Intervention / exposure	Comparison	Study filter used	Date parameters
Adults (aged 18 years or older) who have a diagnosis of acute heart failure, or have possible acute heart failure, or are being investigated for acute heart failure.	Vasodilators	n/a	The following filters were used in Medline and Embase only: RCT, SR	See Table 1

Medline search terms

1.	exp *vasodilator agents/
2.	*nitroglycerin/
3.	*isosorbide dinitrate/
4.	*sodium nitroprusside/
5.	("glyceryl trinitrate" or nitroglycerin or "isosorbide dinitrate" or nitroprusside).ti,ab.
6.	(coro-nitro or glytrin or "GTN 300" or "GTN 400" or nitrolingual or nitromin or suscard or nitrocine or nitronel or deponit or minitran or nitro-dur or percutol or transiderm-nitro).ti,ab.
7.	(cecodard or angitak or isoket).ti,ab.
8.	nesiritide.ti,ab.
9.	(vasoactiv* or vasodilat* or vasorelax*).ti,ab.
10.	or/1-9

Embase search terms

1.	exp *coronary vasodilating agent/
2.	exp *glyceryl trinitrate/
3.	exp *isosorbide dinitrate/
4.	exp *nitroprusside sodium/
5.	("glyceryl trinitrate" or "isosorbide dinitrate" or nitroprusside).ti,ab.
6.	(coro-nitro or glytrin or "GTN 300" or "GTN 400" or nitrolingual or nitromin or suscard or nitrocine or nitronel or deponit or minitran or nitro-dur or percutol or transiderm-nitro).ti,ab.
7.	(cecodard or angitak or isoket).ti,ab.
8.	(vasoactiv* or vasodilat* or vasorelax*).ti,ab.
9.	nitroglycerin.ti,ab.
10.	nesiritide.ti,ab.
11.	or/1-10

<Please insert your copyright statement - one line of text entry only>

Cochrane search terms

#1.	MeSH descriptor: [Vasodilator Agents] explode all trees
#2.	MeSH descriptor: [Nitroglycerin] explode all trees
#3.	MeSH descriptor: [Isosorbide Dinitrate] explode all trees
#4.	MeSH descriptor: [Nitroprusside] explode all trees
#5.	("glyceryl trinitrate" or nitroglycerin or "isosorbide dinitrate" or nitroprusside):ti,ab
#6.	(coro-nitro or glytrin or "GTN 300" or "GTN 400" or nitrolingual or nitromin or suscard or nitrocine or nitronel or deponit or minitran or nitro-dur or percutol or transiderm-nitro):ti,ab
#7.	(cecodard or angitak or isoket):ti,ab
#8.	nesiritide:ti,ab
#9.	(vasoactiv* or vasodilat* or vasorelax*):ti,ab
#10.	#1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9

Treatment after stabilisation

A.3.10   Angiotensin converting enzyme (ACE) inhibitors

For people with confirmed acute heart failure not already on angiotensin converting enzyme (ACE)-inhibitor therapy should ACEi therapy commence in hospital or following discharge?

Search constructed by combining the columns in the following table using the AND Boolean operator

Population	Intervention / exposure	Comparison	Study filter used	Date parameters
Adults (aged 18 years or older) who have a diagnosis of acute heart failure, or have possible acute heart failure, or are being investigated for acute heart failure.	ACE inhibitor therapy	n/a	The following filters were used in Medline and Embase only: OBS, RCT, SR	See Table 1

Medline search terms

1.	exp *angiotensin-converting enzyme inhibitors/
2.	((ace or acei or ((angiotensin adj converting adj2 enzyme*) or ace or kininase)) adj2 (inhibit* or antagonist*)).ti,ab.
3.	(captopril or ecopace or kaplon or capoten or co-zidocapt or capto-co or capozide or cilazapril or vascace or enalapril or ednyt or innovace or innozide or fosinopril or imidapril or tanatril or lisinopril or zestril or carace or zestoretic or moexipril or perdix or perindopril or coversyl or quinapril or quinil or accupro or accuretic or ramipril or tritace or triapin or trandolapril or gopten or tarka).ti,ab.
4.	or/1-3
5.	time factors/
6.	exp drug administration schedule/
7.	((time or timing or early or earlier or late or later) adj2 (initiat* or start* or treat* or therap* or administ*)).ti,ab.
8.	((commenc* or start* or initiat*) adj2 treat*).ti,ab.
9.	or/5-8
10.	4 and 9

Embase search terms

<Please insert your copyright statement - one line of text entry only>

1.	exp *dipeptidyl carboxypeptidase inhibitor/
2.	((ace or acei or ((angiotensin adj converting adj2 enzyme*) or ace or kininase)) adj2 (inhibit* or antagonist*)).ti,ab.
3.	(captopril or ecopace or kaplon or capoten or co-zidocapt or capto-co or capozide or cilazapril or vascace or enalapril or ednyt or innovace or innozide or fosinopril or imidapril or tanatril or lisinopril or zestril or carace or zestoretic or moexipril or perdix or perindopril or coversyl or quinapril or quinil or accupro or accuretic or ramipril or tritace or triapin or trandolapril or gopten or tarka).ti,ab.
4.	or/1-3
5.	*time/
6.	exp *drug administration/
7.	((time or timing or early or earlier or late or later) adj2 (initiat* or start* or treat* or therap* or administ*)).ti,ab.
8.	((commenc* or start* or initiat*) adj2 treat*).ti,ab.
9.	or/5-8
10.	1 and 9

Cochrane search terms

#1.	MeSH descriptor: [Angiotensin-Converting Enzyme Inhibitors] explode all trees
#2.	((ace or acei or ((angiotensin adj converting near/2 enzyme*) or ace or kininase)) near/2 (inhibit* or antagonist*)):ti,ab
#3.	(captopril or ecopace or kaplon or capoten or co-zidocapt or capto-co or capozide or cilazapril or vascace or enalapril or ednyt or innovace or innozide or fosinopril or imidapril or tanatril or lisinopril or zestril or carace or zestoretic or moexipril or perdix or perindopril or coversyl or quinapril or quinil or accupro or accuretic or ramipril or tritace or triapin or trandolapril or gopten or tarka):ti,ab
#4.	#1 or #2 or #3
#5.	MeSH descriptor: [Time Factors] explode all trees
#6.	MeSH descriptor: [Drug Administration Schedule] explode all trees
#7.	((time or timing or early or earlier or late or later) near/2 (initiat* or start* or treat* or therap* or administ*)):ti,ab
#8.	((commenc* or start* or initiat*) near/2 treat*):ti,ab
#9.	#5 or #6 or #7 or #8
#10.	#4 and #9

A.3.11   Beta-blockers

Searches for the following two questions were run as one search:

- In people with acute heart failure already on beta-blocker therapy should beta-blockers be reduced or discontinued, and if so should they be reinstated in hospital after stabilisation?
- For people with confirmed acute heart failure not already on beta-blocker therapy should beta-blocker treatment commence in hospital after stabilisation or following discharge?

Search constructed by combining the columns in the following table using the AND Boolean operator

Population	Intervention / exposure	Comparison	Study filter used	Date parameters
Adults (aged 18 years or older) who have a diagnosis of acute heart failure,	Beta blocker therapy	n/a	The following filters were used in Medline and Embase only:	See Table 1

<Please insert your copyright statement - one line of text entry only>

	Population	Intervention / exposure	Comparison	Study filter used	Date parameters
	or have possible acute heart failure, or are being investigated for acute heart failure.			OBS, RCT, SR	

Medline search terms

1.	exp *adrenergic beta-antagonists/
2.	(propranolol or angilol or angilol or inderal-la or half-inderal or inderal or bedranol or prograne or slo-pro or acebutolol or sectral or atenolol or tenormin or bisoprolol or cardicor or emcor or carvedilol or eucardic or celiprolol or celectol or co-tenidone or tenoret or tenoretic or esmolol or brevibloc or labetalol or trandate or metoprolol or betaloc or lopresor or nadolol or corgard or nebivolol or nebilet or hypoloc or oxprenolol or trasicor or slow-trasicor or pindolol or visken or sotalol or beta-cardone or sotacor or timolol or betim).ti,ab.
3.	(beta adj3 block*).ti,ab.
4.	(b adj3 block*).ti,ab.
5.	(beta adj2 antagonist*).ti,ab.
6.	((beta-adrenoceptor or b-adrenoceptor or beta-adrenergic) adj3 (blockade or blocker*or blocking or antagonist*)).ti,ab.
7.	or/1-6
8.	exp time factors/
9.	exp drug administration schedule/
10.	(continu* or discontinu* or stop* or halt* or ceas* or cessation).ti,ab.
11.	((time or timing or early or earlier or late or later) adj2 (initiat* or start* or treat* or therap* or administ*)).ti,ab.
12.	((commenc* or start* or initiat*) adj2 treat*).ti,ab.
13.	or/8-12
14.	7 and 13

Embase search terms

1.	exp *beta adrenergic receptor blocking agent/
2.	exp *bisoprolol/ or exp *bisoprolol fumarate/ or exp *bisoprolol fumarate plus hydrochlorothiazide/ or exp *carvedilol/ or exp *metoprolol/ or exp*metoprolol fumarate/ or exp *metoprolol succinate/ or exp *metoprolol tartrate/ or exp *nebivolol/
3.	(propranolol or angilol or angilol or inderal-la or half-inderal or inderal or bedranol or prograne or slo-pro or acebutolol or sectral or atenolol or tenormin or bisoprolol or cardicor or emcor or carvedilol or eucardic or celiprolol or celectol or co-tenidone or tenoret or tenoretic or esmolol or brevibloc or labetalol or trandate or metoprolol or betaloc or lopresor or nadolol or corgard or nebivolol or nebilet or hypoloc or oxprenolol or trasicor or slow-trasicor or pindolol or visken or sotalol or beta-cardone or sotacor or timolol or betim).ti,ab.
4.	(beta adj3 block*).ti,ab.
5.	(b adj3 block*).ti,ab.
6.	(beta adj2 antagonist*).ti,ab.
7.	((beta-adrenoceptor or b-adrenoceptor or beta-adrenergic) adj3 (blockade or blocker* or blocking or antagonist*)).ti,ab.
8.	or/1-7
9.	*time/
10.	exp *drug administration/
11.	(continu* or discontinu* or stop* or halt* or ceas* or cessation).ti,ab.

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12.	((time or timing or early or earlier or late or later) adj2 (initiat* or start* or treat* or therap* or administ*)).ti,ab.
13.	((commenc* or start* or initiat*) adj2 treat*).ti,ab.
14.	or/9-13
15.	8 and 14

Cochrane search terms

#1.	MeSH descriptor: [Adrenergic beta-Antagonists] explode all trees
#2.	MeSH descriptor: [Bisoprolol] explode all trees
#3.	MeSH descriptor: [Metoprolol] explode all trees
#4.	(propranolol or angilol or angilol or inderal-la or half-inderal or inderal or bedranol or prograne or slo-pro or acebutolol or sectral or atenolol or tenormin or bisoprolol or cardicor or emcor or carvedilol or eucardic or celiprolol or celectol or co-tenidone or tenoret or tenoretic or esmolol or brevibloc or labetalol or trandate or metoprolol or betaloc or lopresor or nadolol or corgard or nebivolol or nebilet or hypoloc or oxprenolol or trasicor or slow-trasicor or pindolol or visken or sotalol or beta-cardone or sotacor or timolol or betim):ti,ab
#5.	(beta near/3 block*):ti,ab
#6.	(b near/3 block*):ti,ab
#7.	(beta near/2 antagonist*):ti,ab
#8.	((beta-adrenoceptor or b-adrenoceptor or beta-adrenergic) next (block* or antagonist*)):ti,ab
#9.	#1 or #2 or #3 or #4 or #5 or #6 or #7 or #8
#10.	MeSH descriptor: [Time Factors] explode all trees
#11.	MeSH descriptor: [Drug Administration Schedule] explode all trees
#12.	(continu* or discontinu* or stop* or halt* or ceas* or cessation):ti,ab
#13.	((time or timing or early or earlier or late or later) near/2 (initiat* or start* or treat* or therap* or administ*)):ti,ab
#14.	((commenc* or start* or initiat*) near/2 treat*):ti,ab
#15.	#10 or #11 or #12 or #13 or #14
#16.	#9 and #15

A.3.12   Mineralocorticoid receptor antagonists (MRA)

For people with confirmed acute heart failure not already on mineralocorticoid receptor antagonists (MRAs) should MRA therapy commence in hospital or following discharge?

Search constructed by combining the columns in the following table using the AND Boolean operator

Population	Intervention / exposure	Comparison	Study filter used	Date parameters
Adults (aged 18 years or older) who have a diagnosis of acute heart failure, or have possible acute heart failure, or are being investigated for acute heart failure.	MRA therapy	n/a	The following filters were used in Medline and Embase only: OBS, RCT, SR	See Table 1

Medline search terms

| 1. | exp mineralocorticoid receptor antagonists/ |
| 2. | exp triamterene/ |

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3.	((mra or ((mineralocorticoid adj receptor*) or aldosterone)) adj2 (inhibit* or antagonist*)).ti,ab.
4.	(spironolactone or aldactone or lasilctone or co-flumactone or aldactide or eplerenone or inspra or triamterene or dytac or frusene or co-triamterzide or triam-co or dyazide or kalspare).ti,ab.
5.	or/1-4
6.	time factors/
7.	exp drug administration schedule/
8.	((time or timing or early or earlier or late or later) adj2 (initiat* or start* or treat* or therap* or administ*)).ti,ab.
9.	((commenc* or start* or initiat*) adj2 treat*).ti,ab.
10.	or/6-9
11.	5 and 10

Embase search terms

1.	exp *mineralocorticoid antagonist/
2.	exp *triamterene/
3.	exp *aldosterone antagonist/ or exp *aldosterone/
4.	exp *eplerenone/
5.	exp *spironolactone/
6.	((mra or ((mineralocorticoid adj receptor*) or aldosterone)) adj2 (inhibit* or antagonist*)).ti,ab.
7.	(spironolactone or aldactone or lasilctone or co-flumactone or aldactide or eplerenone or inspra or triamterene or dytac or frusene or co-triamterzide or triam-co or dyazide or kalspare).ti,ab.
8.	or/1-7
9.	time factors/
10.	exp drug administration schedule/
11.	((time or timing or early or earlier or late or later) adj2 (initiat* or start* or treat* or therap* or administ*)).ti,ab.
12.	((commenc* or start* or initiat*) adj2 treat*).ti,ab.
13.	or/9-12
14.	8 and 13

Cochrane search terms

#1.	MeSH descriptor: [Mineralocorticoid Receptor Antagonists] explode all trees
#2.	MeSH descriptor: [Triamterene] explode all trees
#3.	MeSH descriptor: [Spironolactone] explode all trees
#4.	((mra or ((mineralocorticoid next receptor*) or aldosterone)) near/2 (inhibit* or antagonist*)):ti,ab
#5.	(spironolactone or aldactone or lasilctone or co-flumactone or aldactide or eplerenone or inspra or triamterene or dytac or frusene or co-triamterzide or triam-co or dyazide or kalspare):ti,ab
#6.	#1 or #2 or #3 or #4 or #5
#7.	MeSH descriptor: [Time Factors] explode all trees
#8.	MeSH descriptor: [Drug Administration Schedule] explode all trees
#9.	((time or timing or early or earlier or late or later) near/2 (initiat* or start* or treat* or therap* or administ*)):ti,ab
#10.	((commenc* or start* or initiat*) near/2 treat*):ti,ab

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#11.	#7 or #8 or #9 or #10
#12.	#6 and #11

A.3.13 Aortic stenosis

Searches for the following three questions were run as one search:

- For people with acute heart failure accompanied by aortic stenosis is surgical valvular intervention more clinically or cost effective compared to standard medical care?
- For people with acute heart failure accompanied by aortic stenosis is percutaneous valvular intervention more clinically or cost effective compared to standard medical care?
- For people with acute heart failure accompanied by aortic stenosis is surgical valvular intervention more clinically or cost effective compared to percutaneous valvular intervention?

Search constructed by combining the columns in the following table using the AND Boolean operator

Population	Intervention / exposure	Comparison	Study filter used	Date parameters
None	Aortic valve surgery	n/a	The following filters were used in Medline and Embase only: RCT, SR	See Table 1

Medline search terms

1.	exp *aortic valve stenosis/
2.	(aort* adj2 stenos*).ti,ab.
3.	(aort* adj2 scleros*).ti,ab.
4.	or/1-3

Embase search terms

1.	exp *aorta valve stenosis/
2.	(aort* adj2 stenos*).ti,ab.
3.	(aort* adj2 scleros*).ti,ab.
4.	or/1-3

Cochrane search terms

#1.	MeSH descriptor: [Aortic Valve Stenosis] explode all trees
#2.	(aort* near/2 stenos*):ti,ab
#3.	(aort* near/2 scleros*):ti,ab
#4.	#1 or #2 or #3

A.3.14 Mitral regurgitation

Searches for the following three questions were run as one search:

- For people with acute heart failure accompanied by mitral regurgitation is surgical valvular intervention more clinically or cost effective compared to standard medical care?
- For people with acute heart failure accompanied by mitral regurgitation is percutaneous valvular intervention more clinically or cost effective compared to standard medical care?

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- For people with acute heart failure accompanied by mitral regurgitation is surgical valvular intervention more clinically or cost effective compared to percutaneous valvular intervention?

Search constructed by combining the columns in the following table using the AND Boolean operator

Population	Intervention / exposure	Comparison	Study filter used	Date parameters
None	Mitral valve surgery	n/a	The following filters were used in Medline and Embase only:	See Table 1

Medline search terms

1.	exp *mitral valve insufficiency/
2.	(mitral adj2 (regurgit* or incompet* or insufficien* or prolapse*)).ti,ab.
3.	1 or 2

Embase search terms

1.	exp *mitral valve regurgitation/
2.	(mitral adj2 (regurgit* or incompet* or insufficien* or prolapse*)).ti,ab.
3.	1 or 2

Cochrane search terms

#1.	MeSH descriptor: [Mitral Valve Insufficiency] explode all trees
#2.	(mitral near/2 (regurgit* or incompet* or insufficien* or prolapse*)):ti,ab
#3.	#1 or #2

A.3.15 Intra-aortic balloon counterpulsation

For people with acute heart failure is intra-aortic balloon counterpulsation (IABP) more clinically / cost effective compared to standard medical care alone?

Search constructed by combining the columns in the following table using the AND Boolean operator

Population	Intervention / exposure	Comparison	Study filter used	Date parameters
Adults (aged 18 years or older) who have a diagnosis of acute heart failure, or have possible acute heart failure, or are being investigated for acute heart failure.	IABP	n/a	The following filters were used in Medline and Embase only: RCT, SR	See Table 1

Medline search terms

1.	*heart-assist devices/
2.	intra-aortic balloon pumping/
3.	counterpulsation/
4.	counterpulsation.ti,ab.
5.	(intra-aortic balloon* or intraaortic balloon* or iabp).ti,ab.
6.	assist* circulation.ti,ab.

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7.	((intra-aort* or intraaort* or aort*) adj2 counterpulsation).ti,ab.
8.	((intra-aort* or intraaort* or aort*) adj2 pump*).ti,ab.
9.	((intra-aort* or intraaort* or aort*) adj2 balloon*).ti,ab.
10.	or/1-9

Embase search terms

1.	*heart assist device/
2.	aorta balloon/
3.	intraaortic balloon pump/
4.	counterpulsation/
5.	counterpulsation.ti,ab.
6.	assist* circulation.ti,ab.
7.	(intra-aortic balloon* or intraaortic balloon* or iabp).ti,ab.
8.	((intra-aort* or intraaort* or aort*) adj2 counterpulsation).ti,ab.
9.	((intra-aort* or intraaort* or aort*) adj2 pump*).ti,ab.
10.	((intra-aort* or intraaort* or aort*) adj2 ballon*).ti,ab.
11.	or/1-10

Cochrane search terms

#1.	MeSH descriptor: [Intra-Aortic Balloon Pumping] explode all trees
#2.	MeSH descriptor: [Counterpulsation] explode all trees
#3.	MeSH descriptor: [Heart-Assist Devices] explode all trees
#4.	counterpulsation:ti,ab
#5.	assist* circulation:ti,ab
#6.	(intra-aortic balloon* or intraaortic balloon* or iabp):ti,ab
#7.	((intra-aort* or intraaort* or aort*) near/2 counterpulsation):ti,ab
#8.	((intra-aort* or intraaort* or aort*) near/2 pump*):ti,ab
#9.	((intra-aort* or intraaort* or aort*) near/2 balloon*):ti,ab
#10.	#1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9

A.3.16   Ventricular assist devices

For people with acute heart failure are ventricular assist devices more clinically / cost effective compared to standard medical care (including IABP) alone?

Search constructed by combining the columns in the following table using the AND Boolean operator

Population	Intervention / exposure	Comparison	Study filter used	Date parameters
Adults (aged 18 years or older) who have a diagnosis of acute heart failure, or have possible acute heart failure, or are being investigated for acute heart failure.	Ventricular assist devices	n/a	The following filters were used in Medline and Embase only: RCT, SR	See Table 1

Medline search terms

| 1. | exp *heart-assist devices/ |

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2.	ventricular assist* device*.ti,ab.
3.	(mechanical* adj2 circulatory support).ti,ab.
4.	rotary blood pump*.ti,ab.
5.	LVAD*.ti,ab.
6.	(heartware or jarvik heart or heartmate ii or berlin heart or terumo or micromed debakey vad or levitronix or thoratec or berlin excor or abiomed).ti,ab.
7.	or/1-6

Embase search terms

1.	exp *heart assist device/
2.	exp *assisted circulation/
3.	ventricular assist* device*.ti,ab.
4.	(mechanical* adj2 circulatory support).ti,ab.
5.	rotary blood pump*.ti,ab.
6.	LVAD*.ti,ab.
7.	(heartware or jarvik heart or heartmate ii or berlin heart or terumo or micromed debakey vad or levitronix or thoratec or berlin excor or abiomed).ti,ab.
8.	or/1-7

Cochrane search terms

#1.	MeSH descriptor: [Heart-Assist Devices] explode all trees
#2.	MeSH descriptor: [Assisted Circulation] explode all trees
#3.	(ventricular next assist* next device*):ti,ab
#4.	(mechanical* near/2 "circulatory support"):ti,ab
#5.	LVAD*:ti,ab
#6.	(rotary next blood next pump*):ti,ab
#7.	(heartware or jarvik heart or heartmate ii or berlin heart or terumo or micromed debakey vad or levitronix or thoratec or berlin excor or abiomed):ti,ab
#8.	#1 or #2 or #3 or #4 or #5 or #6 or #7

Organisation of care

A.3.17 Specialist management units

For people with suspected or confirmed acute heart failure is a specialist management unit more clinically / cost effective than general medical hospital care?

Search constructed by combining the columns in the following table using the AND Boolean operator

Population	Intervention / exposure	Comparison	Study filter used	Date parameters
Adults (aged 18 years or older) who have a diagnosis of acute heart failure, or have possible acute heart failure, or are being investigated for acute heart failure.	Special management units	n/a	The following filters were used in Medline and Embase only: RCT, SR, OBS	1999-?

Medline search terms

<Please insert your copyright statement - one line of text entry only>

1.	exp physician's practice patterns/
2.	exp nurse's practice patterns/
3.	exp case management/
4.	exp patient care team/
5.	exp interdisciplinary communication/
6.	(special* adj2 (team* or unit* or ward* or center* or centre* or equip* or hub* or network* or care or clinic or clinics or doctor* or physician* or nurse* or clinician*)).ti,ab.
7.	(multidisciplinar* or multiprofessional* or interdisciplinar* or interobserver*).ti,ab.
8.	((cardi* or heart failure) adj2 (ward* or unit*)).ti,ab.
9.	or/1-8

Embase search terms

1.	exp *clinical practice/
2.	exp *nursing practice/
3.	exp *case management/
4.	exp *patient care/
5.	exp *interdisciplinary communication/
6.	(special* adj2 (team* or unit* or ward* or center* or centre* or equip* or hub* or network* or care or clinic or clinics or doctor* or physician* or nurse* or clinician*)).ti,ab.
7.	(multidisciplinar* or multiprofessional* or interdisciplinar* or interobserver*).ti,ab.
8.	((cardi* or heart failure) adj2 (ward* or unit*)).ti,ab.
9.	or/1-8

Cochrane search terms

#1.	MeSH descriptor: [Physician' s Practice Patterns] explode all trees
#2.	MeSH descriptor: [Nurse's Practice Patterns] explode all trees
#3.	MeSH descriptor: [Case Management] explode all trees
#4.	MeSH descriptor: [Patient Care Team] explode all trees
#5.	MeSH descriptor: [Interdisciplinary Communication] explode all trees
#6.	(special* near/2 (team* or unit* or ward* or center* or centre* or equip* or hub* or network* or care or clinic or clinics or doctor* or physician* or nurse* or clinician*))):ti,ab
#7.	(multidisciplinar* or multiprofessional* or interdisciplinar* or interobserver*):ti,ab
#8.	((cardi* or heart failure) near/2 (ward* or unit*)):ti,ab
#9.	#1 or #2 or #3 or #4 or #5 or #6 or #7 or #8

HMIC search terms

1.	exp medical staff/
2.	exp case management/
3.	exp health care teams/
4.	exp interprofessional communication/
5.	(special* adj2 (team* or unit* or ward* or center* or centre* or equip* or hub* or network* or care or clinic or clinics or doctor* or physician* or nurse* or clinician*)).ti,ab.
6.	(multidisciplinar* or multiprofessional* or interdisciplinar* or interobserver*).ti,ab.
7.	((cardi* or heart failure) adj2 (ward* or unit*)).ti,ab.
8.	or/1-7

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A.4 Health economics searches

A.4.1 Acute heart failure

Population	Intervention / exposure	Comparison	Study filter used	Date parameters
Adults (aged 18 years or older) who have a diagnosis of acute heart failure, or have possible acute heart failure, or are being investigated for acute heart failure or pulmonary oedema.			The following filters were used in Medline and Embase only: HE	Medline and Embase: 2010-28th January 2014 CRD and HEED: 1999-28th January 2014

CRD search terms

1.	MeSH descriptor heart failure explode all trees
2.	MeSH descriptor shock, cardiogenic
3.	MeSH descriptor ventricular dysfunction explode all trees
4.	MeSH descriptor cardiac output, low
5.	MeSH descriptor cardiomyopathy, dilated
6.	(lsvd) or (cardiogenic near2 shock):ti
7.	((heart or cardiac or myocardial) near2 (failure or decompensation)):ti
8.	(((congestive or acute or decompensat*) near2 (heart failure)))
9.	(((dilated or congestive) near2 (cardiomyopath*)):ti
10.	(((left ventricle* or left ventricular) near2 (failure or insufficienc* or dysfunction*)))
11.	(((ventricle* or ventricular) near2 (failure or insufficienc* or dysfunction*)):ti
12.	(#1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10 or #11)
13.	MeSH descriptor pulmonary edema explode all trees
14.	(((cardiogenic) near2 (pulmonary oedema or pulmonary edema or lung edema or lung oedema)):ti
15.	(#12 or #13 or #14)

HEED search terms

1.	ax=heart or cardiac or myocardial
2.	ax=failure or decompensat*
3.	cs=1 and 2
4.	ax=ventricular or ventricle*
5.	ax=failure or insufficient* or dysfunction*
6.	cs=4 and 5
7.	ax=cardiomyopathy
8.	ax=cardiogenic shock
9.	ax=cardiac output
10.	ax=lvsd
11.	ax=cardiogenic

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12.	ax=pulmonary oedema or pulmonary edema or lung edema or lung oedema
13.	cs=11 and 12
14.	cs=3 or 6 or 7 or 8 or 9 or 10 or 13

A.4.2 Valvular surgery

Population	Intervention / exposure	Comparison	Study filter used	Date parameters
No population	Valvular surgery		The following filters were used in Medline and Embase only: HE	Medline and Embase: 2010-28th January 2014 CRD and HEED: 1999-28th January 2014

Medline search terms

1.	exp *aortic valve stenosis/
2.	(aort* adj2 stenos*).ti,ab.
3.	(aort* adj2 scleros*).ti,ab.
4.	exp *mitral valve insufficiency/
5.	(mitral adj2 (regurgit* or incompet* or insufficien* or prolapse*)).ti,ab.
6.	or/1-5

Embase search terms

1.	exp *aorta valve stenosis/
2.	(aort* adj2 stenos*).ti,ab.
3.	(aort* adj2 scleros*).ti,ab.
4.	exp *mitral valve regurgitation/
5.	(mitral adj2 (regurgit* or incompet* or insufficien* or prolapse*)).ti,ab.
6.	or/1-5

CRD search terms

1.	MeSH descriptor aortic valve stenosis explode all trees
2.	MeSH descriptor mitral valve insufficiency explode all trees
3.	((aort* near2 (stenos* or scleros*)))
4.	((mitral near2 (regurgit* or incompet* or insufficien* or prolapse*)))
5.	#1 or #2 or #3 or #4

HEED search terms

1.	AX=mitral or aort*
2.	AX=stenos* or scleros* or regurgit* or incompet* or insufficien* or prolapse*
3.	CS=1 AND 2

A.4.3 Quality of life

Population	Intervention / exposure	Comparison	Study filter used	Date parameters
Adults (aged 18 years or older) who have a diagnosis of			The following filters were used in Medline and	Medline: 1946-22nd March 2013 Embase: 1974-22nd

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Population	Intervention / exposure	Comparison	Study filter used	Date parameters
acute heart failure, or have possible acute heart failure, or are being investigated for acute heart failure or pulmonary oedema.		41	Embase only: QOL	March 2013

A.5   References

1 National Institute for Health and Clinical Excellence. The guidelines manual. London: National Institute for Health and Clinical Excellence; 2012. Available from: http://publications.nice.org.uk/the-guidelines-manual-pmg6/

	Intervention / exposure	Comparison	Study filter used	Date parameters