

## BIJLAGE 10 ZOEKVERANTWOORDING

### Methodology report PICO 1 (Levensverwachting)

Key question

**Uitgangsvraag 1:** *Welke factoren bepalen de levensverwachting van patiënten met hartfalen NYHA klasse III-IV?*

P: Patiënten met hartfalen NYHA klasse III-IV

I: -

C: -

O: Levensverwachting

#### Search strategy

Search date: December 8 and 11, 2016.

Databases: OVID Medline, Pubmed, Embase and Cochrane Library (see appendix for search strings).

Search limits:

- Publication date: 2007-2016 for systematic reviews; 2014-2016 for primary studies
- English, Dutch;
- Study design: systematic reviews, RCTs, observational studies.

#### Search Results

Table 1. Overall search results.

Database	Number of hits	
	8-12-2016	11-12-2016
OVID Medline	2883	
Pubmed		79
Embase	3733	
CENTRAL	482	
HTA	1	
DARE	27	
CDSR	35	
<b>Total hits</b>	<b>7240</b>	
N excluded (language, year, duplicates)	1606	
<b>Total unique eligible hits</b>	<b>5634</b>	

a) Excluded studies

5634 unique hits were screened on title and abstract (Table 1). Of these, 5240 were excluded in a first phase. The most important reasons for exclusion were:

1. Other population: patients without heart failure, no palliative population
2. No model or not on risk factors
3. Wrong study design: e.g. narrative reviews, case series, needs assessment, etc.

The remaining 394 papers were categorized in four groups: systematic reviews of risk factors (N=39), individual studies on risk factors (N=299), studies on models (N=43) and potentially relevant studies without abstract (N=13). Of the last two groups (56 studies), the full-text was retrieved. Two additional studies were provided by an expert: 1 study published just after the search date (Uszko-Lencer 2017), and 1 letter (validating a model) (Lupon 2015). Based on the full-text, 46 papers were excluded.

Table 2 provides an overview of the excluded studies.

b) Included studies

Twelve studies were included:

- One systematic review:

- Alba AC, Agoritsas T, Jankowski M, Courvoisier D, Walter SD, Guyatt GH, et al. Risk prediction models for mortality in ambulatory patients with heart failure: a systematic review. *Circ. Heart fail.* 2013;6(5):881-9.

- Eleven primary studies:

- Scrutinio D, Ammirati E, Guida P, et al. The ADHF/NT-proBNP risk score to predict 1-year mortality in hospitalized patients with advanced decompensated heart failure. *J Heart Lung Transplant.* 2014;33(4):404-11.
- Scrutinio D, Ammirati E, Passantino A, et al. Predicting short-term mortality in advanced decompensated heart failure - role of the updated acute decompensated heart failure/N-terminal pro-B-type natriuretic Peptide risk score. *Circ J.* 2015;79(5):1076-83.
- Uszko-Lencer NH, Frankenstein L, Spruit MA, et al. TIME-CHF Investigators. *Int J Cardiol.* 2017 Jan 15;227:901-907. doi: 10.1016/j.ijcard.2016.11.122. Epub 2016 Nov 9. Predicting hospitalization and mortality in patients with heart failure: The BARDICHE-index.
- Salah K, Kok WE, Eurlings LW, et al. A novel discharge risk model for patients hospitalised for acute decompensated heart failure incorporating N-terminal pro-B-type natriuretic peptide levels: a European collaboration on acute decompensated Heart Failure: ELAN-HF Score. *Heart.* 2014;100(2):115-25.
- Pocock SJ, Ariti CA, McMurray JJ, et al. Predicting survival in heart failure: a risk score based on 39 372 patients from 30 studies. *Eur Heart J.* 2013;34(19):1404-13.
- Sartipy U, Dahlstrom U, Edner M, et al. Predicting survival in heart failure: validation of the MAGGIC heart failure risk score in 51,043 patients from the Swedish heart failure registry. *Eur J Heart Fail.* 2014;16(2):173-9.
- Bjurman C, Holmstrom A, Petzold M, et al. Assessment of a multi-marker risk score for predicting cause-specific mortality at three years in older patients with heart failure and reduced ejection fraction. *Cardiol J.* 2015;22(1):31-6.
- Hussain S, Kayani AM, Munir R, et al. Validation of the Seattle Heart Failure Model (SHFM) in heart failure population. *J Coll Physicians Surg Pak.* 2014;24(3):153-6.
- Shiraishi Y, Sawano M, Kohno T, et al. Validation of the Seattle Heart Failure Model in Japanese heart failure patients. *International Journal of Cardiology.* 2016;203:87-9.
- Lupon J, de Antonio M, Vila J, et al. Development of a novel heart failure risk tool: the barcelona bio-heart failure risk calculator (BCN bio-HF calculator). *PLoS ONE.* 2014;9(1):e85466.
- Lupón J, Januzzi JL, de Antonio M, et al. Validation of the Barcelona Bio-Heart Failure Risk Calculator in a cohort from Boston. *Rev Esp Cardiol (Engl Ed).* 2015 Jan;68(1):80-1.

Table 2. Key question 1: overview of excluded studies based on full-text evaluation.

Reference	Reason
Abe S, Yoshihisa A, Takiguchi M, et al. Liver dysfunction assessed by model for end-stage liver disease excluding INR	Not validated

(MELD-XI) scoring system predicts adverse prognosis in heart failure. <i>PLoS ONE</i> . 2014;9(6):e100618.	
Dardas T, Li Y, Reed SD, et al. Incremental and independent value of cardiopulmonary exercise test measures and the Seattle Heart Failure Model for prediction of risk in patients with heart failure. <i>J Heart Lung Transplant</i> . 2015;34(8):1017-23.	Not validated
Demissei BG, Valente MAE, Cleland JG, et al. Optimizing clinical use of biomarkers in high-risk acute heart failure patients. <i>Eur. J. Heart Fail</i> . 2016;18(3):269-80.	Not validated
Ford I, Robertson M, Komajda M, et al. Top ten risk factors for morbidity and mortality in patients with chronic systolic heart failure and elevated heart rate: The SHIFT Risk Model. <i>International Journal of Cardiology</i> . 2015;184:163-9.	Not validated
Gruson D, Ahn SA, Rousseau MF. Multiple biomarker strategy based on parathyroid hormone and natriuretic peptides testing for improved prognosis of chronic heart failure. <i>Peptides</i> . 2015;64:24-8.	Not validated
Ingle L, Rigby AS, Sloan R, et al. Development of a composite model derived from cardiopulmonary exercise tests to predict mortality risk in patients with mild-to-moderate heart failure. <i>Heart</i> . 2014;100(10):781-6.	Not validated
Jackson CE, Haig C, Welsh P, et al. The incremental prognostic and clinical value of multiple novel biomarkers in heart failure. <i>Eur. J. Heart Fail</i> . 2016;18(12):1491-8.	Not validated
Nakajima K, Nakata T, Yamada T, et al. A prediction model for 5-year cardiac mortality in patients with chronic heart failure using 123I-metaiodobenzylguanidine imaging. <i>Eur J Nucl Med Mol Imaging</i> . 2014;41(9):1673-82.	Not validated
Okazaki H, Shirakabe A, Hata N, et al. New scoring system (APACHE-HF) for predicting adverse outcomes in patients with acute heart failure: evaluation of the APACHE II and Modified APACHE II scoring systems. <i>J Cardiol</i> . 2014;64(6):441-9.	Not validated
Rodriguez-Pascual C, Paredes-Galan E, Vilches-Moraga A, et al. Comprehensive geriatric assessment and 2-year mortality in elderly patients hospitalized for heart failure. <i>Circ Cardiovasc Qual Outcomes</i> . 2014;Cardiovascular Quality & Outcomes. 7(2):251-8.	Not validated
Shadman R, Poole JE, Dardas TF, et al. A novel method to predict the proportional risk of sudden cardiac death in heart failure: Derivation of the Seattle Proportional Risk Model. <i>Heart Rhythm</i> . 2015;12(10):2069-77.	Not validated
Velavan P, Khan NK, Goode K, et al. Predictors of short term mortality in heart failure - insights from the Euro Heart Failure survey. <i>Int J Cardiol</i> . 2010;138(1):63-9.	Not validated
Chyu J, Fonarow GC, Tseng CH, et al. Four-variable risk model in men and women with heart failure. <i>Circ. Heart fail</i> . 2014;7(1):88-95.	Wrong outcome
Freudenberger RS, Cheng B, Mann DL, et al. The first prognostic model for stroke and death in patients with systolic heart failure. <i>J. Cardiol</i> . 2016;68(2):100-3.	Wrong outcome
Gil V, Miró Ò, Schull MJ, et al. Emergency Heart Failure	Wrong

Mortality Risk Grade score performance for 7-day mortality prediction in patients with heart failure attended at the emergency department: validation in a Spanish cohort. <i>Eur. J. Emerg. Med.</i> 2016.	outcome
Lagu T, Pekow PS, Shieh MS, et al. Validation and comparison of seven mortality prediction models for hospitalized patients with acute decompensated heart failure. <i>Circ. Heart Fail.</i> 2016;9(8).	Wrong outcome
Shiraishi Y, Kohsaka S, Abe T, et al. Validation of the Get With The Guideline-Heart Failure risk score in Japanese patients and the potential improvement of its discrimination ability by the inclusion of B-type natriuretic peptide level. <i>Am Heart J.</i> 2016;171(1):33-9.	Wrong outcome
Alvarez-Garcia J, Ferrero-Gregori A, Puig T, et al. A simple validated method for predicting the risk of hospitalization for worsening of heart failure in ambulatory patients: the Redin-SCORE. <i>Eur J Heart Fail.</i> 2015;17(8):818-27.	Prediction of readmission
Bayes-Genis A, Ordonez-Llanos J. Multiple biomarker strategies for risk stratification in heart failure. <i>Clinica Chimica Acta.</i> 2015;443:120-5.	Narrative review
Bayes-Genis A, Richards AM, Maisel AS, et al. Multimarker testing with ST2 in chronic heart failure. <i>Am J Cardiol.</i> 2015;115(7 Suppl):76B-80B.	Narrative review
Betihavas V, Frost SA, Newton PJ, et al. An Absolute Risk Prediction Model to Determine Unplanned Cardiovascular Readmissions for Adults with Chronic Heart Failure. <i>Heart Lung Circ.</i> 2015;24(11):1068-73.	Prediction of readmission
Cioffi G, Pulignano G, Barbati G, et al. Reasons why patients suffering from chronic heart failure at very high risk for death survive. <i>Int J Cardiol.</i> 2014;177(1):213-8.	Identification of prognostic variables
Collins SP, Jenkins CA, Harrell FE, Jr., et al. Identification of Emergency Department Patients With Acute Heart Failure at Low Risk for 30-Day Adverse Events: The STRATIFY Decision Tool. <i>JACC Heart Fail.</i> 2015;3(10):737-47.	Combined endpoint; not validated
Ferrero P, Iacovoni A, D'Elia E, et al. Prognostic scores in heart failure - Critical appraisal and practical use. <i>International Journal of Cardiology.</i> 2015;188:1-9.	Only pubmed
French B, Saha-Chaudhuri P, Ky B, et al. Development and evaluation of multi-marker risk scores for clinical prognosis. <i>Statistical methods in medical research.</i> 2016;25(1):255-71.	Methodological article
Goldraich L, Beck-da-Silva L, Clausell N. Are scores useful in advanced heart failure? <i>Expert Rev Cardiovasc Ther.</i> 2009;7(8):985-97.	Narrative review
Hendry PB, Krisdinarti L, Erika M. Scoring system based on electrocardiogram features to predict the type of heart failure in patients with chronic heart failure. <i>Cardiology Research.</i> 2016;7(3):110-6.	Wrong outcome
Hippisley-Cox J, Coupland C. Development and validation of risk prediction equations to estimate future risk of heart failure in patients with diabetes: a prospective cohort study. <i>BMJ Open.</i> 2015;5(9):e008503.	Wrong outcome
Ketchum ES, Levy WC. Multivariate risk scores and patient outcomes in advanced heart failure. <i>Congest Heart Fail.</i>	Narrative review

2011;17(5):205-12.	
Levy WC, Linker DT. Prediction of mortality in patients with heart failure and systolic dysfunction. <i>Curr Cardiol Rep</i> . 2008;10(3):198-205.	Narrative review
Ruiz-Salas A, García-Pinilla JM, Cabrera-Bueno F, et al. Comparison of the new risk prediction model (HCM Risk-SCD) and classic risk factors for sudden death in patients with hypertrophic cardiomyopathy and defibrillator. <i>Europace</i> . 2016;18(5):773-7.	Very specific population, not validated in second cohort
Sartipy U, Goda A, Mancini DM, et al. Assessment of a University of California, Los Angeles 4-variable risk score for advanced heart failure. <i>J Am Heart Assoc</i> . 2014;3(3):e000998.	Wrong outcome
Scandroglio AM, Pieri M, Zangrillo A, et al. Role of survival scores before left ventricular assist device implantation: The New CHRiSS compared to the HeartMate II score. <i>ASAIO J</i> . 2016;62(4):438-41.	Very specific population
Alvarez-Garcia J, Ferrero-Gregori A, Puig T, et al. A simple validated method for predicting the risk of hospitalization for worsening of heart failure in ambulatory patients: the Redin-SCORE. <i>Eur J Heart Fail</i> . 2015;17(8):818-27.	Prediction of readmission
Bayes-Genis A, Ordonez-Llanos J. Multiple biomarker strategies for risk stratification in heart failure. <i>Clinica Chimica Acta</i> . 2015;443:120-5.	Narrative review
Bayes-Genis A, Richards AM, Maisel AS, Mueller C, Ky B. Multimarker testing with ST2 in chronic heart failure. <i>Am J Cardiol</i> . 2015;115(7 Suppl):76B-80B.	Narrative review
Betihavas V, Frost SA, Newton PJ, et al. An Absolute Risk Prediction Model to Determine Unplanned Cardiovascular Readmissions for Adults with Chronic Heart Failure. <i>Heart Lung Circ</i> . 2015;24(11):1068-73.	Prediction of readmission
Cioffi G, Pulignano G, Barbati G, et al. Reasons why patients suffering from chronic heart failure at very high risk for death survive. <i>Int J Cardiol</i> . 2014;177(1):213-8.	Identification of prognostic variables
Collins SP, Jenkins CA, Harrell FE, Jr., et al. Identification of Emergency Department Patients With Acute Heart Failure at Low Risk for 30-Day Adverse Events: The STRATIFY Decision Tool. <i>JACC Heart Fail</i> . 2015;3(10):737-47.	Combined endpoint; not validated
Ferrero P, Iacovoni A, D'Elia E, et al. Prognostic scores in heart failure - Critical appraisal and practical use. <i>International Journal of Cardiology</i> . 2015;188:1-9.	Only pubmed
French B, Saha-Chaudhuri P, Ky B, et al. Development and evaluation of multi-marker risk scores for clinical prognosis. <i>Statistical methods in medical research</i> . 2016;25(1):255-71.	Methodological article
Goldraich L, Beck-da-Silva L, Clausell N. Are scores useful in advanced heart failure? <i>Expert Rev Cardiovasc Ther</i> . 2009;7(8):985-97.	Narrative review
Hendry PB, Krisdinarti L, Erika M. Scoring system based on electrocardiogram features to predict the type of heart failure in patients with chronic heart failure. <i>Cardiology Research</i> . 2016;7(3):110-6.	Wrong outcome
Hippisley-Cox J, Coupland C. Development and validation of risk prediction equations to estimate future risk of heart failure	Wrong outcome

in patients with diabetes: a prospective cohort study. *BMJ Open*. 2015;5(9):e008503.

Ketchum ES, Levy WC. Multivariate risk scores and patient outcomes in advanced heart failure. *Congest Heart Fail*. 2011;17(5):205-12.

Narrative review

Levy WC, Linker DT. Prediction of mortality in patients with heart failure and systolic dysfunction. *Curr Cardiol Rep*. 2008;10(3):198-205.

Narrative review

### Methodology report PICO 3 (ACP)

Key question

**Uitgangsvraag 3:** *Leidt advance care planning bij patiënten met hartfalen (NYHA-klasse III-IV) tot een betere kwaliteit van leven en/of hogere tevredenheid van de patiënt en de familieleden?*

P: Patiënten met hartfalen NYHA klasse III-IV

I: Advance care planning

C: Geen advance care planning

O: Tevredenheid van de patiënt, tevredenheid van de familieleden, kwaliteit van leven, kwaliteit van sterfte, heropname, percentage reanimatie in eindstadium

### Search strategy

Search date: November 23 and December 8, 2016.

Databases: OVID Medline, Pubmed, Embase and Cochrane Library (see appendix for search strings).

Search limits:

- Publication date: 2007-2016
- English, Dutch;
- Study design: systematic reviews, RCTs, comparative observational studies.

### Search Results

Table 3. Overall search results.

Database	Number of hits		
	23-11-2016	8-12-2016	8-12-2016
OVID Medline	542	180	
Pubmed			271
Embase	1454		
CENTRAL	387		
HTA	0		
DARE	4		
CDSR	29		
<b>Total hits</b>	<b>2416</b>	<b>180</b>	<b>271</b>
N excluded (language, year, duplicates)	710	33	8
<b>Total unique eligible hits</b>	<b>1706</b>	<b>147</b>	<b>263</b>

a) Excluded studies

1706, 147 and 263 unique hits, respectively, were screened on title and abstract (Table 3). Of these, 2078 were excluded in a first phase. The most important reasons for exclusion were:

1. Other population: patients without heart failure, no palliative population
2. Wrong intervention
3. Wrong study design: e.g. narrative reviews, case series, needs assessment, etc.

Of the remaining 38 papers, the full-text was retrieved. Based on the full-text, 33 papers were excluded.

Table 4 provides an overview of the excluded studies.

b) Included studies

The following five studies were included:

- Denvir MA, Cudmore S, Highet G, et al. Phase 2 Randomised Controlled Trial and Feasibility Study of Future Care Planning in Patients with Advanced Heart Disease. *Sci Rep.* 2016;6:24619 LID - 10.1038/srep [doi].
- Kirolos I, Tamariz L, Schultz EA, et al. Interventions to improve hospice and palliative care referral: a systematic review. *J Palliat Med.* 2014;17(8):957-64.
- Singer AE, Goebel JR, Kim YS, et al. Populations and Interventions for Palliative and End-of-Life Care: A Systematic Review. *J. Palliative Med.* 2016;19(9):995-1008.
- Dev S, Clare RM, Felker GM, et al. Link between decisions regarding resuscitation and preferences for quality over length of life with heart failure. *Eur J Heart Fail.* 2012;14(1):45-53.
- Dunlay SM, Swetz KM, Mueller PS, et al. Advance directives in community patients with heart failure. *Circ Cardiovasc Qual Outcomes.* 2012;Cardiovascular Quality & Outcomes. 5(3):283-9.

Table 4. Key question 3: overview of excluded studies based on full-text evaluation.

<b>Reference</b>	<b>Reason</b>
Adler ED, Goldfinger JZ, Kalman J, et al. Palliative care in the treatment of advanced heart failure. <i>Circulation.</i> 2009;120(25):2597-606.	Narrative overview
Brännström M, Boman K. A new model for integrated heart failure and palliative advanced homecare--rationale and design of a prospective randomized study. <i>European journal of cardiovascular nursing : journal of the Working Group on Cardiovascular Nursing of the European Society of Cardiology.</i> 2013;12(3):269-75.	Protocol for RCT
Brannstrom M, Boman K. Effects of person-centred and integrated chronic heart failure and palliative home care. <i>PREFER: a randomized controlled study. Eur J Heart Fail.</i> 2014;16(10):1142-51.	ACP not clearly delineable
Butler J, Binney Z, Kalogeropoulos A, et al. Advance directives among hospitalized patients with heart failure. <i>JACC Heart Fail.</i> 2015;3(2):112-21.	No comparative study
Chen CY, Thorsteinsdottir B, Cha SS, et al. Health care outcomes and advance care planning in older adults who receive home-based palliative care: A pilot cohort study. <i>J. Palliative Med.</i> 2015;18(1):38-44.	ACP reported as outcome
Chen JLT, Sosnov J, Lessard D, et al. Impact of do-not-resuscitation orders on quality of care performance measures in patients hospitalized with acute heart failure. <i>Am Heart J.</i> 2008;156(1):78-84.	Wrong outcomes
Denvir MA, Murray SA, Boyd KJ. Future care planning: a first step to palliative care for all patients with advanced heart disease.	Narrative overview

Heart. 2015;101(13):1002-7.

Dionne-Odom JN, Kono A, Frost J, et al. Translating and testing the ENABLE: CHF-PC concurrent palliative care model for older adults with heart failure and their family caregivers. <i>J. Palliative Med.</i> 2014;17(9):995-1004.	No comparative study
El-Jawahri A, Paasche-Orlow MK, Matlock D, et al. Randomized, controlled trial of an advance care planning video decision support tool for patients with advanced heart failure. <i>Circulation.</i> 2016;134(1):52-60.	ACP use as an outcome
Evangelista LS, Liao S, Motie M, et al. Does the type and frequency of palliative care services received by patients with advanced heart failure impact symptom burden. <i>J. Palliative Med.</i> 2014;17(1):75-9.	No comparative study
Evangelista LS, Liao S, Motie M, et al. On-going palliative care enhances perceived control and patient activation and reduces symptom distress in patients with symptomatic heart failure: a pilot study. <i>EUR J CARDIOVASC NURS.</i> 2014;13(2):116-23.	ACP not clearly delineable
Evangelista LS, Lombardo D, Malik S, et al. Examining the effects of an outpatient palliative care consultation on symptom burden, depression, and quality of life in patients with symptomatic heart failure. <i>J Card Fail.</i> 2012;18(12):894-9.	ACP not clearly delineable
Gadoud A, Jenkins SMM, Hogg KJ. Palliative care for people with heart failure: summary of current evidence and future direction. <i>Palliat Med.</i> 2013;27(9):822-8.	Narrative overview
Gomes B, Calanzani N, Curiale V, et al. Effectiveness and cost-effectiveness of home palliative care services for adults with advanced illness and their caregivers. <i>Cochrane Database Syst. Rev.</i> 2013;2016(3).	ACP not clearly delineable
Hayek S, Nieva R, Corrigan F, et al. End-of-life care planning: improving documentation of advance directives in the outpatient clinic using electronic medical records. <i>J Palliat Med.</i> 2014;17(12):1348-52.	ACP use as an outcome
Irving G, Holden J, Edwards J, et al. Chronic heart failure guidelines: do they adequately address patient need at the end-of-life? <i>Int J Cardiol.</i> 2013;168(3):2304-9.	Overview of guidelines; useful for other considerations
Jaarsma T, Beattie JM, Ryder M, et al. Palliative care in heart failure: A position statement from the palliative care workshop of the Heart Failure Association of the European Society of Cardiology. <i>Eur. J. Heart Fail.</i> 2009;11(5):433-43.	Position statement; no methods reported for searching; useful for other considerations
Johnson M, Nunn A, Hawkes T, et al. Planning for end-of-life care in heart failure: Experience of two integrated cardiology-palliative care teams. <i>Br. J. Cardiol.</i> 2012;19(2):71-5.	Descriptive study
Lemond L, Allen LA. Palliative Care and Hospice in Advanced Heart Failure. <i>Prog. Cardiovasc. Dis.</i> 2011;54(2):168-78.	Narrative overview
Low J, Pattenden J, Candy B, Beattie JM, Jones L. Palliative care in advanced heart failure: An international review of the perspectives of recipients and health professionals on care provision. <i>J. Card. Fail.</i> 2011;17(3):231-52.	Not on ACP as such
Malhotra C, Sim DKL, Jaufferally F, et al. Impact of advance care planning on the care of patients with heart failure: Study protocol	Protocol for RCT



for a randomized controlled trial. *Trials*. 2016;17(1).

McIlvennan CK, Allen LA. Palliative care in patients with heart failure. *Bmj*. 2016;353.

McKelvie RS, Moe GW, Cheung A, et al. The 2011 Canadian cardiovascular society heart failure management guidelines update: Focus on sleep apnea, renal dysfunction, mechanical circulatory support, and palliative care. *Can. J. Cardiol*. 2011;27(3):319-38.

Mentz RJ, Tulsy JA, Granger BB, Anstrom KJ, Adams PA, Dodson GC, et al. The palliative care in heart failure trial: rationale and design. *Am Heart J*. 2014;168(5):645-51.e1.

Pattenden JF, Mason AR, Lewin RJP. Collaborative palliative care for advanced heart failure: outcomes and costs from the 'Better Together' pilot study. *BMJ support*. 2013;3(1):69-76.

Sadeghi B, Walling AM, Romano PS, et al. A Hospital-Based Advance Care Planning Intervention for Patients with Heart Failure: A Feasibility Study. *J. Palliative Med*. 2016;19(4):451-5.

Schwarz ER, Baraghoush A, Morrissey RP, et al. Pilot study of palliative care consultation in patients with advanced heart failure referred for cardiac transplantation. *J. Palliative Med*. 2012;15(1):12-5.

Shah AB, Morrissey RP, Baraghoush A, et al. Failing the failing heart: a review of palliative care in heart failure. *Reviews in Cardiovascular Medicine*. 2013;14(1):41-8.

Siouta N, van Beek K, Preston N, et al. Towards integration of palliative care in patients with chronic heart failure and chronic obstructive pulmonary disease: a systematic literature review of European guidelines and pathways. *BMC Palliative Care*. 2016;15(18).

Stevenson LW, O'Donnell A. Advanced care planning: care to plan in advance. *JACC Heart Fail*. 2015;3(2):122-6.

Van Scoy LJ, Green MJ, Dimmock AEF, et al. High satisfaction and low decisional conflict with advance care planning among chronically ill patients with advanced chronic obstructive pulmonary disease or heart failure using an online decision aid: A pilot study. *Chronic Illn*. 2016;12(3):227-35.

Ventura MdM. Effectiveness and cost-effectiveness of home palliative care services for adults with advanced illness and their caregivers. *Sao Paulo Med J*. 2016;134(1):93-4.

Xu J, Abshire M, Han HR. Decision Making Among Persons Living With Heart Failure. *J Cardiovasc Nurs*. 2016;31(5):E1-9 LID - 10.1097/JCN.0000000000000312 [doi].

### Search strings Question 1 (Levensverwachting)

#### medline (ovid)

- 1 exp Heart Failure/ (108079)
- 2 (heart adj2 failure\*).tw. (127990)
- 3 (cardiac adj2 failure\*).tw. (13182)
- 4 (myocardial adj2 failure\*).tw. (2752)
- 5 (heart adj2 decompensat\*).tw. (2859)
- 6 heart failure.tw. (127385)
- 7 cardiac failure.tw. (10681)
- 8 NYHA III.mp. (601)

Is in fact a narrative overview Consensus guidelines; useful for other considerations

Protocol for RCT

No clear ACP as part of intervention Study on implementation of ACP intervention No comparative study

Narrative overview

Overview of guidelines; useful for other considerations

Editorial

No comparative study

Comment on Gomes 2013

Not on ACP as such

- 9 NYHA IV.mp. (239)
- 10 NYHA 3.mp. (26)
- 11 NYHA 4.mp. (6)
- 12 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 (172099)
- 13 predict\*.mp. (1202751)
- 14 validat\*.mp. (381371)
- 15 scor\*.mp. (677927)
- 16 observ\*.mp. (2808719)
- 17 risk assessment/ or risk factors/ (890631)
- 18 evaluation.mp. (1347602)
- 19 exp Prognosis/ (1386449)
- 20 prognostic factor\*.mp. (71450)
- 21 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 (6703643)
- 22 (mortality or survival or death).mp. (1871028)
- 23 Mortality/ (40715)
- 24 Survival/ (4788)
- 25 22 or 23 or 24 (1871028)
- 26 statistics as topic/ or exp regression analysis/ (480843)
- 27 statistic\*.mp. (1076516)
- 28 (logistic adj2 model\*).mp. (153341)
- 29 (likelihood adj2 function\*).mp. (22497)
- 30 regression\*.mp. (592427)
- 31 exp mathematical concepts/ (919692)
- 32 algorithm\*.mp. (296152)
- 33 mathematic\*.mp. (153338)
- 34 multivariate analysis/ (114057)
- 35 exp models, biological/ or exp models, statistical/ or logistic models/ (1149774)
- 36 area under curve/ (34176)
- 37 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 (3244882)
- 38 12 and 21 and 25 and 37 (12606)
- 39 limit 38 to yr="2014 -Current" (2434)
- 40 meta-analysis.mp,pt. or review.pt. or search:.tw. (2482932)
- 41 38 and 40 (1021)
- 42 limit 41 to yr="2007 -Current" (663)
- 43 39 or 42 (2883)

#### Pubmed, 27-10-2016

#17,"Search ((((((((((((((((((heart[Abstract] AND failure\*)[Abstract])) OR ((heart[Title] AND failure\*)[Title]))) OR (((myocardial[Abstract] AND failure\*)[Abstract])) OR ((myocardial[Title] AND failure\*)[Title]))) OR (((cardiac[Abstract] AND failure\*)[Abstract])) OR ((cardiac[Title] AND failure\*)[Title]))) OR (((heart[Abstract] AND decompensat\*)[Abstract])) OR ((heart[Title] AND decompensat\*)[Title]))) OR ((heart failure[Abstract] OR heart failure[Title])) OR ((cardiac failure[Abstract] OR cardiac failure[Title])) OR ((NYHA III[Abstract] OR NYHA III[Title])) OR ((NYHA IV[Abstract] OR NYHA IV[Title])) OR ((NYHA 3[Abstract] OR NYHA 3[Title])) OR ((NYHA 4[Abstract] OR NYHA 4[Title])) AND (((predict\*[Abstract] OR validat\*[Abstract] OR scor\*[Abstract] OR observ\*[Abstract] OR evaluation[Abstract] OR prognostic factor\*[Abstract] OR risk factor\*[Abstract] OR risk assessment[Abstract] OR prognosis[Abstract])) OR (predict\*[Title] OR validat\*[Title] OR scor\*[Title] OR observ\*[Title] OR evaluation[Title] OR prognostic factor\*[Title] OR risk factor\*[Title] OR risk assessment[Title] OR prognosis[Title]))) AND (((mortality[Abstract] OR survival[Abstract] OR death)[Abstract])) OR ((mortality[Title] OR survival[Title] OR death)[Title])) AND (((statistic\*[Abstract] OR (logistic[Abstract] AND model\*)[Abstract] OR (likelihood[Abstract] AND function\*)[Abstract] OR regression\*[Abstract] OR algorithm\*[Abstract] OR mathematic\*[Abstract] OR multivariate analysis[Abstract] OR area under the curve[Abstract] OR (biological[Abstract] AND model\*)[Abstract])) OR (statistic\*[Title]

OR (logistic[Title] AND model\*)[Title] OR (likelihood[Title] AND function\*)[Title] OR regression\*[Title] OR algorithm\*[Title] OR mathematic\*[Title] OR multivariate analysis[Title] OR area under the curve[Title] OR (biological[Title] AND model\*)[Title])) Filters: Publication date from 2016/01/01 to 2016/12/31",79

#16,"Search (((((((((((((((heart[Abstract] AND failure\*)[Abstract])) OR ((heart[Title] AND failure\*)[Title]))) OR (((myocardial[Abstract] AND failure\*)[Abstract])) OR ((myocardial[Title] AND failure\*)[Title]))) OR (((cardiac[Abstract] AND failure\*)[Abstract])) OR ((cardiac[Title] AND failure\*)[Title]))) OR (((heart[Abstract] AND decompensat\*)[Abstract])) OR ((heart[Title] AND decompensat\*)[Title])) OR ((heart failure[Abstract] OR heart failure[Title])) OR ((cardiac failure[Abstract] OR cardiac failure[Title])) OR ((NYHA III[Abstract] OR NYHA III[Title])) OR ((NYHA IV[Abstract] OR NYHA IV[Title])) OR ((NYHA 3[Abstract] OR NYHA 3[Title])) OR ((NYHA 4[Abstract] OR NYHA 4[Title])) AND (((predict\*[Abstract] OR validat\*[Abstract] OR scor\*[Abstract] OR observ\*[Abstract] OR evaluation[Abstract] OR prognostic factor\*[Abstract] OR risk factor\*[Abstract] OR risk assessment[Abstract] OR prognosis[Abstract])) OR (predict\*[Title] OR validat\*[Title] OR scor\*[Title] OR observ\*[Title] OR evaluation[Title] OR prognostic factor\*[Title] OR risk factor\*[Title] OR risk assessment[Title] OR prognosis[Title])) AND (((mortality[Abstract] OR survival[Abstract] OR death)[Abstract])) OR ((mortality[Title] OR survival[Title] OR death)[Title])) AND (((statistic\*[Abstract] OR (logistic[Abstract] AND model\*)[Abstract] OR (likelihood[Abstract] AND function\*)[Abstract] OR regression\*[Abstract] OR algorithm\*[Abstract] OR mathematic\*[Abstract] OR multivariate analysis[Abstract] OR area under the curve[Abstract] OR (biological[Abstract] AND model\*)[Abstract])) OR (statistic\*[Title] OR (logistic[Title] AND model\*)[Title] OR (likelihood[Title] AND function\*)[Title] OR regression\*[Title] OR algorithm\*[Title] OR mathematic\*[Title] OR multivariate analysis[Title] OR area under the curve[Title] OR (biological[Title] AND model\*)[Title]))",571

#15,"Search ((statistic\*[Abstract] OR (logistic[Abstract] AND model\*)[Abstract] OR (likelihood[Abstract] AND function\*)[Abstract] OR regression\*[Abstract] OR algorithm\*[Abstract] OR mathematic\*[Abstract] OR multivariate analysis[Abstract] OR area under the curve[Abstract] OR (biological[Abstract] AND model\*)[Abstract])) OR (statistic\*[Title] OR (logistic[Title] AND model\*)[Title] OR (likelihood[Title] AND function\*)[Title] OR regression\*[Title] OR algorithm\*[Title] OR mathematic\*[Title] OR multivariate analysis[Title] OR area under the curve[Title] OR (biological[Title] AND model\*)[Title])",40790

#14,"Search (((mortality[Abstract] OR survival[Abstract] OR death)[Abstract])) OR ((mortality[Title] OR survival[Title] OR death)[Title])",112371

#13,"Search ((predict\*[Abstract] OR validat\*[Abstract] OR scor\*[Abstract] OR observ\*[Abstract] OR evaluation[Abstract] OR prognostic factor\*[Abstract] OR risk factor\*[Abstract] OR risk assessment[Abstract] OR prognosis[Abstract])) OR (predict\*[Title] OR validat\*[Title] OR scor\*[Title] OR observ\*[Title] OR evaluation[Title] OR prognostic factor\*[Title] OR risk factor\*[Title] OR risk assessment[Title] OR prognosis[Title])",1019638

#12,"Search (((((((((((((((heart[Abstract] AND failure\*)[Abstract])) OR ((heart[Title] AND failure\*)[Title]))) OR (((myocardial[Abstract] AND failure\*)[Abstract])) OR ((myocardial[Title] AND failure\*)[Title]))) OR (((cardiac[Abstract] AND failure\*)[Abstract])) OR ((cardiac[Title] AND failure\*)[Title]))) OR (((heart[Abstract] AND decompensat\*)[Abstract])) OR ((heart[Title] AND decompensat\*)[Title])) OR ((heart failure[Abstract] OR heart failure[Title])) OR ((cardiac failure[Abstract] OR cardiac failure[Title])) OR ((NYHA III[Abstract] OR NYHA III[Title])) OR ((NYHA IV[Abstract] OR NYHA IV[Title])) OR ((NYHA 3[Abstract] OR NYHA 3[Title])) OR ((NYHA 4[Abstract] OR NYHA 4[Title])",27769

#11,"Search (NYHA 4[Abstract] OR NYHA 4[Title])",0

#10,"Search (NYHA 3[Abstract] OR NYHA 3[Title])",4

#9,"Search (NYHA IV[Abstract] OR NYHA IV[Title])",19

#8,"Search (NYHA III[Abstract] OR NYHA III[Title])",59

#7,"Search (cardiac failure[Abstract] OR cardiac failure[Title])",1274

#6,"Search (heart failure[Abstract] OR heart failure[Title])",19709

#5,"Search (((heart[Abstract] AND decompensat\*)[Abstract])) OR ((heart[Title] AND decompensat\*)[Title])",539  
 #4,"Search (((cardiac[Abstract] AND failure\*)[Abstract])) OR ((cardiac[Title] AND failure\*)[Title])",4689  
 #3,"Search (((myocardial[Abstract] AND failure\*)[Abstract])) OR ((myocardial[Title] AND failure\*)[Title])",2504  
 #1,"Search (((heart[Abstract] AND failure\*)[Abstract])) OR ((heart[Title] AND failure\*)[Title])",5733

## 1. Embase

#1	'heart failure'/exp	390691
#2	(heart NEAR/2 failure*):ab,ti	202915
#3	(myocardial NEAR/2 failure*):ab,ti	3795
#4	(cardiac NEAR/2 failure*):ab,ti	18879
#5	(heart NEAR/2 decompensat*):ab,ti	5757
#6	nyha:ab,ti AND 3:ab,ti OR nyha:ab,ti AND 4:ab,ti OR nyha:ab,ti AND iii:ab,ti OR nyha:ab,ti AND iv:ab,ti	9740
#7	#1 or #2 or #3 or #4 or #5 or #6	430891
#8	predict*:ti,ab OR validat*:ti,ab OR (prognostic:ti,ab AND factor*:ti,ab)	1981582
#9	'risk assessment'/exp OR 'risk factor'/exp OR 'prognosis'/exp	1566884
#10	predict*:ti,ab OR validat*:ti,ab OR (prognostic:ti,ab AND factor*:ti,ab) OR 'risk assessment'/exp OR 'risk factor'/exp OR 'prognosis'/exp	3191743
#11	'mortality'/exp OR 'survival'/exp	1470597
#12	(logistic NEAR/2 model*):ti,ab OR (likelihood NEAR/2 function*):ti,ab OR regression*:ti,ab OR algorithm*:ti,ab	928907
#13	'regression analysis'/exp OR 'mathematical phenomena'/exp OR 'biological model'/exp OR 'statistical model'/exp OR 'area under the curve'/exp	4338562
#14	#12 or #13	4748767
#15	#7 and #10 and #11 and #14	24790
#16	#15 and ([cochrane review]/lim OR [systematic review]/lim OR [meta analysis]/lim) AND ([article]/lim OR [article in press]/lim OR [review]/lim) AND ([dutch]/lim OR [english]/lim) AND ([embase]/lim OR [medline]/lim) AND [2007-2017]/py	465
#17	#15 and ([article]/lim OR [article in press]/lim OR [review]/lim) AND ([dutch]/lim OR [english]/lim) AND ([embase]/lim OR [medline]/lim) AND [2014-2017]/py	3500
#18	#15 and ([article]/lim OR [article in press]/lim OR [review]/lim) AND ([dutch]/lim OR [english]/lim) AND ([embase]/lim OR [medline]/lim) AND [2014-2017]/py AND [humans]/lim	3473
#19	#16 or #17	3733

## 2. Cochrane Library

#1	MeSH descriptor: [Heart Failure] 1 tree(s) exploded
#2	(heart and failure*):ti,ab
#3	(cardiac and failure*):ti,ab
#4	(myocardial and failure*):ti,ab
#5	(heart and decompensat*):ti,ab
#6	"NYHA III":ti,ab
#7	"NYHA IV":ti,ab
#8	"NYHA 3":ti,ab
#9	"NYHA 4":ti,ab

- #10 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9
- #11 predict\*:ti,ab
- #12 validat\*:ti,ab
- #13 scor\*:ti,ab
- #14 observ\*:ti,ab
- #15 prognostic factor\*:ti,ab
- #16 MeSH descriptor: [Risk Assessment] 1 tree(s) exploded
- #17 MeSH descriptor: [Risk Factors] 1 tree(s) exploded
- #18 evaluation:ti,ab
- #19 MeSH descriptor: [Prognosis] 1 tree(s) exploded
- #20 #11 or #12 or #13 or #14 or #15 or #16 or #17 or #18 or #19
- #21 (mortality or survival or death):ti,ab
- #22 MeSH descriptor: [Mortality] 1 tree(s) exploded
- #23 MeSH descriptor: [Survival] 1 tree(s) exploded
- #24 #21 or #22 or #23
- #25 MeSH descriptor: [Statistics as Topic] 1 tree(s) exploded
- #26 MeSH descriptor: [Regression Analysis] 1 tree(s) exploded
- #27 MeSH descriptor: [Mathematical Concepts] 1 tree(s) exploded
- #28 MeSH descriptor: [Multivariate Analysis] 1 tree(s) exploded
- #29 MeSH descriptor: [Models, Biological] 1 tree(s) exploded
- #30 MeSH descriptor: [Models, Statistical] 1 tree(s) exploded
- #31 MeSH descriptor: [Logistic Models] 1 tree(s) exploded
- #32 MeSH descriptor: [Area Under Curve] 1 tree(s) exploded
- #33 statistic\*:ti,ab
- #34 (logistic and model\*):ti,ab
- #35 (likelihood and function\*):ti,ab
- #36 regression\*:ti,ab
- #37 algorithm\*:ti,ab
- #38 mathematic\*:ti,ab
- #39 #25 or #26 or #27 or #28 or #29 or #30 or #31 or #32 or #33 or #34 or #35 or #36 or #37 or #38
- #40 #10 and #20 and #24 and #39

### Search strings Question 3 (ACP)

#### 1. medline (ovid): 23-11-2016

- 1 exp Heart Failure/ (108062)
- 2 (heart adj2 failure\*).tw. (127967)
- 3 (cardiac adj2 failure\*).tw. (13178)
- 4 (myocardial adj2 failure\*).tw. (2750)
- 5 (heart adj2 decompensat\*).tw. (2859)
- 6 heart failure.tw. (127362)
- 7 cardiac failure.tw. (10677)
- 8 or/1-7 (171860)
- 9 NYHA III.mp. (599)
- 10 NYHA IV.mp. (239)
- 11 NYHA 3.mp. (26)
- 12 NYHA 4.mp. (6)
- 13 or/1-12 (172070)
- 14 exp Advance Care Planning/ (8406)
- 15 (advance care adj (plan or plans or planning)).tw. (1332)
- 16 (advance adj (directive\* or decision\*)).tw. (3044)
- 17 living will\*.tw. (1173)
- 18 Right to Die/ (5120)

- 19 right to die.tw. (925)
- 20 ((patient or patients) adj5 (advocat\* or advocacy)).tw. (4859)
- 21 power of attorney.tw. (353)
- 22 ((end of life or EOL) adj5 (care or discuss\* or decision\* or plan or plans or planning or preference\*)).tw. (10117)
- 23 Terminal Care/ (25238)
- 24 Treatment Refusal/ (11915)
- 25 exp Withholding Treatment/ (14673)
- 26 (treatment adj5 (refus\* or withhold\* or withdraw\*)).tw. (14155)
- 27 future care planning.mp. (22)
- 28 anticipating care.mp. (1)
- 29 early palliative care.mp. (120)
- 30 timely palliative care.mp. (11)
- 31 or/14-30 (74433)
- 32 13 and 31 (926)
- 33 limit 32 to yr="2007 -Current" (542)

## 2. medline (ovid): 8-12-2016

- 1 exp Heart Failure/ (108079)
- 2 (heart adj2 failure\*).tw. (127990)
- 3 (cardiac adj2 failure\*).tw. (13182)
- 4 (myocardial adj2 failure\*).tw. (2752)
- 5 (heart adj2 decompensat\*).tw. (2859)
- 6 heart failure.tw. (127385)
- 7 cardiac failure.tw. (10681)
- 8 or/1-7 (171889)
- 9 NYHA III.mp. (601)
- 10 NYHA IV.mp. (239)
- 11 NYHA 3.mp. (26)
- 12 NYHA 4.mp. (6)
- 13 or/1-12 (172099)
- 14 exp Advance Care Planning/ (8409)
- 15 (advance care adj (plan or plans or planning)).tw. (1336)
- 16 (advance adj (directive\* or decision\*)).tw. (3046)
- 17 living will\*.tw. (1173)
- 18 Right to Die/ (5120)
- 19 right to die.tw. (925)
- 20 ((patient or patients) adj5 (advocat\* or advocacy)).tw. (4861)
- 21 power of attorney.tw. (353)
- 22 ((end of life or EOL) adj5 (care or discuss\* or decision\* or plan or plans or planning or preference\*)).tw. (10126)
- 23 Terminal Care/ (25250)
- 24 Treatment Refusal/ (11917)
- 25 exp Withholding Treatment/ (14678)
- 26 (treatment adj5 (refus\* or withhold\* or withdraw\*)).tw. (14160)
- 27 future care planning.mp. (22)
- 28 anticipating care.mp. (1)
- 29 early palliative care.mp. (120)
- 30 timely palliative care.mp. (11)
- 31 or/14-30 (74459)
- 32 13 and 31 (929)
- 33 limit 32 to yr="2007 -Current" (545)
- 34 \*"Palliative Care"/ (26669)
- 35 31 or 34 (94797)

- 36 13 and 35 (1214)
- 37 limit 36 to yr="2007 -Current" (725)
- 38 37 not 33 (180)

### 3. PubMed: 8-12-2016

- #20,"Search #5 and #18 Filters: Publication date from 2016/01/01 to 2016/12/31",271,09:06:18
- #19,"Search #5 and #18",4418,09:05:40
- #18,"Search #6 or #7 or #8 or #9 or #10 or #11 or #12 or #13 or #14 or #15 or #16 or #17",211534,09:05:22
- #17,"Search timely palliative care",445,09:04:26
- #16,"Search early palliative care",3881,09:04:17
- #15,"Search anticipating care",852,09:04:10
- #14,"Search future care planning",9633,09:04:02
- #13,"Search (treatment and (refus\* or withhold\* or withdraw\*))",115848,09:03:53
- #12,"Search ((end of life or EOL) and (care or discuss\* or decision\* or plan or plans or planning or preference\*))",27503,09:03:38
- #11,"Search power of attorney",423,09:03:22
- #10,"Search ((patient or patients) and (advocat\* or advocacy))",49439,09:03:11
- #9,"Search right to die",5804,09:02:57
- #8,"Search living will\*",2209,09:02:49
- #7,"Search (advance and (directive\* or decision\*))",9587,09:02:42
- #6,"Search (advance care and (plan or plans or planning))",3943,09:02:27
- #5,"Search #1 or #2 or #3 or #4",229234,09:02:09
- #4,"Search NYHA",10804,09:01:46
- #3,"Search myocardial and failure",64853,09:01:38
- #2,"Search cardiac and failure",221219,09:01:30
- #1,"Search heart and failure",204795,09:01:22

### 4. Embase

- |     |  |        |
|-----|--|--------|
| #1  | 'heart failure'/exp  | 389502 |
| #2  | (heart NEAR/2 failure*):ab,ti  | 202388 |
| #3  | (myocardial NEAR/2 failure*):ab,ti   | 3791   |
| #4  | (cardiac NEAR/2 failure*):ab,ti  | 18833  |
| #5  | (heart NEAR/2 decompensat*):ab,ti  | 5732   |
| #6  | nyha:ab,ti AND 3:ab,ti OR nyha:ab,ti AND 4:ab,ti OR nyha:ab,ti AND iii:ab,ti OR nyha:ab,ti AND iv:ab,ti  | 9721   |
| #7  | #1 or #2 or #3 or #4 or #5 or #6   | 429594 |
| #8  | 'living will'/exp OR 'right to die'/exp OR 'patient advocacy'/exp OR 'power of attorney'/exp OR 'terminal care'/exp OR 'treatment refusal'/exp OR 'treatment withdrawal'/exp | 100146 |
| #9  | (living NEAR/1 will*):ab,ti  | 1370   |
| #10 | ('advance care' NEAR/1 (plan OR plans OR planning)):ab,ti  | 2050   |
| #11 | 'right to die':ab,ti   | 920    |
| #12 | ((patient OR patients) NEAR/5 (advocat* OR advocacy)):ab,ti  | 6796   |
| #13 | 'power of attorney':ab,ti  | 469    |
| #14 | (('end of life' OR eol) NEAR/5 (care OR discuss* OR decision* OR plan OR plans OR planning OR preference*)):ab,ti  | 14104  |
| #15 | 'terminal care':ab,ti  | 1687   |
| #16 | (treatment NEAR/2 (refus* OR withhold* OR withdraw*)):ab,ti  | 10163  |
| #17 | #8 OR #9 OR #10 OR #11 OR #12 OR #13 OR #14 OR #15 OR #16  | 117925 |
| #18 | #7 AND #17   | 3203   |
| #19 | #18 AND ([article]/lim OR [article in press]/lim OR [review]/lim) AND ([dutch]/lim OR [english]/lim) AND ([embase]/lim OR  | 1454   |

[medline]/lim) AND [2007-2016]/py

## 5. Cochrane Library

- #1 MeSH descriptor: [Advance Care Planning] explode all trees
- #2 MeSH descriptor: [Right to Die] 1 tree(s) exploded
- #3 MeSH descriptor: [Terminal Care] 1 tree(s) exploded
- #4 MeSH descriptor: [Treatment Refusal] 1 tree(s) exploded
- #5 MeSH descriptor: [Withholding Treatment] 1 tree(s) exploded
- #6 MeSH descriptor: [Patient Advocacy] 1 tree(s) exploded
- #7 ("advance care" and (plan or plans or planning)):ti,ab
- #8 (advance and (directive\* or decision\*)):ti,ab
- #9 living will\*:ti,ab
- #10 "right to die":ti,ab
- #11 ((patient or patients) and (advocat\* or advocacy)):ti,ab
- #12 "power of attorney":ti,ab
- #13 (("end of life" or EOL) and (care or discuss\* or decision\* or plan or plans or planning or preference\*)):ti,ab
- #14 (treatment and (refus\* or withhold\* or withdraw\*)):ti,ab
- #15 "terminal care":ti,ab
- #16 "palliative approach":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: [Heart Failure] 1 tree(s) exploded
- #19 (heart and failure\*):ti,ab
- #20 (cardiac and failure\*):ti,ab
- #21 (myocardial and failure\*):ti,ab
- #22 (heart and decompensat\*):ti,ab
- #23 "NYHA III":ti,ab
- #24 "NYHA IV":ti,ab
- #25 "NYHA 3":ti,ab
- #26 "NYHA 4":ti,ab
- #27 #18 or #19 or #20 or #21 or #22 or #23 or #24 or #25 or #26
- #28 #17 and #27

Methodology report PICO 6a

### Key question

**Uitgangsvraag 6a:** Wat is de invloed van diuretica op kwaliteit van leven bij patiënten met hartfalen NYHA klasse III-IV in de laatste levensfase?

<b>Patiënten</b>	Patiënten met hartfalen NYHA klasse III-IV (laatste levensfase: in eerste instantie laatste 4 weken. Als er geen studies zijn dan patiënten met hele korte levensverwachting.)
<b>Interventie</b>	Diuretica: Eplerenone, spironolacton. MRA=mineralocorticoid receptor antagonisten: furosemide, bumetanide, hydrochlorothiazide. indapamide, chloortalidon
<b>Comparison</b>	(andere) diuretica, geen behandeling of placebo.
<b>Outcome</b>	kwaliteit van leven

### golden hits

#	Ref	Reason for in- or exclusion
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## 1. Search strategy

The searches were run 14 december 2016. Medline, Embase, Cochrane (CDSR, Central), were searched. Detailed search strings are given below. The searches were limited to 2007-2016, English and Dutch. Study types: systematic reviews, meta-analysis, RCTs and observational studies.

## 2. Search results

The Medline search yielded 422 hits, while the search in Embase yielded 2590 hits, Cochrane (CDSR and Central) yielded 151 hits.

After merging the search files into one file and removal of the duplicates 2696 records were screened on title and abstract. Of these 2696 were excluded. The most important reasons for exclusion was that studies were

1. Inappropriate patient population
2. Other intervention

### Search strategy

Medline 14 dec 2016

#	Search terms	Number of hits
1	exp Heart Failure/	108079
2	(heart adj2 failure*).tw	139200
3	(cardiac adj2 failure*).tw	13963
4	(myocardial adj2 failure*).tw	2926
5	(heart adj2 decompensat*).tw	3208
6	NYHA III.mp	646
7	NYHA IV.mp	250
8	NYHA 3.mp	29
9	NYHA 4.mp	6
10	stage D.mp	989
11	chronic.mp	1188308
12	resistant.mp	394673
13	(end stage or end-stage or endstage).tw	57083
14	exp Palliative Care/ or exp Palliative Medicine/ or palliativ*.mp	73852
15	1 or 2 or 3 or 4 or 5	183671

16	6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14	1657192
17	15 AND 16	43299
18	eplerenone.mp	1277
19	furosemide.mp. or exp Furosemide/	16238
20	bumetanide.mp. or exp Bumetanide/	3485
21	hydrochlorothiazide.mp. or exp Hydrochlorothiazide/	8862
22	exp Spironolactone/ or Spironolactone.mp	8569
23	indapamide.mp. or exp Indapamide/	1298
24	exp Chlorthalidone/ or Chlorthalidone.mp	1901
25	18 or 19 or 20 or 21 or 22 or 23 or 24	37246
26	17 AND 25	1087
29	Limit 26 to (yr="2007 -Current" and (dutch or english))	422

Embase (14 dec 2016)

#	Search terms	Number of hits
1	'heart failure'/exp OR (heart NEAR/2 failure*):ab,ti OR (myocardial NEAR/2 failure*):ab,ti OR (cardiac NEAR/2 failure*):ab,ti OR (heart NEAR/2 decompensat*):ab,ti OR 'heart failure':ab,ti OR 'cardiac failure':ab,ti	428503
2	'stage d':ab,ti OR resistant:ab,ti OR chronic:ab,ti	1737539
3	endstage:ab,ti OR end:ab,ti AND stage:ab,ti OR 'end stage':ab,ti	107168
4	'NYHA III':ab,ti	1992
5	'NYHA 3':ab,ti	217
6	'NYHA IV':ab,ti	576
7	'NYHA 4':ab,ti	37
8	'palliative therapy'/exp or palliativ*:ti,ab	108660
9	#1 AND (#2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8)	78219
10	'eplerenone'	3896
11	'furosemide'	53771
12	'bumetanide'	6235
13	'hydrochlorothiazide'	27485
14	'spironolactone'	27342
15	'indapamide'	5032
16	'chlortalidone'	7556
17	#10 or #11 or #12 or #13 or #14 or #15 or #16	105240

18	#9 AND #17	4634
19	#18 AND ([dutch]/lim OR [english]/lim) AND [2007-2017]/py	2590

#### CDSR/Central

#	Search terms	Number of hits
1	MeSH descriptor: [Heart Failure] explode all trees	6641
2	((heart AND failure*) OR (myocardial AND failure*) OR (cardiac AND failure*) OR (heart AND decompensat*)):ti,ab	16629
3	('stage d' OR resistant OR chronic) :ti,ab	84090
4	(endstage OR end AND stage OR 'end stage'):ti,ab	5588
5	('NYHA III'):ti,ab	1108
6	('NYHA 3') :ti,ab	1276
7	('NYHA IV'):ti,ab	734
8	('NYHA 4'):ti,ab	1036
9	MeSH descriptor: [Palliative Care] explode all trees	1608
10	palliativ*:ti,ab	2398
11	(#1 or #2) and (#3 or #4 or #5 or #6 or #7 or #8 or #9 or #10)	5792
12	Eplerenone:ti,ab	175
13	Furosemide:ti,ab	1348
14	Bumetanide:ti,ab	138
15	Hydrochlorothiazide:ti,ab	2733
16	Spirolactone:ti,ab	884
17	Indapamide:ti,ab	405
18	Chlortalidone:ti,ab	25
19	MeSH descriptor: [Furosemide] explode all trees	949
20	MeSH descriptor: [Bumetanide] explode all trees	91
21	MeSH descriptor: [Hydrochlorothiazide] explode all trees	1774
22	MeSH descriptor: [Spirolactone] explode all trees	632
23	MeSH descriptor: [Indapamide] explode all trees	257
24	MeSH descriptor: [Chlortalidone] explode all trees	354
25	#12 or #13 or #14 or #15 or #16 or #17 or #18 or #19 or #20 or #21 or #22 or #23 or #24	6243
26	#11 AND #25	155

#### Methodology report PICO 5

#### Key question

**Uitgangsvraag 6c:** Wat is de invloed van  $\beta$  blokkers op kwaliteit van leven bij patiënten met hartfalen NYHA klasse III-IV in de laatste levensfase?

**Patiënten** Patiënten met hartfalen NYHA klasse III-IV (laatste levensfase: in eerste instantie laatste 4 weken. Als er geen studies zijn dan patiënten met hele korte

<b>Interventie</b>	levensverwachting.)
<b>Comparison</b>	β blokkers: metoprolol, carvedilol, nebivolol en bisoprolol
<b>Outcome</b>	andere bètablokkers, geen behandeling of placebo. kwaliteit van leven

### golden hits

#	Ref	Reason for in- or exclusion
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### Search strategy

The searches were run on 14 dec 2016. Medline, Embase, Cochrane (CDSR, Central), were searched. Detailed search strings are given below. The searches were limited to 2007-2016, English and Dutch. Study types: systematic reviews, meta-analysis, RCTs and observational studies.

### Search results

The Medline search yielded 303 hits, while the search in Embase yielded 1686 hits, Cochrane (CDSR and Central) yielded 130 hits.

After merging the search files into one file and removal of the duplicates 1874 records were screened on title and abstract. Of these 1874 were excluded. The most important reasons for exclusion was that studies were

1. Inappropriate patient population
2. Other intervention

### Search strategy

Medline OVID 14 dec 2016

#	Search terms	Number of hits
1	exp Heart Failure/	108079
2	(heart adj2 failure*).tw	139200
3	(cardiac adj2 failure*).tw	13963
4	(myocardial adj2 failure*).tw	2926
5	(heart adj2 decompensat*).tw	3208
6	NYHA III.mp	646
7	NYHA IV.mp	250
8	NYHA 3.mp	29
9	NYHA 4.mp	6
10	stage D.mp	989
11	chronic.mp	1188030
12	resistant.mp	394506
13	end stage or end-stage or endstage).tw	57048

14	exp Palliative Care/ or exp Palliative Medicine/ or palliativ*.mp	73852
15	1 or 2 or 3 or 4 or 5	183671
16	6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14	1657192
17	15 AND 16	43299
18	metoprolol.mp. or exp Metoprolol/	7768
19	carvedilol.mp	3252
20	nebivolol.mp. or exp Nebivolol/	968
21	bisoprolol.mp. or exp Bisoprolol/	1502
22	18 or 19 or 20 or 21	12009
23	17 and 22	918
24	limit 23 to (yr="2007 -Current" and (dutch or english))	303

Embase (14 dec 2016)

#	Search terms	Number of hits
1	'heart failure'/exp OR (heart NEAR/2 failure*):ab,ti OR (myocardial NEAR/2 failure*):ab,ti OR (cardiac NEAR/2 failure*):ab,ti OR (heart NEAR/2 decompensat*):ab,ti OR 'heart failure':ab,ti OR 'cardiac failure':ab,ti	428503
2	'stage d':ab,ti OR resistant:ab,ti OR chronic:ab,ti	1737539
3	endstage:ab,ti OR end:ab,ti AND stage:ab,ti OR 'end stage':ab,ti	107168
4	'NYHA III':ab,ti	1992
5	'NYHA 3': ab,ti	217
6	'NYHA IV':ab,ti	576
7	'NYHA 4':ab,ti	37
8	'palliative therapy'/exp or palliativ*:ti,ab	108660
9	#1 AND (#2 OR #3 OR #4 OR # 5OR #6 OR #7 OR #8)	78219
10	'metoprolol'	32196
11	'carvedilol'	12694
12	'nebivolol'	3201
13	'bisoprolol'	8037
14	#10 OR #11 OR #12 OR #13	45740
15	#9 AND #14	3159
17	#15 AND ([dutch]/lim OR [english]/lim) AND [2007-2017]/py	1686

CDSR/Central (date)

CDSR/Central

#	Search terms	Number of hits
1	MeSH descriptor: [Heart Failure] explode all trees	6641
2	((heart and failure*) or (myocardial and failure*) or (cardiac and failure*) or (heart and decompensat*)):ti,ab	16629
3	('stage d' or resistant or chronic):ti,ab	84090
4	(endstage or end and stage or 'end stage'):ti,ab	5588
5	('NYHA III'):ti,ab	1108

6	('NYHA 3'):ti,ab	1276
7	('NYHA IV'):ti,ab	734
8	('NYHA 4'):ti,ab	1036
9	MeSH descriptor: [Palliative Care] explode all trees	1608
10	palliativ*:ti,ab	2398
11	(#1 or #2) and (#3 or #4 or #5 or #6 or #7 or #8 or #9 or #10)	5792
12	metoprolol:ti,ab	2330
13	carvedilol:ti,ab	845
14	nebivolol:ti,ab	381
15	bisoprolol:ti,ab	593
16	MeSH descriptor: [Metoprolol] explode all trees	1424
17	MeSH descriptor: [Nebivolol] explode all trees	167
18	MeSH descriptor: [Bisoprolol] explode all trees	290
19	#12 or #13 or #14 or #15 or #16 or #17 or #18	3832
20	#11 AND #19	359
21	Limit to Central/CDSR & [2007-2017]	130

Methodology report PICO 4

### 1. Key question

**Uitgangsvraag 6c:** Wat is de invloed van ACE remmers op kwaliteit van leven bij patiënten met hartfalen NYHA klasse III-IV in de laatste levensfase?

<b>Patiënten</b>	Patiënten met hartfalen NYHA klasse III-IV (laatste levensfase: in eerste instantie laatste 4 weken. Als er geen studies zijn dan patiënten met hele korte levensverwachting.)
<b>Interventie</b>	ACE remmers: Captopril, enalapril, lisinopril, ramipril, perindopril. ARB's=angiotensine receptor blokkers: losertan, valsartan, candesartan
<b>Comparison</b>	(andere) ACE-remmers, (andere) ARB's, geen behandeling of placebo.
<b>Outcome</b>	kwaliteit van leven

### 2. golden hits

#	Ref	Reason for in- or exclusion
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### 3. Search strategy

The searches were run on 14 December 2016. Medline, Embase, Cochrane (CDSR, Central), were searched. Detailed search strings are given below. The searches were limited to 2007-2016, English and Dutch. Study types: systematic reviews, meta-analysis, RCTs and observational studies.

### 4. Search results

The Medline search yielded 339 hits, while the search in Embase yielded 1763 hits, Cochrane (CDSR and Central) yielded 130 hits.

After merging the search files into one file and removal of the duplicates 1877 records were screened on title and abstract. Of these 1877 were excluded. The most important reasons for exclusion was that studies were

1. Inappropriate patient population

## 2. Other intervention

### Search strategy

Medline (OVID 14 dec 2016)		
#	Search terms	Number of hits
1	exp Heart Failure/	108079
2	(heart adj2 failure*).tw	139200
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6	NYHA III.mp	646
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8	NYHA 3.mp	29
9	NYHA 4.mp	6
10	stage D.mp	989
11	chronic.mp	1188030
12	resistant.mp	394673
13	end stage or end-stage or endstage).tw	57083
14	exp Palliative Care/ or exp Palliative Medicine/ or palliativ*.mp	73852
15	1 or 2 or 3 or 4 or 5	183671
16	6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14	1657192
17	15 AND 16	43299
18	exp Enalapril/ or enalapril*.mp	8901
19	lisinopril.mp. or exp Lisinopril/	2923
20	candesartan.mp	3156
21	ramipril.mp. or exp Ramipril/	2757
22	losartan.mp. or exp Losartan/	9708
23	exp Valsartan/ or valsartan.mp	3121
24	captopril.mp. or exp Captopril/	13634
25	perindopril.mp. or exp Perindopril/	2122
26	18 or 19 or 20 or 21 or 22 or 23 or 24 or 25	39704
27	17 and 25	1632
28	limit 27 to (yr="2007 -Current" and (dutch or english))	339
Embase 14 dec 2016		
#	Search terms	Number of hits
1	'heart failure'/exp OR (heart NEAR/2 failure*):ab,ti OR (myocardial NEAR/2 failure*):ab,ti OR (cardiac NEAR/2 failure*):ab,ti OR (heart NEAR/2 decompensat*):ab,ti OR 'heart failure':ab,ti OR 'cardiac failure':ab,ti	428503
2	'stage d':ab,ti OR resistant:ab,ti OR chronic:ab,ti	1737539
3	endstage:ab,ti OR end:ab,ti AND stage:ab,ti OR 'end stage':ab,ti	107168
4	'NYHA III':ab,ti	1992
5	'NYHA 3': ab,ti	217
6	'NYHA IV':ab,ti	576
7	'NYHA 4':ab,ti	37
8	'palliative therapy'/exp or palliativ*:ti,ab	108660
9	#1 AND (#2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8)	78219
10	'enalapril'	27149

11	'lisinopril'	14019
12	'candesartan'	9515
13	'ramipril'	13021
14	'losartan'	22509
15	'valsartan'	10961
16	'captopril'	33822
17	'perindopril'	8193
18	#10 OR #11 OR #12 OR #13 OR #14 OR #15 OR #16 OR #17	95693
19	#9 AND #18	4307
20	#19 AND ([dutch]/lim OR [english]/lim) AND [2007-2017]/py	1763

CDSR/Central

#	Search terms	Number of hits
1	MeSH descriptor: [Heart Failure] explode all trees	6641
2	((heart and failure*) or (myocardial and failure*) or (cardiac and failure*) or (heart and decompensat*)):ti,ab	16629
3	('stage d' or resistant or chronic):ti,ab	84090
4	(endstage or end and stage or 'end stage'):ti,ab	5588
5	('NYHA III'):ti,ab	1108
6	('NYHA 3'):ti,ab	1276
7	('NYHA IV'):ti,ab	734
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9	MeSH descriptor: [Palliative Care] explode all trees	1608
10	palliativ*:ti,ab	2398
11	(#1 or #2) and (#3 or #4 or #5 or #6 or #7 or #8 or #9 or #10)	5792
12	enalapril:ti,ab	2248
13	lisinopril:ti,ab	880
14	candesartan:ti,ab	762
15	ramipril:ti,ab	867
16	losartan:ti,ab	1594
17	valsartan:ti,ab	1181
18	captopril:ti,ab	2007
19	perindopril:ti,ab	700
20	MeSH descriptor: [Enalapril] explode all trees	1594
21	MeSH descriptor: [Lisinopril] explode all trees	545
22	MeSH descriptor: [Ramipril] explode all trees	494
23	MeSH descriptor: [Losartan] explode all trees	971
24	MeSH descriptor: [Valsartan] explode all trees	568
25	MeSH descriptor: [Captopril] explode all trees	1238
26	MeSH descriptor: [Perindopril] explode all trees	439
27	#12 or #13 or #14 or #15 or #16 or #17 or #18 or #19 or #20 or #21 or #22 or #23 or #24 or #25 or #26	9533
28	#11 AND #27	130