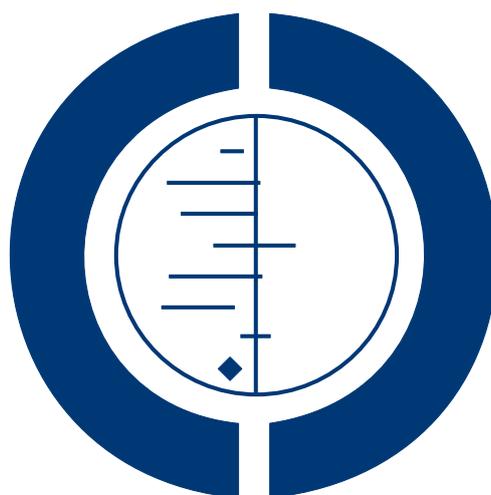


# Exercise-based rehabilitation for heart failure (Review)

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[Intervention Review]

## Exercise-based rehabilitation for heart failure

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### ABSTRACT

#### Background

Previous systematic reviews and meta-analyses consistently show the positive effect of exercise-based rehabilitation for heart failure (HF) on exercise capacity; however, the direction and magnitude of effects on health-related quality of life, mortality and hospital admissions in HF remain less certain. This is an update of a Cochrane systematic review previously published in 2010.

#### Objectives

To determine the effectiveness of exercise-based rehabilitation on the mortality, hospitalisation admissions, morbidity and health-related quality of life for people with HF. Review inclusion criteria were extended to consider not only HF due to reduced ejection fraction (HFREF or 'systolic HF') but also HF due to preserved ejection fraction (HFPEF or 'diastolic HF').

#### Search methods

We updated searches from the previous Cochrane review. We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (Issue 1, 2013) from January 2008 to January 2013. We also searched MEDLINE (Ovid), EMBASE (Ovid), CINAHL (EBSCO) and PsycINFO (Ovid) (January 2008 to January 2013). We handsearched Web of Science, bibliographies of systematic reviews and trial registers (Controlled-trials.com and Clinicaltrials.gov).

#### Selection criteria

Randomised controlled trials of exercise-based interventions with six months' follow-up or longer compared with a no exercise control that could include usual medical care. The study population comprised adults over 18 years and were broadened to include individuals with HFPEF in addition to HFREF.

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## Data collection and analysis

Two review authors independently screened all identified references and rejected those that were clearly ineligible. We obtained full-text papers of potentially relevant trials. One review author independently extracted data from the included trials and assessed their risk of bias; a second review author checked data.

## Main results

We included 33 trials with 4740 people with HF predominantly with HFREF and New York Heart Association classes II and III. This latest update identified a further 14 trials. The overall risk of bias of included trials was moderate. There was no difference in pooled mortality between exercise-based rehabilitation versus no exercise control in trials with up to one-year follow-up (25 trials, 1871 participants: risk ratio (RR) 0.93; 95% confidence interval (CI) 0.69 to 1.27, fixed-effect analysis). However, there was trend towards a reduction in mortality with exercise in trials with more than one year of follow-up (6 trials, 2845 participants: RR 0.88; 95% CI 0.75 to 1.02, fixed-effect analysis). Compared with control, exercise training reduced the rate of overall (15 trials, 1328 participants: RR 0.75; 95% CI 0.62 to 0.92, fixed-effect analysis) and HF specific hospitalisation (12 trials, 1036 participants: RR 0.61; 95% CI 0.46 to 0.80, fixed-effect analysis). Exercise also resulted in a clinically important improvement superior in the Minnesota Living with Heart Failure questionnaire (13 trials, 1270 participants: mean difference: -5.8 points; 95% CI -9.2 to -2.4, random-effects analysis) - a disease specific health-related quality of life measure. However, levels of statistical heterogeneity across studies in this outcome were substantial. Univariate meta-regression analysis showed that these benefits were independent of the participant's age, gender, degree of left ventricular dysfunction, type of cardiac rehabilitation (exercise only vs. comprehensive rehabilitation), mean dose of exercise intervention, length of follow-up, overall risk of bias and trial publication date. Within these included studies, a small body of evidence supported exercise-based rehabilitation for HFPEF (three trials, undefined participant number) and when exclusively delivered in a home-based setting (5 trials, 521 participants). One study reported an additional mean healthcare cost in the training group compared with control of USD3227/person. Two studies indicated exercise-based rehabilitation to be a potentially cost-effective use of resources in terms of gain in quality-adjusted life years (QALYs) and life-years saved.

## Authors' conclusions

This updated Cochrane review supports the conclusions of the previous version of this review that, compared with no exercise control, exercise-based rehabilitation does not increase or decrease the risk of all-cause mortality in the short term (up to 12-months' follow-up) but reduces the risk of hospital admissions and confers important improvements in health-related quality of life. This update provides further evidence that exercise training may reduce mortality in the longer term and that the benefits of exercise training on appear to be consistent across participant characteristics including age, gender and HF severity. Further randomised controlled trials are needed to confirm the small body of evidence seen in this review for the benefit of exercise in HFPEF and when exercise rehabilitation is exclusively delivered in a home-based setting.

## PLAIN LANGUAGE SUMMARY

### Exercise-based rehabilitation for heart failure

#### Background

People with heart failure experience marked reductions in their exercise capacity, which has detrimental effects on their activities of daily living, health-related quality of life and ultimately their hospital admission rate and mortality.

#### Study characteristics

We searched the scientific literature for randomised controlled trials (experiments in which two or more interventions, possibly including a control intervention or no intervention, are compared by being randomly allocated to participants) looking at the effectiveness of exercise-based treatments compared with no exercise on heart failure in adults over 18 years of age. The inclusion criteria of this updated review were extended to consider not only HF due to reduced ejection fraction (HFREF or 'systolic HF') (ejection fraction is a measure of how well your heart is pumping), but also HF due to preserved ejection fraction (HFPEF or 'diastolic HF'). The search is current to January 2013.

#### Key results

We found 33 RCTs that included 4740 participants. The findings of this update are consistent with the previous (2010) version of this Cochrane review and show important benefits of exercise-based rehabilitation that include a reduction in the risk of hospital admissions

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due to HF and improvements in health-related quality of life compared with not undertaking exercise. There was a high level of variation across studies in health-related quality of life outcome. While the majority of evidence was for exercise-based rehabilitation in people with HFREF, this update did identify a broader evidence base that included higher risk (New York Heart Association class IV) and older people, people with HFPEF and more programmes conducted in a home-based setting. We found no evidence to suggest that exercise training programmes cause harm in terms of an increase in the risk of death in either the short or longer term. A small body of economic evidence was identified indicating exercise-based rehabilitation to be cost-effective. Further evidence is needed to understand the effect of exercise training in people with HFPEF better and the costs and effects of exclusively home-based exercise rehabilitation programmes.

#### **Quality of evidence**

The general lack of reporting of methods in the included trial reports made it difficult to assess their methodological quality and thereby judge their risk of possible bias.