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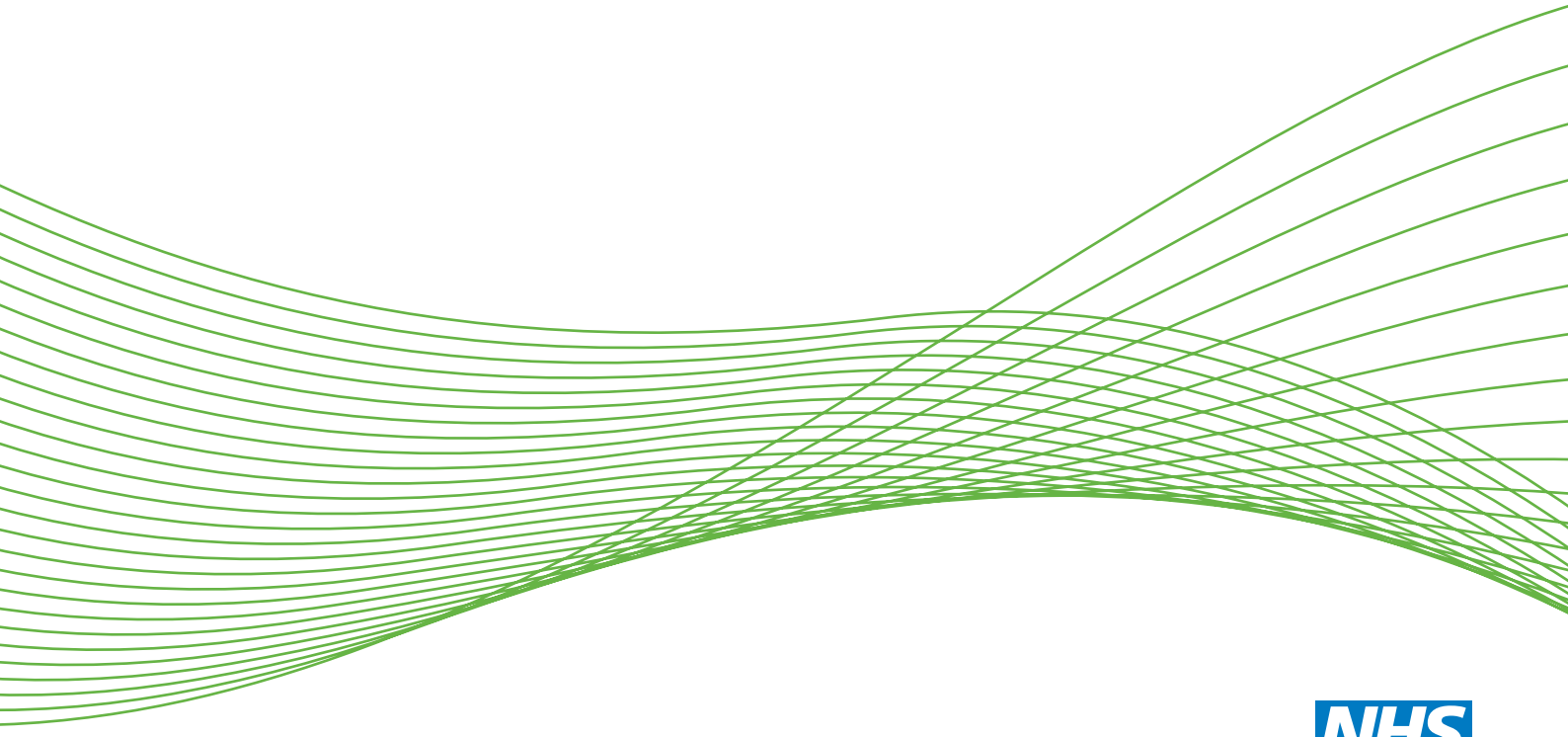

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Abstract

Reducing Care Utilisation through Self-management Interventions (RECURSIVE): a systematic review and meta-analysis

Maria Panagioti,[1] Gerry Richardson,[2] Elizabeth Murray,[3] Anne Rogers,[4] Anne Kennedy,[4] Stanton Newman,[5] Nicola Small[1] and Peter Bower[1]*

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Background: A critical part of future service delivery will involve improving the degree to which people become engaged in 'self-management'. Providing better support for self-management has the potential to make a significant contribution to NHS efficiency, as well as providing benefits in patient health and quality of care.

Objective: To determine which models of self-management support are associated with significant reductions in health services utilisation (including hospital use) without compromising outcomes, among patients with long-term conditions.

Data sources: Cochrane Central Register of Controlled Trials, Cumulative Index to Nursing and Allied Health, EconLit (the American Economic Association's electronic bibliography), EMBASE, Health Economics Evaluations Database, MEDLINE (the US National Library of Medicine's database), MEDLINE In-Process & Other Non-Indexed Citations, NHS Economic Evaluation Database (NHS EED) and PsycINFO (the behavioural science and mental health database), as well as the reference lists of published reviews of self-management support.

Methods: We included patients with long-term conditions in all health-care settings and self-management support interventions with varying levels of additional professional support and input from multidisciplinary teams. Main outcome measures were quantitative measures of service utilisation (including hospital use) and quality of life (QoL). We presented the results for each condition group using a permutation plot, plotting the effect of interventions on utilisation and outcomes simultaneously and placing them in quadrants of the cost-effectiveness plane depending on the pattern of outcomes. We also conducted conventional meta-analyses of outcomes.

Results: We found 184 studies that met the inclusion criteria and provided data for analysis. The most common categories of long-term conditions included in the studies were cardiovascular (29%), respiratory (24%) and mental health (16%). Of the interventions, 5% were categorised as 'pure self-management' (without additional professional support), 20% as 'supported self-management' (< 2 hours' support),

47% as 'intensive self-management' (> 2 hours' support) and 28% as 'case management' (> 2 hours' support including input from a multidisciplinary team). We analysed data across categories of long-term conditions and also analysed comparing self-management support (pure, supported, intense) with case management. Only a minority of self-management support studies reported reductions in health-care utilisation in association with decrements in health. Self-management support was associated with small but significant improvements in QoL. Evidence for significant reductions in utilisation following self-management support interventions were strongest for interventions in respiratory and cardiovascular disorders. Caution should be exercised in the interpretation of the results, as we found evidence that studies at higher risk of bias were more likely to report benefits on some outcomes. Data on hospital use outcomes were also consistent with the possibility of small-study bias.

Limitations: Self-management support is a complex area in which to undertake literature searches. Our analyses were limited by poor reporting of outcomes in the included studies, especially concerning health-care utilisation and costs.

Conclusions: Very few self-management support interventions achieve reductions in utilisation while compromising patient outcomes. Evidence for significant reductions in utilisation were strongest for respiratory disorders and cardiac disorders. Research priorities relate to better reporting of the content of self-management support, exploration of the impact of multimorbidity and assessment of factors influencing the wider implementation of self-management support.

Study registration: This study is registered as PROSPERO CRD42012002694.

Funding: The National Institute for Health Research Health Services and Delivery Research programme.

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List of abbreviations

CDSMP	Chronic Disease Self-Management Programme
CENTRAL	Cochrane Central Register of Controlled Trials
CI	confidence interval
CINAHL	Cumulative Index to Nursing and Allied Health
DAFNE	Dose Adjustment For Normal Eating
DESMOND	Diabetes Education and Self-Management for Ongoing and Newly Diagnosed
FEV	forced expiratory volume
HbA_{1c}	glycosylated haemoglobin
HRQoL	health-related quality of life
ICER	incremental cost-effectiveness ratio
NHS EED	NHS Economic Evaluation Database
PRISMS	Practical Systematic Review of Self-management support for long-term conditions
QIPP	Quality, Innovation, Productivity and Prevention
QoL	quality of life
RCT	randomised controlled trial
RECURSIVE	Reducing Care Utilisation through Self-management Interventions
SD	standard deviation

Plain English summary

Many patients live with long-term conditions and the NHS needs to provide effective and patient-centred care to these patients. However, the NHS faces significant pressures on resources. One way of using NHS resources more effectively is to encourage people to engage in self-management, which refers to care taken by people to support their health and well-being, and can include adoption of a healthy lifestyle, actions taken to better manage long-term conditions, as well as meeting psychosocial needs.

Encouraging self-management means that it may be possible for the NHS to use less of the expensive forms of care, such as hospital admissions. We reviewed the current international evidence to see what types of self-management could reduce patient use of NHS services, without causing difficulties in their quality of life (QoL).

We found 184 studies that met our criteria, with most studies in patients with cardiovascular, respiratory and mental health problems. We also found many different types of self-management.

Generally, self-management support was associated with small improvements in QoL. Some self-management interventions also reduced utilisation of health care, with the best evidence in respiratory and cardiovascular disorders. However, the effects were generally modest. Further research is needed to explore self-management in patients with more than one long-term condition, and to test how self-management can be better encouraged across the wider population of patients.

Scientific summary

Background

The global burden of disease is increasingly driven by the prevalence of long-term conditions, leading to increasing interest in new models of service delivery to manage the needs of this patient group in ways that are accessible, effective, efficient and patient-centred.

There is increasing agreement that an important part of future service delivery will involve improving the degree to which people become engaged in 'self-management'. Self-management refers to care taken by people to support their health and well-being, and can include adoption of a healthy lifestyle, actions taken to better manage long-term conditions, as well as meeting psychosocial needs.

The global financial crisis has meant that even greater focus is being placed on efficiency in health-care delivery. Like most health systems, the NHS is seeking ways to increase efficiency, and providing better support for self-management is seen as having a significant contribution to make to efficiency, over and above benefits in patient empowerment, quality of life (QoL) and well-being.

Self-management support has the potential to provide interventions that are less costly and at least as effective as current treatments. For example, providing improved self-management support may allow patients to achieve the same or better outcomes, while potentially reducing expensive forms of health-care utilisation (such as hospital use). Delivered on a large scale, such interventions could help NHS organisations achieve effective redistribution of services (e.g. from hospital to the community) and potentially reduce the overall costs of care, without compromising on patient outcomes.

Objective

To determine which models of self-management support are associated with significant reductions in health services utilisation (including admissions) without compromising outcomes, among patients with long-term conditions.

Methods

We used systematic review with meta-analysis. Inclusion criteria were as follows:

- population: patients with long-term conditions
- intervention: self-management support, including 'pure self-management' (without additional professional support), 'supported self-management' (< 2 hours' support), 'intensive self-management' (> 2 hours' support) and 'case management' (> 2 hours' support including input from a multidisciplinary team)
- comparison: usual care
- outcomes: service utilisation (including hospital use) and QoL
- study design: randomised controlled trials.

To identify relevant literature, we searched multiple databases in 2012 [Cochrane Central Register of Controlled Trials, Cumulative Index to Nursing and Allied Health, EconLit (the American Economic Association's electronic bibliography), EMBASE, Health Economics Evaluations Database, MEDLINE (the US National Library of Medicine's database), MEDLINE In-Process & Other Non-Indexed Citations,

NHS Economic Evaluation Database and the PsycINFO behavioural science and mental health database]. We also checked the reference lists of 52 reviews.

Data were extracted on populations, interventions, study quality and outcomes (utilisation and QoL). We also conducted a separate data extraction of the subset of full economic analyses (cost-effectiveness and cost–utility analyses).

We extracted data that allowed us to report a measure of the magnitude of effects (an 'effect size') for both health outcomes and costs, to allow us to assess the impact of the intervention on both outcomes simultaneously. We presented the results of the included studies for each condition group according to a permutation plot, plotting the effect of interventions on utilisation and outcomes simultaneously and placing them in quadrants of the cost-effectiveness plane depending on the pattern of outcomes. We also conducted conventional meta-analyses of outcomes.

Results

We found 184 studies that met the inclusion criteria for the study and provided data for analysis. Of those studies, 35% were conducted in the USA and 23% in the UK. The most common categories of long-term conditions included in the studies were cardiovascular (29%), respiratory (24%) and mental health (16%). Of the interventions, 5% were categorised as 'pure self-management' (without additional professional support), 20% as supported self-management (< 2 hours' support), 47% as 'intensive self-management' (> 2 hours' support) and 28% as 'case management' (> 2 hours' support including input from a multidisciplinary team). We analysed data across categories of long-term conditions, and also compared self-management support (combining 'pure', 'supported' and 'intense') with case management.

Generally, self-management support was associated with small but significant improvements in QoL, with the best evidence for diabetes, respiratory disorders, cardiovascular disorders and mental health. Only a minority of self-management support studies reported reductions in health-care utilisation in association with decrements in health. Evidence for significant reductions in utilisation following self-management support interventions were strongest for respiratory disorders and cardiovascular disorders.

Caution should be exercised in the interpretation of the results, as we found evidence that studies at higher risk of bias were more likely to report benefits on some outcomes. Data on hospital use outcomes were also consistent with the possibility of small-study bias.

Limitations

Self-management support is a complex area in which to undertake literature searches. Our analyses were limited by poor reporting of outcomes in the included studies, especially concerning health-care utilisation and costs.

Conclusions

Self-management support interventions rarely compromise patient outcomes. There was evidence that self-management support interventions can reduce hospital use and total costs, although effects were generally small. Evidence for significant reductions in utilisation were strongest for interventions in respiratory and cardiovascular disorders.

Reporting of data relevant to the core research question was poor. Research priorities relate to better reporting of the content of self-management support, exploration of the impact of multimorbidity and assessment of factors influencing the wider implementation of self-management support.

Study registration

This study is registered as PROSPERO CRD42012002694.

Funding

The National Institute for Health Research Health Services and Delivery Research programme.

Chapter 1 Background

In the context of the increasing prevalence and impact of long-term conditions,[1] and increasing numbers of patients reporting multiple conditions,[2] there is worldwide interest in innovations in service delivery that can better manage patients with long-term conditions in a way that is effective, patient-centred and efficient.[3]

Current NHS policy for long-term conditions has been influenced by work done at Kaiser Permanente in the USA, and envisages care for long-term conditions based around three tiers representing three broad groups of patients with different needs. Care for patients in those tiers is supposed to be qualitatively different in content and process – the various aspects of care in each tier are shown in *Box 1*.

BOX 1 The content of tiers of NHS model

Case management

Designed for the highest users of unscheduled care, care at this tier may involve a 'community matron' or similar professional who adopts a case management approach, proactively intervening to anticipate potential crises and to co-ordinate the care from multiple agencies.

Disease-specific care management

Disease-specific care management may be focused on general practice teams identifying patients with long-term conditions through disease registers, following clinical protocols through regular clinical review and supporting self-management.

Supported self-management

This involves assisting patients with conditions to manage their care through the development of appropriate confidence, skills and attitudes.

Adapted from Department of Health. *Supporting People with Long Term Conditions: An NHS and Social Care Model to Support Local Innovation and Integration*. London, HMSO; 2005.[4]

Supported self-management

For the purposes of this report, the terms 'self-care' and 'self-management' will be considered synonymous.

Many different types of self-management have been described, including regulatory self-management (e.g. eating, sleeping and bathing), preventative self-management (e.g. exercising, dieting and brushing teeth), reactive self-management (e.g. responding to symptoms) and restorative self-management (e.g. adherence to treatment regimens).[5]

Although different long-term conditions have varying requirements, across conditions a number of key tasks have been defined, including response to symptoms; response to acute episodes and emergencies; using medication; managing diet, exercise and giving up smoking; managing emotions, using relaxation and stress reduction; interacting effectively with health professionals; seeking information and appropriate community resources; adapting to work; and managing relations with significant others.[6]

Self-management can involve a very wide range of activities, from basic health literacy and self-management skills, through to broader social activities (public engagement, and social capital).[7] There are also debates in the literature about the relative importance of self-management behaviours (e.g. changes in diet or exercise) and more general attitudes, such as self-efficacy, as it has been argued that the benefits of programmes such as the Stanford Chronic Disease Self-Management Programme (CDSMP) are mediated through self-efficacy changes.[8] Comprehensive models of self-management[9,10] highlight the fact that self-management cannot be divorced from influences at other 'levels', such as health services, family and wider social networks,[11] and the physical and sociocultural environment.

Formal self-management support in England is provided through a number of different models.[12] These include:

- increasing access to health information[13]
- deployment of assistive technologies such as telehealth and telecare[14,15]
- facilitation of community-based skills training and support networks, such as the Dose Adjustment For Normal Eating (DAFNE)[16] and Diabetes Education and Self-Management for Ongoing and Newly Diagnosed (DESMOND)[17] courses for particular conditions and the NHS version of the CDSMP (the Expert Patients Programme)[18] for generic long-term conditions
- interventions led by health professionals.[9]

The benefits of self-management

Despite a developing evidence base, there is a lack of clarity concerning the clinical effectiveness and cost-effectiveness of self-management interventions. A large metareview of 46 existing reviews of self-management interventions reported:

> *Despite the large number of studies . . . the evidence base still has large gaps. Long-term outcomes, cost-effectiveness, the comparative effectiveness of different . . . strategies, and which components of complex interventions provide the greatest benefit have not been adequately evaluated.*[13]

The limited effectiveness of self-management support reflects a number of factors. It may reflect intrinsic problems with the design of such interventions, or that the clinical effectiveness and cost-effectiveness is moderated by patient characteristics or contextual factors such that only some populations (patterned by demography, clinical conditions or other factors) show benefit. Equally, it may reflect problems in the implementation of self-management support, such as limited engagement from patients and professionals,[19] lack of reach into marginalised groups who have most capacity to benefit and a lack of integration with other long-term condition initiatives.[20] Self-management support interventions are unlikely to reflect the considerable inputs and mobilisation of resources undertaken by others in a personal social network.[21]

Self-management and demand management

Self-management is an attractive proposition to the management of long-term conditions for a number of reasons. As well as the potential benefits for health, self-management offers a more participatory approach to health care, with patients making a critical contribution to achieving health gain and making decisions to ensure that their care is personalised to their needs.

However, a key part of the driver for health policy is the potential of self-management to make a significant contribution to the efficient delivery of health care. The influential Wanless report suggested that the future costs of health care would be related to the degree to which people became engaged with their health and its management.[22] Although the health costs associated with ageing are a matter of

controversy,[23] health services are facing major challenges in terms of the projected increases in those aged ≥ 65 years, the consequent prevalence of multimorbidity and concomitant increases in demand associated with these demographic changes.

The global financial crisis and central government pressure for major savings has meant that even greater focus is being placed on efficiency in health-care delivery. The Quality, Innovation, Productivity and Prevention (QIPP) initiative in the NHS is designed to identify efficiencies through service redesign. Increasing self-management support is a major focus of the programme.[24]

Although self-management support has been highlighted as having a significant contribution to make to efficiency, there are uncertainties about the scale of that contribution. Initial reports of major effects of self-management support on health-care utilisation[25] have not always been replicated[26] and the fact that the main impact of some interventions is on intermediate outcomes (such as self-efficacy) rather than health and health-care utilisation has led to controversy over the overall impact of self-management.[27,28] Some implementation of self-management support may have inadvertently driven up demand in populations to which self-management is directed.[29]

Economic analysis in health services is based on the principle of opportunity cost, i.e. any one use of resources involves a 'cost' associated with the lost potential from alternative uses. Efficiency involves maximising outcomes for a given cost or minimising costs for a given level of outcome.

However, many health-care interventions improve outcomes and increase costs, which means decision-makers are faced with decisions about 'allocative efficiency': additional resources are required to provide the new service, which incurs an opportunity cost for other groups of patients.[30] Economists use the concept of the cost-effectiveness plane to illustrate the relationships between costs and outcomes (*Figure 1*). Many health-care interventions are placed in the 'top right' quadrant of the cost-effectiveness plane and raise such 'allocative efficiency' questions for decision-makers.

However, the financial pressures faced by health systems means that there is increasing interest in interventions that are 'technically efficient'. This is defined as an intervention which is less costly and at least as effective as current treatments.[30] An implicit assumption underlying interest in self-management support is that delivering care in this way has the potential to be technically efficient, by shifting some activity from health services to the patient and by more effective management of problems to avoid crises and the need for more extensive health service intervention.

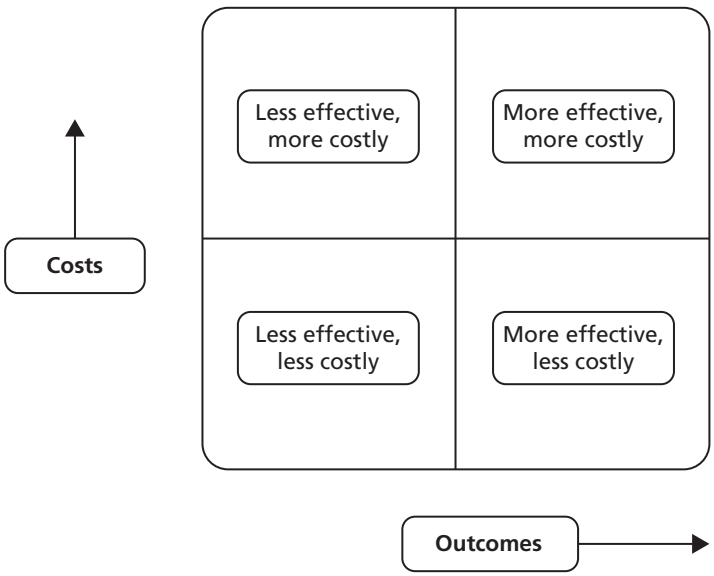

FIGURE 1 Cost-effectiveness plane.

Assessing the technical efficiency of self-management support is best achieved through comprehensive economic analyses using an assessment (and quantification) of both quality of life (QoL) and costs, to assess the location of the intervention on the cost-effectiveness plane. Although there are increasing numbers of full economic analyses, many self-management studies have not conducted such a full economic analysis, but many have included data on outcomes and costs, which may allow placement on the plane.

The aim of this review is to conduct a comprehensive assessment of the current evidence around self-management support to judge the degree to which current models of support reduce utilisation without compromising outcomes.

The results of the Reducing Care Utilisation through Self-management Interventions (RECURSIVE) review need to be considered alongside the Practical Systematic Review of Self-management support for long-term conditions (PRISMS) study,[31] which is a broader assessment of the role of self-management support in long-term conditions using a variety of metareview techniques.[31]

Chapter 2 Research questions

What models of self-management support are associated with significant reductions in health services utilisation (including admissions) without compromising outcomes, among patients with long-term conditions?

- Population: patients with long-term conditions.
- Intervention: self-management support.
- Comparison: usual care.
- Outcomes: service utilisation (including admissions) and QoL.
- Study design: randomised controlled trials (RCTs).

What are the key recommendations for service commissioners and research funding bodies on delivery of self-management support and future research priorities?

Chapter 3 Review methods

Population

We included studies of patients with long-term conditions.

There is no definitive list of such conditions and we adopted the generic definition of a long-term condition as one that cannot be cured but can be managed through medication and/or therapy. This included common conditions such as diabetes, asthma, coronary heart disease, as well as more rare disorders and mental health conditions such as depression, anxiety and psychosis. We also included studies recruiting patients with a mixture of long-term conditions, as well as those recruiting on the basis of multimorbidity.

As well as using clinical and diagnostic labels reported in the studies, we also structured aspects of our review on potentially important characteristics of long-term conditions discussed at the first PRISMS workshop (*Table 1*).[31]

We excluded subjects < 18 years of age and studies conducted in the developing world.

TABLE 1 Characteristics of long-term conditions discussed at the first PRISMS workshop[31]

Cluster	Exemplar conditions
1. Long-term conditions with marked variability in symptoms over time	Asthma, low back pain, type 1 diabetes, chronic pain, depression, schizophrenia, inflammatory bowel disease, migraine, endometriosis
2. Largely asymptomatic long-term conditions in which management is directed at stopping an event or reducing complications	Hypertension, type 2 diabetes, epilepsy, allergy/anaphylaxis, atrial fibrillation, chronic kidney disease
3. Ongoing symptomatic long-term conditions with exacerbations	Chronic obstructive pulmonary disease, congestive heart failure, multiple sclerosis
4. Ongoing symptomatic long-term conditions with little variability	Osteoarthritis, dementia, chronic fatigue syndrome, progressive neurological conditions (Parkinson's, multiple sclerosis, motor neuron disease)

Intervention

For the purposes of the review, we defined a self-management support intervention as:

> *An intervention primarily designed to develop the abilities of patients to undertake management of health conditions through education, training and support to develop patient knowledge, skills or psychological and social resources.*

Categories of support of relevance to the review are outlined in *Table 2*. It is important to note that we excluded self-management undertaken without input, guidance or facilitation by services. Although an enormous amount of self-management is undertaken without any support from services, it is rarely the subject of intervention studies.

We included all formats and delivery methods (group or individual, face to face or remote, professional or peer led).

In line with the original brief, we included interventions across the pyramid of care for long-term conditions. After initial screening of a proportion of the studies, we distinguished the following types post hoc:

- 'pure' self-management, with self-management materials provided without any additional support beyond that provided in usual care
- supported self-management (with up to 2 hours of additional support in total from a health professional or trained peer)
- intensively supported self-management (with more than 2 hours of additional support from a health professional or trained peer)
- case management (with more than 2 hours of additional support from a health professional or trained peer, and support from a multidisciplinary team as part of the intervention protocol).

TABLE 2 Types of self-management support

Type	Examples
Education/training for providers	Training programmes which help providers counsel patients more skilfully, particularly in relation to behaviour change
Education/training for patients/carers	Disease-specific education or behaviour change interventions. Modes of education delivery may include online, paper based, face to face or through audio/visual technologies
Decision support	Support to make shared decisions about treatment options
Monitoring and feedback	Telehealth, such as telephone-, mobile phone- or computer-based monitoring methods, with monitoring by professionals and potential access to a wider team
Environmental adaptations	Supported living equipment and home modification, or telecare
Care or action plans	Discussion and negotiation between patients and professionals about management and goals, often involving a written plan
Exercise	Training and formal exercise programmes
Psychological support	Peer support (face to face or online, or more formal supportive counselling or therapy)
Financial interventions	Personal health budgets or payments for achieving treatment tasks or goals

The adoption of the 2-hour threshold was an arbitrary empirical threshold that provided a reasonable distribution of studies among the different categories.

Two authors independently assessed the type of intervention and disagreements were identified and resolved through discussion. For analytical purposes we combined the first three categories into a broad 'self-management' category and compared that with 'case management'.

Comparisons

We included studies for which a self-management support intervention was additional to usual care and compared this against usual care alone or against studies for which the self-management support intervention was compared with a more intensive 'usual care' intervention (e.g. 'hospital at home' vs. conventional hospital use). We excluded studies for which two versions of self-management support interventions were compared, as such comparisons did not allow assessment of the impact of the self-management support per se.

Outcomes

We extracted data on the effect of self-management interventions on core types of health-care utilisation. Our focus was on comprehensive measures of costs (i.e. summaries including multiple sources of cost) or major cost drivers (i.e. hospital use). Other, more minor, costs (such as medication and primary care visits) were identified but not analysed. Our focus was on hospital use and total costs.

We also separately extracted data on outcomes relating to patient QoL and health outcomes. These included standardised measures of disease-specific outcomes, generic QoL and depression/anxiety. We excluded measures of psychological or clinical variables that did not provide a direct assessment of health or QoL, such as self-management behaviour, self-efficacy, glycosylated haemoglobin (HbA_{1c}) or forced expiratory volume (FEV), as these are likely to be unreliable indicators of health-related quality of life (HRQoL).[32]

Study design

We included only RCTs in the review, as these studies give optimal protection against selection bias, and excluded quantitative studies lower down the hierarchy of evidence about clinical effectiveness and cost-effectiveness (non-randomised trials, longitudinal studies and cross-sectional studies).

Review protocol

The review protocol – Reducing Care Utilisation through Self-management Interventions (RECURSIVE): a quantitative review of self-management support to reduce utilisation without compromising outcomes (registration number CRD42012002694) – is available as part of the PROSPERO database and is provided in *Appendix 1*. We have been explicit about any deviations from the published protocol in this report.

Identification of studies

We began the process of identifying eligible studies by checking published reviews, including those identified by the PRISMS study.[15,33–81]

We complemented searches of existing reviews with a primary search of multiple databases, conducted in 2012. Databases included the Cochrane Central Register of Controlled Trials (CENTRAL), Cumulative Index to Nursing and Allied Health (CINAHL), EconLit (the American Economic Association's electronic bibliography), EMBASE, Health Economics Evaluations Database, MEDLINE (the US National Library of Medicine's database), MEDLINE In-Process & Other Non-Indexed Citations, NHS Economic Evaluation Database (NHS EED) and the PsycINFO (the behavioural science and mental health database).

A search strategy was developed in MEDLINE, using an iterative approach and a set of existing studies known to be relevant. This strategy was then adapted to run on the remaining databases.

The actual search strategies (developed in conjunction with an information specialist at the Centre for Reviews and Dissemination, University of York, York, UK) and details of the searches are listed in *Appendix 2*.

The titles and abstracts of all the studies identified were screened for eligibility. More than 40% of all the studies ($n = 5000$) were independently screened by two members of our research team. Disagreements were dealt with by discussion and the involvement of a third reviewer. Because high levels of inter-rater reliability were achieved ($\kappa = 87\%$), the abstract screening of the remaining studies was completed by one reviewer.

Studies had to fulfil three inclusion criteria to be eligible for full-text screening:

- RCTs
- long-term conditions
- self-management or case management intervention.

If the studies did not meet one or more of these three criteria, they were excluded from the review. Those studies that did not provide sufficient information to rate their eligibility on the basis of the above criteria were retained for full-text screening.

Approximately one-third of the full texts were screened by two reviewers independently. Disagreements were dealt with by discussion and the involvement of a third reviewer. Because high levels of inter-rater reliability were achieved ($\kappa = 85\%$), the remaining full texts were screened by one reviewer. The full texts had to fulfil five inclusion criteria to be eligible for inclusion in the review:

- RCTs
- diagnosis of a long-term condition
- self-management or case management intervention
- adults (aged ≥ 18 years)
- report quantitative data on costs/rates of health-care utilisation and health outcomes (QoL, depression and anxiety).

All the studies that were rated as eligible or as potentially eligible (if no clear decision could be reached) were discussed in group meetings by three members of our research team (MP, NS, PB).

Data extraction

We designed a data extraction sheet to collect data on the studies and the interventions included within them. We were unable to seek additional data from authors in the time frame of the review.

We extracted data on study quality. We chose a dichotomous measure based on allocation concealment, as this is the aspect of trial quality most consistently associated with treatment effect,[82,83] and is particularly relevant when outcomes are subjective, such as QoL.[84] Other measures of trial quality in the risk of bias tool, such as blinding, are generally less useful in trials of self-management interventions because it is difficult to meet the conditions required for effective blinding. Allocation concealment was judged as adequate or inadequate according to the relevant section from the Cochrane risk of bias tool. We analysed intervention effects on all outcomes (QoL, hospitalisation and costs), grouping by risk of bias (based on the dichotomous measure of the quality of allocation concealment) to assess if results varied by study quality.

We extracted data on the effect of self-management interventions on health-care utilisation and total costs. We also separately extracted data on the methods used in the subset of studies reporting formal cost-effectiveness, cost–utility and cost–benefit analyses. A previously used checklist was employed to assess the quality of the literature.[85] This checklist is based on the Drummond checklist for assessing economic evaluations[86] and has been adapted to capture more fully the quality of economic evaluations in self-management interventions (see *Appendix 3*).

Descriptive data on studies, populations and interventions were extracted by two members of the research team working independently. Coding of the type of intervention was conducted on the basis of those extractions by two members of the research team working independently, with disagreements dealt with by discussion. A subset of data on quantitative outcomes were extracted by two members of the research team working independently ($n = 50$ studies), with the rest of the data extracted by one member and checked by a second.

We also extracted published data on the 'reach' of each model of self-management support, in terms of the proportion of eligible patients who did not take part in the study, and whether or not long-term conditions additional to the index condition (with the exemption of severe psychosis and dementia) were used as exclusion criteria.

Analyses

Accurate placement of studies on the cost-effectiveness plane requires accurate quantification of the magnitude of both effects on costs and outcomes, which requires particular forms of data beyond simple text descriptions of significance and *p*-values.

We sought data that would allow us to report a standardised mean difference (or 'effect size') for health outcomes and costs (*Box 2*). This generally requires reporting of means, standard deviations (SDs) and sample sizes, although other presentations of those data can be used (such as mean difference statistics), and other presentations (i.e. use of dichotomous outcomes such as rates rather than means) can be translated to a standardised mean difference through appropriate transformation.[91] When single parameters were missing (such as a SD, or a sample size at follow-up), we imputed based on other data in the review, or heuristics (e.g. assuming that 70% follow-up would be achieved from numbers of participants randomised at baseline). We excluded studies that lacked data if there were no other studies in the review to allow imputation.

BOX 2 Effect sizes

A RCT assesses the effect of a treatment by comparing the outcomes in the treatment and control groups. Many measures of QoL are continuous, providing a score that varies from 0 up to a maximum based on the number and response range of the items.

Comparing the mean scores of patients in the treatment and control groups gives a good indication of the impact of the treatment. For example, if patients in the treatment group have a mean score at the end of the study of 20, and the controls have a mean of 15, the mean difference is 5 points (i.e. treatment leads to an improvement in QoL of 5 points on average). One difficulty is that it takes an expert to know whether or not a difference of 5 points is important or trivial. A second problem is that studies often use different measures. Knowing that a treatment causes a mean improvement of 5 points when QoL has been measured on two completely different scales makes comparison impossible.

Effect sizes overcome these difficulties by standardising. Essentially, this involves dividing the mean difference from each trial by a measure of the underlying variability of the scores on that outcome (the so-called SD). If scores are generally very variable, then a large mean difference would be required to demonstrate that treatment was better than control. If scores do not vary markedly, then a small mean difference may still represent an important effect of treatment. The mean difference divided by a measure of variability in this way is often described as an effect size.

Standardising in this way means that the difference between treatment and control groups can be described in terms of the same unit (i.e. units of SD). So, if one RCT finds a mean difference of 5 points and the SD is 10, then the effect size is 0.5 (and the difference in QoL is half a SD). A second trial using a different measure might report a larger mean difference of 15 but, if the SD of scores in that trial is 25, then the effect size is actually only slightly increased (15/25 = 0.6) even though the mean difference is much larger.

A convention has emerged to judge the magnitude of effect sizes calculated in this way. An effect size of around 0.2 is often described as 'small', an effect size of 0.5 as 'medium' and an effect size of 0.8 as 'large'.[87] These are convenient labels with some validity[88,89] and they provide a useful rule of thumb to assess the effect of interventions in the context of the wider literature. Nevertheless, decision-makers need to be careful in their interpretation.

Outcomes reported on dichotomous scales (such as proportion of patients using a hospital following treatment) are often reported using different metrics (such as odds ratios, relative risks and NNT). However, they can be translated to an equivalent effect size. For example, a 'small' effect size (0.2) is equivalent to a NNT of approximately 18, while effect sizes of 0.5 and 0.8 are equivalent to NNTs of approximately 4 and 2.5, respectively.[90]

NNT, number needed to treat; SD, standard deviation.

It is generally the case that many measures of utilisation (e.g. hospital length of stay) and data on costs demonstrate significant skew (where many patients report low costs, but a small proportion have disproportionately large values). In line with published reviews,[92] we identified those outcomes for which the SD multiplied by two was greater than the mean, as in these cases it is argued that the mean is not a good indicator of the centre of the distribution,[93] although skewed data are less problematic if the sample size is large.

We explored statistical heterogeneity through the I^2 statistic,[94] which provides an estimate of the percentage of total variation across studies that can be attributed to heterogeneity rather than chance. We labelled levels of heterogeneity as 'low' (1–25%), 'moderate' (26–74%) and 'high' (≥ 75%).

Caution should be applied in the interpretation of pooled effects in meta-analyses with 'high' levels of heterogeneity.

A minority of self-management support trials use cluster allocation to reduce bias associated with contamination. Such studies were identified and the precision of analyses adjusted using a sample size/variation inflation method recommended by the Effective Practice and Organisation of Care group of the Cochrane Collaboration,[95] assuming an intraclass correlation of 0.02.

Some studies reported multiple self-management support interventions against a single control. In these cases, we extracted each self-management support intervention as a separate comparison and entered them where relevant in the meta-analysis, dividing the control group sample size appropriately to avoid double counting in the analysis (although this method assumes effect sizes are independent).

The aim of the analysis was to conduct a quantitative systematic review to identify self-management support interventions associated with significant reductions in health services utilisation (including hospital admissions) without compromising outcomes.

The primary analysis was structured by type of long-term condition, with a separate analysis for studies including mixed groups of patients with varying long-term conditions. We also conducted sensitivity analyses to explore the PRISMS categories of conditions (see *Table 1*) as an alternative typology, restricting those analyses to the two most prevalent categories (PRISMS 1 and 3) (see *Table 1*).

For each condition category, we present a description of the search and identification of the studies, including the total number identified and the subset of studies including analysable data on QoL, on utilisation and costs and on both outcomes. Our primary interest was on studies reporting both forms of data, because studies that reported only one outcome cannot formally be placed in the cost-effectiveness plane.

We present the results of the included studies for each condition group according to a permutation plot for all studies reporting both outcomes (i.e. QoL and hospital use and QoL and costs), plotting the effect of interventions on utilisation and outcomes simultaneously and placing them in quadrants of the cost-effectiveness plane depending on the pattern of outcomes (*Figure 2*). The plot shows the pattern of

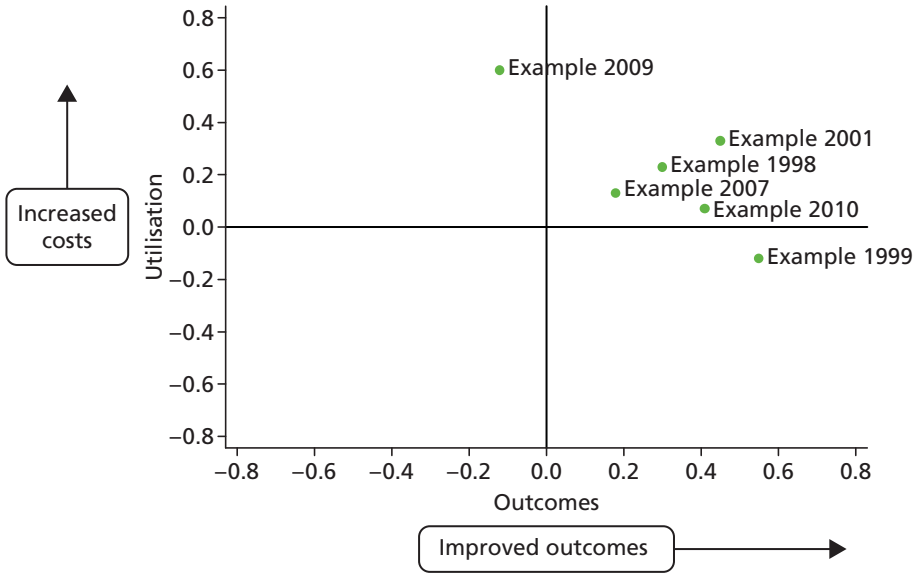

FIGURE 2 Example permutation plot showing utilisation and health outcomes.

results at the level of the individual study, gives a visual impression of the distribution of studies across the cost-effectiveness plane, and identifies studies in the appropriate quadrant (i.e. those that reduce costs without compromising outcomes) and those in problematic quadrants (i.e. those that reduce costs but also compromise outcomes, or those that compromise both outcomes and costs).

Small-study bias

There are a number of forms of bias that can occur in the identification and inclusion of trials in systematic reviews and meta-analyses. For example, publication bias is defined as a bias that reflects differences in the characteristics and results of studies that have been identified for a systematic review, and those that have not been identified.[96]

Funnel plots[97] using standard errors[98] (with associated regression tests) can be used to detect what is called small-study bias. These plot effect size estimates against study sample size. The expectation is that the results from smaller studies will be more variable than larger studies and the plot will resemble a funnel. If the plot is asymmetrical and skewed, this may reflect the fact that some small studies have not been published or identified. It should be noted that funnel plots may identify problems that relate to issues other than publication bias.

It is possible that studies reporting data amenable to meta-analysis differ in systematic ways from those that do not. As reporting of data amenable to meta-analysis was a criterion for inclusion, we did not extract data on the characteristics of studies that were not amenable to our analytic methods and are, therefore, unable to conduct a formal comparison of studies included or excluded for this reason.

We presented two permutation plots, one based on studies reporting a measure related to hospital use, and one based on total costs. Hospital use was the primary outcome measure defined by the brief and generally represents a significant driver of total costs in most health-care systems. However, focusing on a single source of utilisation leaves the analysis vulnerable to cost shifting, when benefits found in terms of reductions in hospital use mask increases in costs elsewhere (e.g. primary care, or patient out of pocket costs). We therefore repeated the permutation plot using the subset of studies that provided data on total costs.

Analysis proceeded as follows.

For each condition, we conducted separate meta-analyses of the effects of self-management interventions in trials reporting utilisation outcomes (separately for total costs and hospital use outcomes) and in trials reporting QoL outcomes.

As a secondary analysis, we then identified the subset of trials of self-management interventions reporting both utilisation and QoL outcomes and conducted a meta-analysis of the effects of self-management interventions on utilisation and QoL outcomes, in the subset of trials reporting both outcomes. We conducted these sensitivity analyses in those long-term conditions for which there were at least 10 studies with both outcomes.

We repeated each of these analyses for all types of self-management support and compared the three types of self-management support, combined, with case management. ‘Self-management’ interventions were defined as either those that did not include any support from health-care professionals or those for which limited support (≤ 2 hours) or more extensive support (> 2 hours) was provided by one or more health-care professionals. ‘Case management’ was defined as supported self-management interventions that involved both > 2 hours of support and input from multidisciplinary health-care teams.

Major deviations of the review from the protocol published in PROSPERO are outlined in *Table 3*.

TABLE 3 Deviations from original PROSPERO protocol

Original protocol	Deviation
All data extraction will be conducted by two members of the research team working independently, with disagreements dealt with via discussion	Data on studies, populations and interventions were extracted by two members of the research team working independently. Coding of the type of intervention was conducted on the basis of those extractions by two members of the research team working independently, with disagreements dealt with by discussion. A subset of data on outcomes was extracted by two members of the research team working independently, with the rest of the data extracted by one member and checked by a second
We will extract data to assist in the quality assessment of primary studies according to the Cochrane risk of bias tool	We restricted our assessment of risk of bias to allocation concealment
We will explore the characteristics of models of self-management showing favourable patterns of outcomes in the matrix through narrative review or through formal meta-regression techniques if the data are amenable	We structured the core analyses by condition and restricted secondary analyses to univariate analyses of the impact of risk of bias and type of intervention

Patient and public involvement

Patient and public involvement in the review was provided through the stakeholder workshops conducted as part of the PRISMS study, for which representatives from the RECURSIVE team attended the initial meeting to help develop the frameworks and priorities for the PRISMS review, which fed through into the analyses for RECURSIVE.

Chapter 4 Results

Study characteristics

Overall, we screened 12,078 titles and abstracts for eligibility in the review. The flow of studies through the search process is outlined in *Figure 3*.

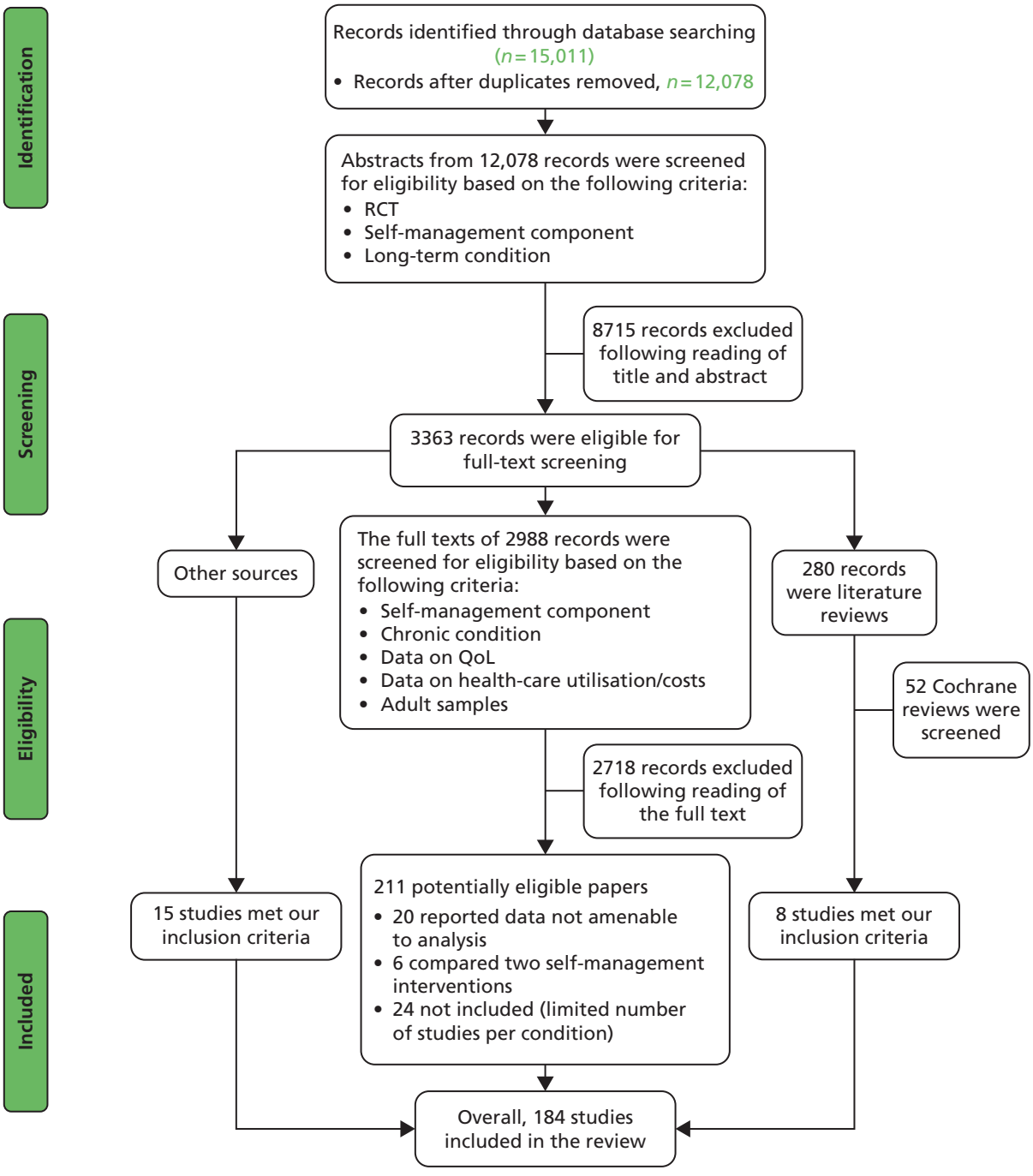

FIGURE 3 The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2009 flow diagram: entire review. Overall pattern of the results.

Full details of data extracted from individual studies (population, conditions, comparisons, risk of bias, economic analyses) are provided in *Appendices 4–8*.

We also identified 24 studies reporting data on QoL and health-care utilisation in other long-term conditions,[99–122] such as hypertension ($n = 5$), inflammatory bowel disease ($n = 6$), lung disease ($n = 3$), multiple sclerosis ($n = 2$), chronic kidney disease ($n = 1$), Parkinson's disease ($n = 1$), migraine/headache ($n = 2$), insomnia ($n = 1$), psoriasis ($n = 1$), acid-peptic disease ($n = 1$) and ulcerative colitis ($n = 1$) (*Table 4*). Although these studies met the eligibility criteria of the review, we excluded studies where there were very low numbers in particular condition categories, where our analytic methods were unlikely to be productive.

TABLE 4 Basic descriptive data on the studies

Category	Characteristics	*n* (%); (*N* = 184)
Context	Country	
	UK	43 (23)
	USA	65 (35)
	European	44 (24)
	Other	32 (17)
Patients	Condition	
	Arthritis	14 (8)
	Cardiovascular	53 (29)
	Diabetes	11 (6)
	Mental health	29 (16)
	Mixed disease	13 (7)
	Respiratory	44 (24)
	Pain	20 (11)
	Mean age (years) (SD)	58 (13)
	% male	49
Intervention	Content	
	Pure SM	9 (5)
	Supported SM	36 (20)
	Intensive SM	87 (47)
	Case management	52 (28)
	Technology involved	43 (23)
	Mean (SD, range)	275 (202, 23–1801)
External validity	Excluded patients with other long-term conditions	65 (35)
	Proportion of eligible patients who did not take part in the study	
	Not clear	48 (26)
	< 20%	40 (22)
	21–40%	55 (30)
	41–60%	25 (14)
	61–80%	14 (8)
	81–100%	2 (1)

SM, self-management.

Figures 4 and *5* show the overall permutation plots, plotting QoL and hospital use outcomes (see *Figure 4*) and QoL and costs (see *Figure 5*).

In terms of hospital use, the bulk of studies are in the lower right quadrant (i.e. they are associated with improvements in QoL and reductions in utilisation). Only a minority of studies report decrements in QoL and a smaller proportion of studies report improved outcomes with increases in utilisation.

In terms of costs, the picture is more mixed with more studies in the top right quadrant, reporting improved outcomes with increases in utilisation. Of the studies reporting costs, almost all demonstrated significant skew (i.e. the SD multiplied by two was more than twice the mean).

Note that the plots do not represent the uncertainty around point estimates, which in many studies would be considerable.

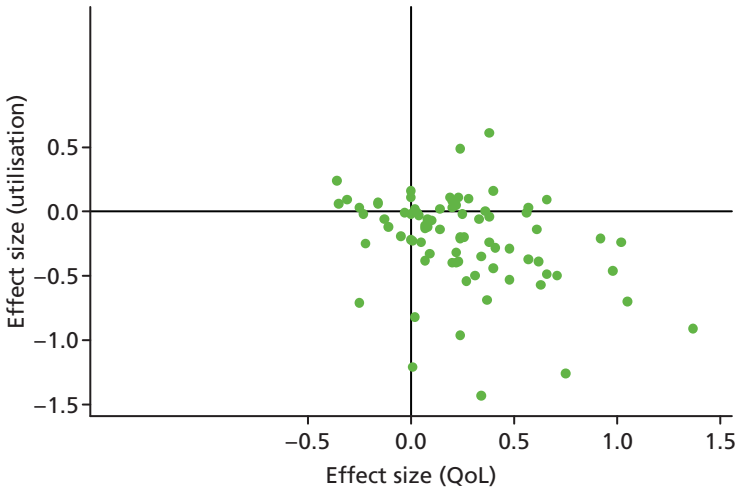

FIGURE 4 Permutation plot (all studies): QoL and hospital use outcomes.

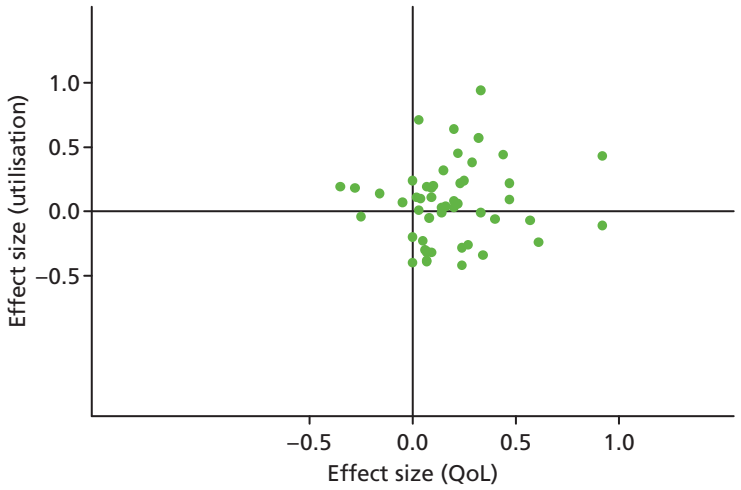

FIGURE 5 Permutation plot (all studies): QoL and total costs.

Formal economic analyses

The formal economic analyses are listed in *Appendix 8* with comments on design and results, with formal extraction of details relating to study design in *Appendix 3*.[123–165]

Although the formal economic analyses represent a more limited data set than those meta-analysed, the broad pattern of the results was similar. A small number of self-management support interventions were dominated by usual care, including studies in diabetes and pain. A significant proportion of studies reported that self-management support was dominant (when the intervention was associated with increases in QoL and reductions in costs). Dominant self-management support interventions were found in a number of conditions, including respiratory, cardiovascular, mental health and arthritis and other pain conditions. The remainder represented studies showing that self-management support was associated with improvements in QoL and increases in costs, with a proportion of those studies going on to show that the ratio between costs and benefits was at levels likely to appeal to decision-makers.

Some of the analyses were sensitive to the perspective taken, with results different when analysis was restricted to health costs or extended to include wider societal costs.

Analyses of studies for patients with respiratory problems

The studies identified in respiratory problems are detailed in *Figure 6*.[118,123–129,166–200]

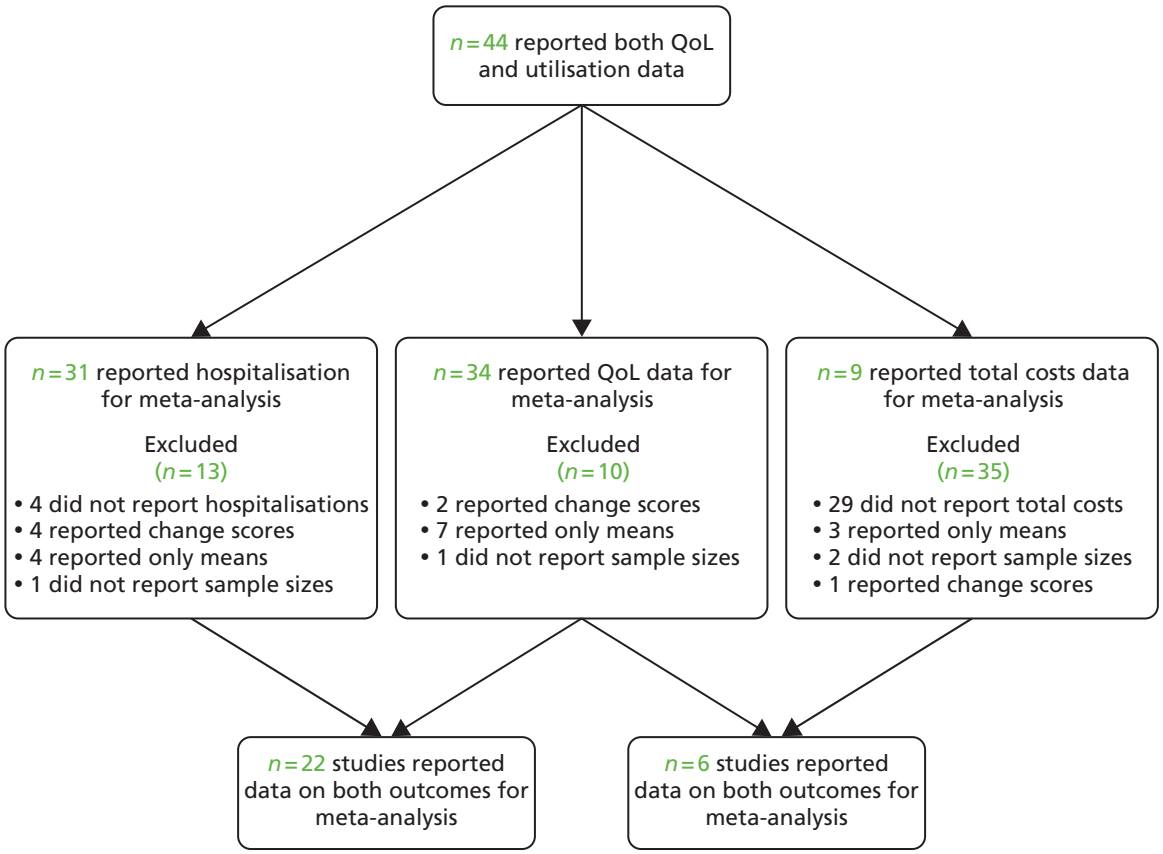

FIGURE 6 Flow chart of studies in patients with respiratory problems.

Figures 7 and *8* show the permutation plots for interventions for patients with respiratory problems.

Most studies reporting hospital data were in the bottom right quadrant of the plots, reporting improvements or no differences in QoL and hospital use. Benefits in utilisation were less pronounced in total costs.

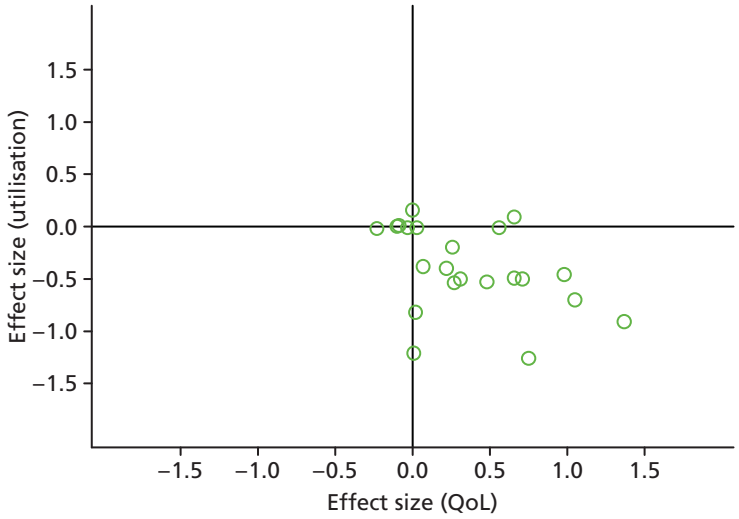

FIGURE 7 Permutation plot: respiratory (hospital use and QoL).

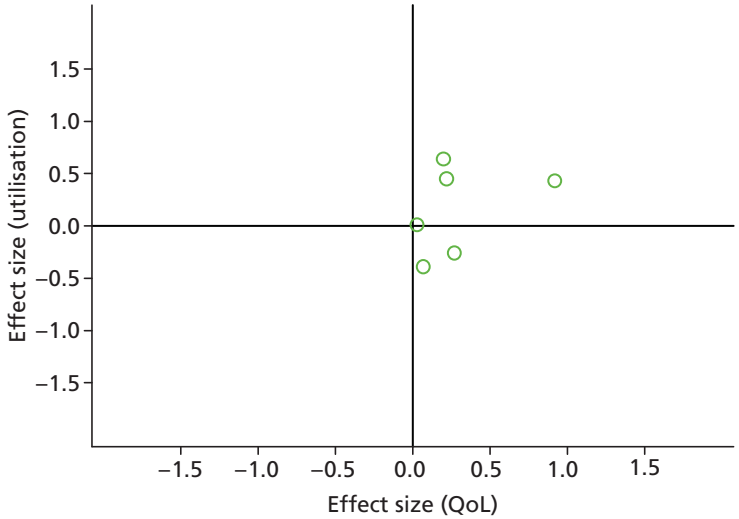

FIGURE 8 Permutation plot: respiratory (total costs and QoL).

In analyses including all studies, self-management support interventions for patients with respiratory problems were associated with small but significant improvements in QoL. Variation across trials was moderate (*Figure 9*).

In analyses including all studies, self-management support interventions for patients with respiratory problems were associated with small but significant reductions in hospital use. Variation across trials was moderate (*Figure 10*).

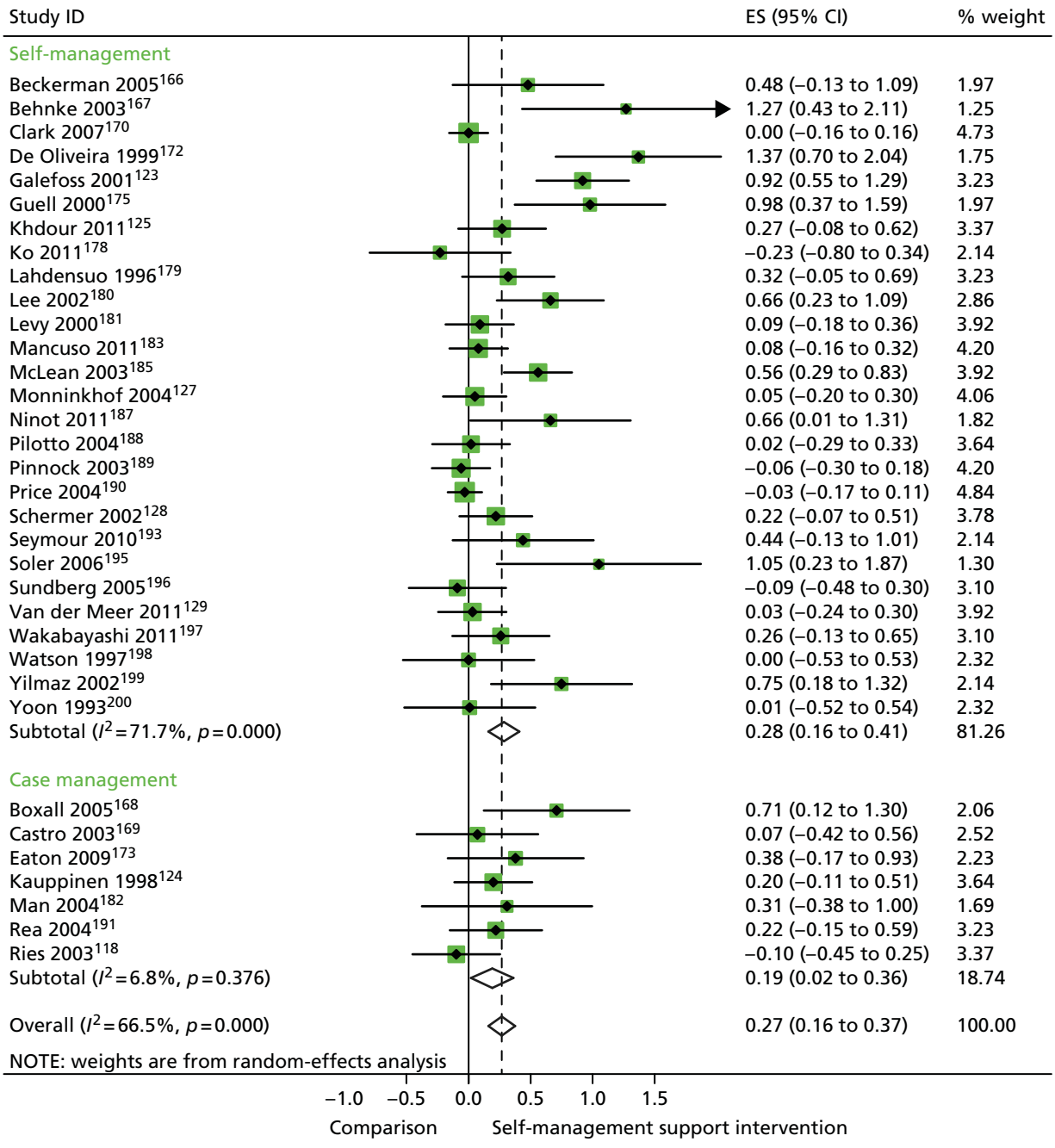

FIGURE 9 Forest plot: respiratory (QoL). CI, confidence interval; ES, effect size.

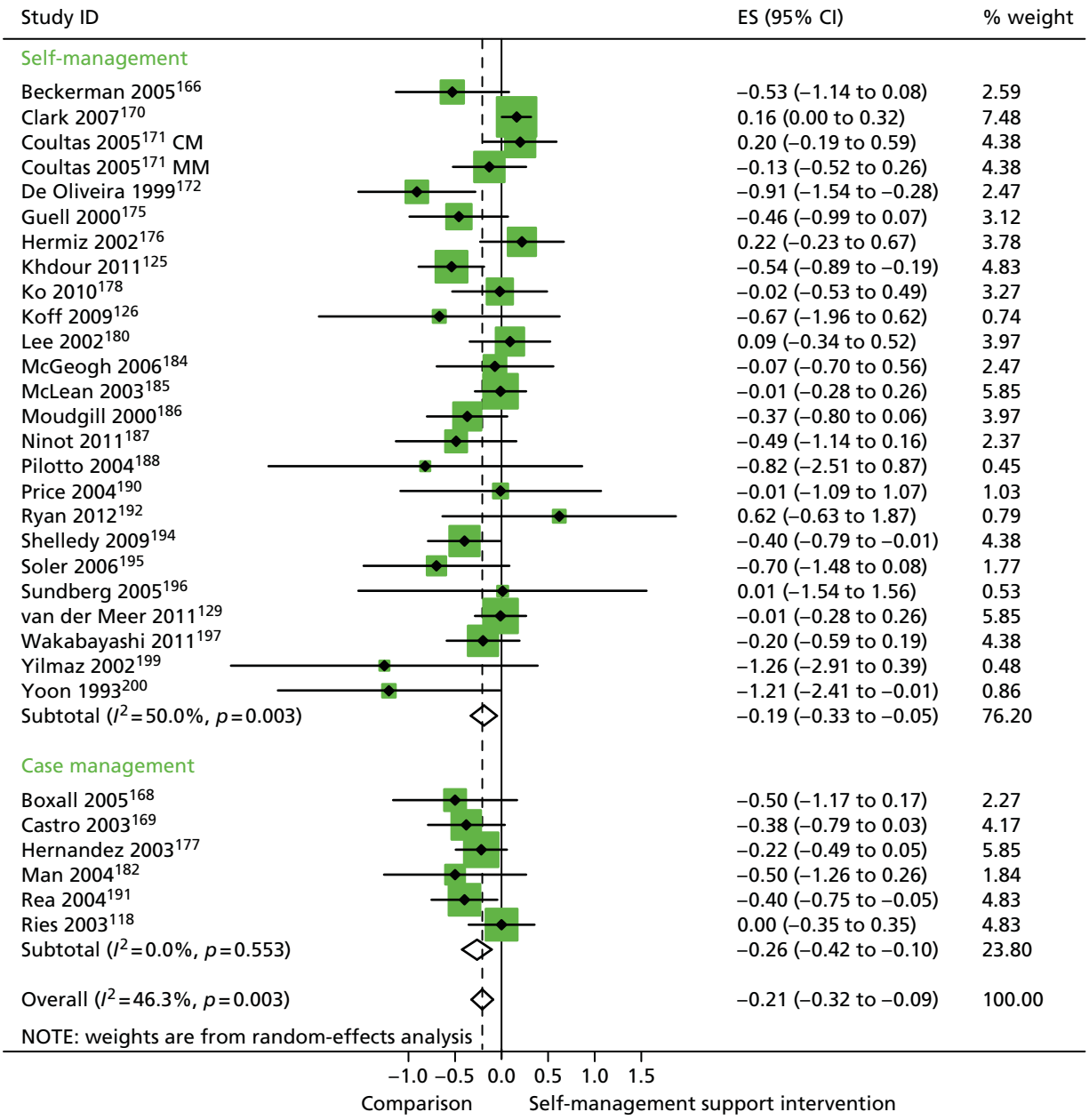

FIGURE 10 Forest plot: respiratory studies (hospital use). CI, confidence interval; CM, nurse-assisted collaborative management; ES, effect size; MM, nurse-assisted medical management. Note: when studies are reported twice, this refers to different arms within the same study.

In analyses including all studies, self-management support interventions for patients with respiratory problems were associated with non-significant increases in costs. Variation across trials was high (*Figure 11*).

In analyses exploring the impact of different types of self-management support, there was evidence that 'case management' interventions produced small but significant improvements in QoL and small but significant reductions in hospital use, but no significant difference in costs. 'Self-management' interventions showed small but significant improvements in QoL and small but significant reductions in hospital use, but no significant difference in costs.

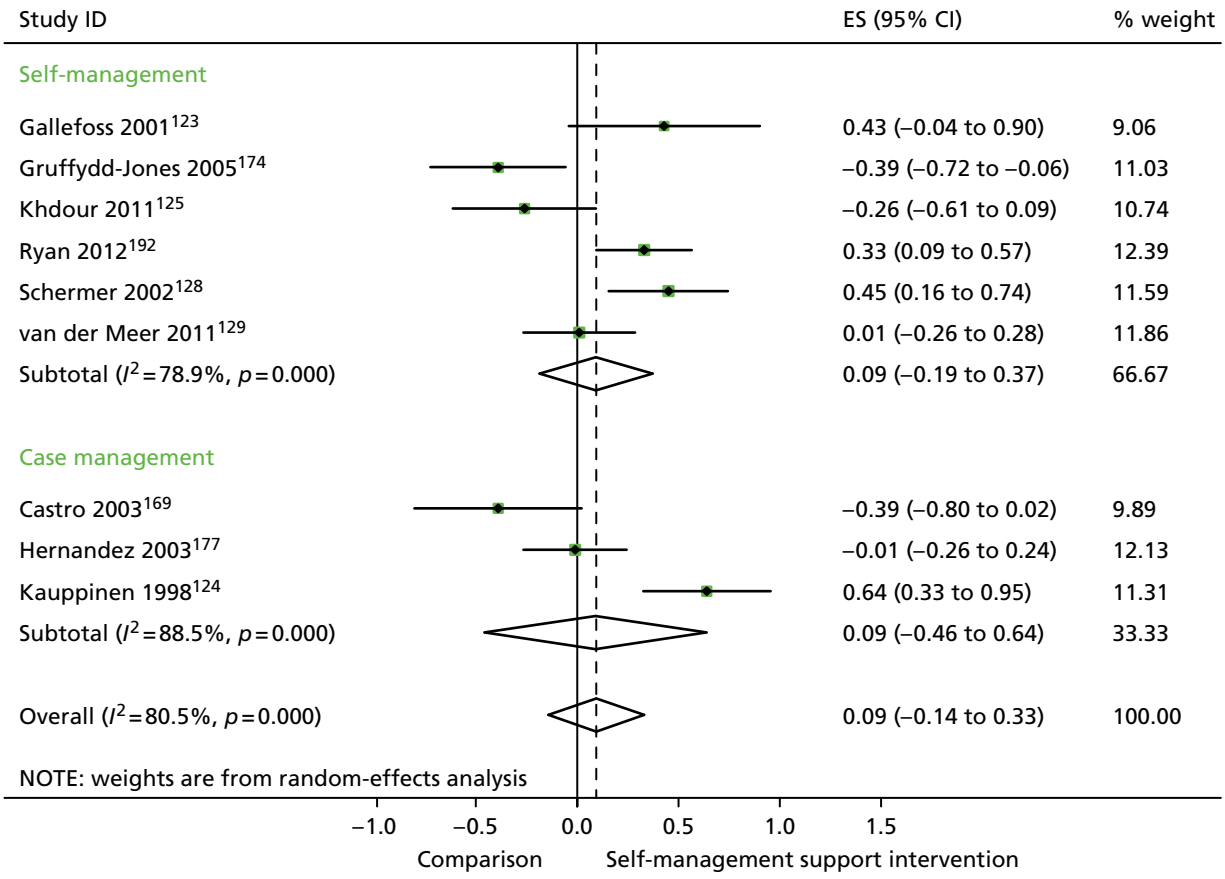

FIGURE 11 Forest plot: respiratory studies (costs); CI, confidence interval; ES, effect size.

Analyses of studies for patients with cardiovascular problems

The studies identified in cardiovascular problems are detailed in *Figure 12*.[134–137,201–247]

Figures 13 and *14* show the permutation plots for patients with cardiovascular problems.

Most studies were in the bottom right quadrant of the plots, reporting improvements or no differences on QoL and hospital use.

In analyses including all studies, self-management support interventions for patients with cardiovascular problems were associated with small but significant improvements in QoL. Variation across trials was moderate (*Figure 15*).

In analyses including all studies, self-management support interventions for patients with cardiovascular problems were associated with small but significant reductions in hospital use. Variation across trials was high (*Figure 16*).

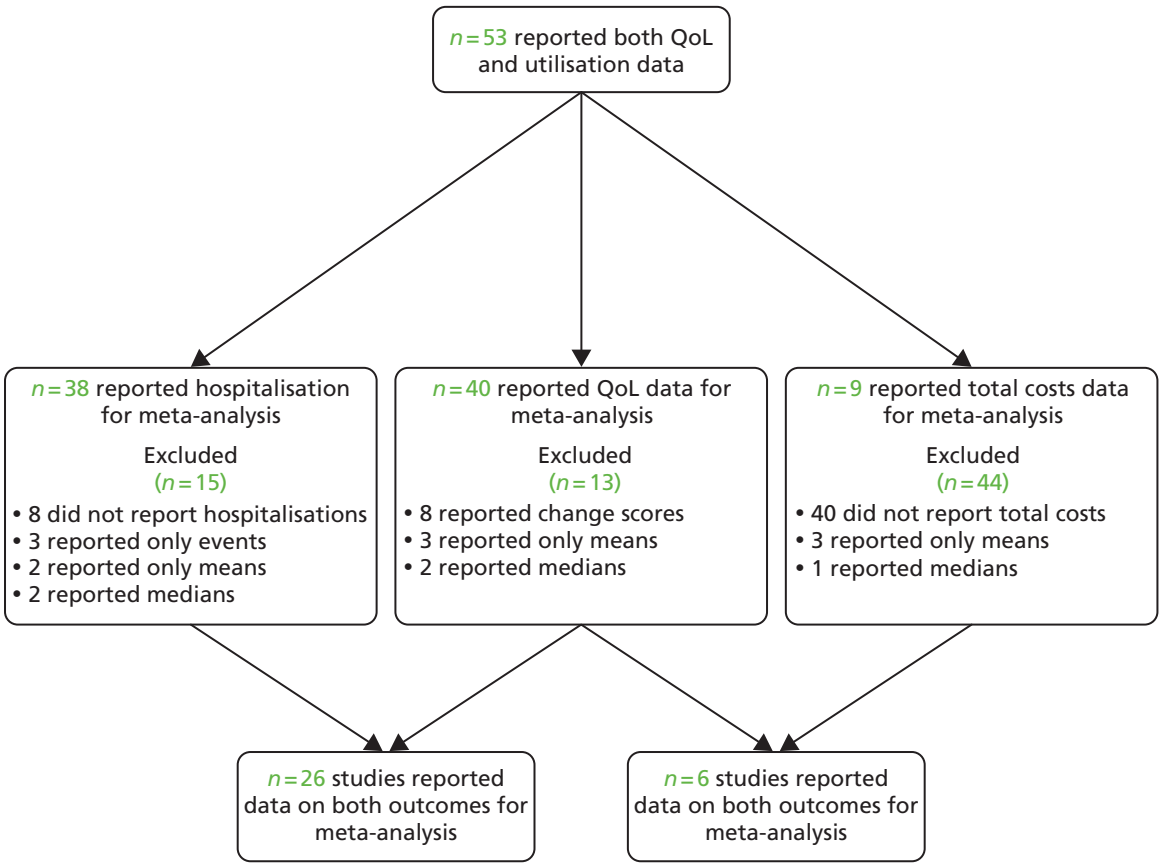

FIGURE 12 Flow chart of studies in patients with cardiovascular problems.

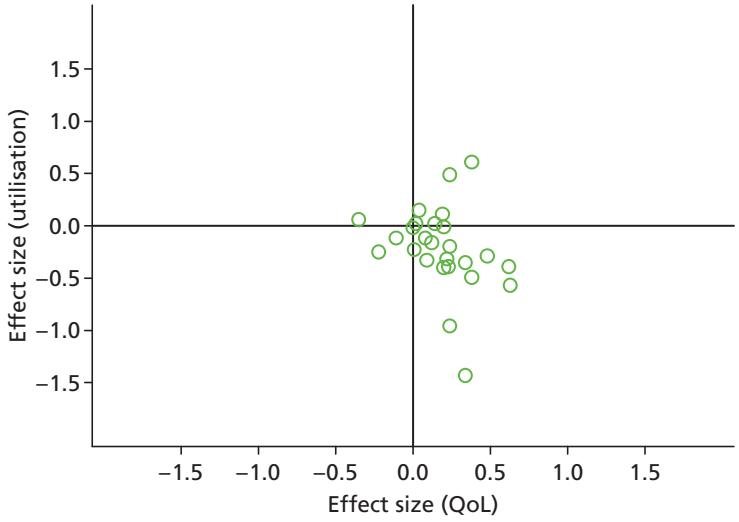

FIGURE 13 Permutation plot: cardiovascular (hospital use and QoL).

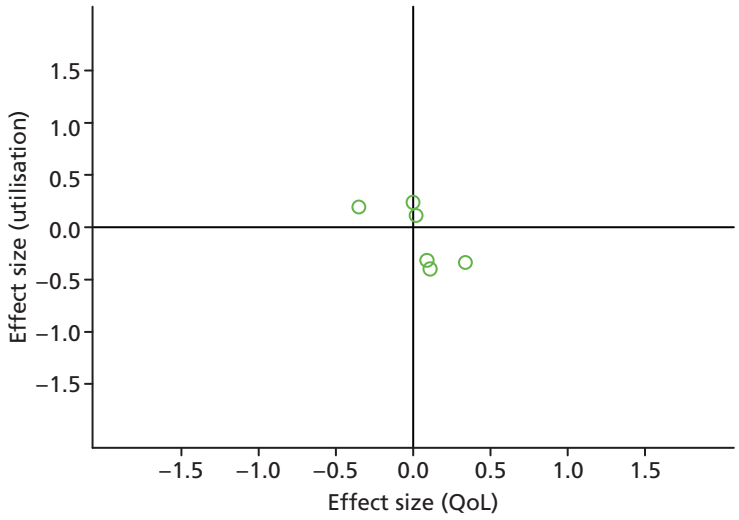

FIGURE 14 Permutation plot: cardiovascular (costs and QoL).

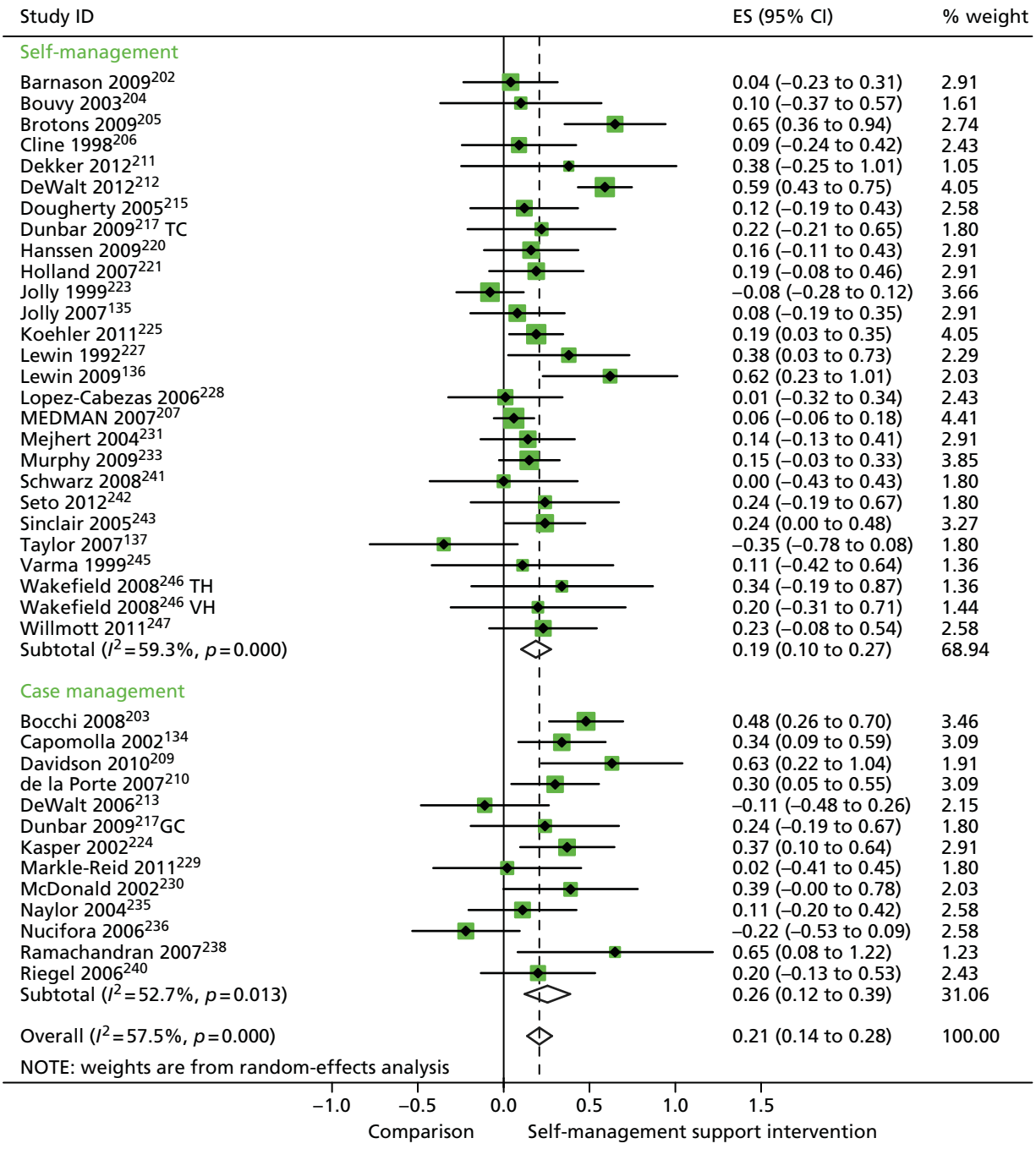

FIGURE 15 Forest plot: cardiovascular (QoL). CI, confidence interval; ES, effect size; GC, group counselling intervention; TC, individual telephone counselling intervention; TH, telehealth post-discharge support; VH, video health post-discharge support. Note: when studies are reported twice, this refers to different arms within the same study.

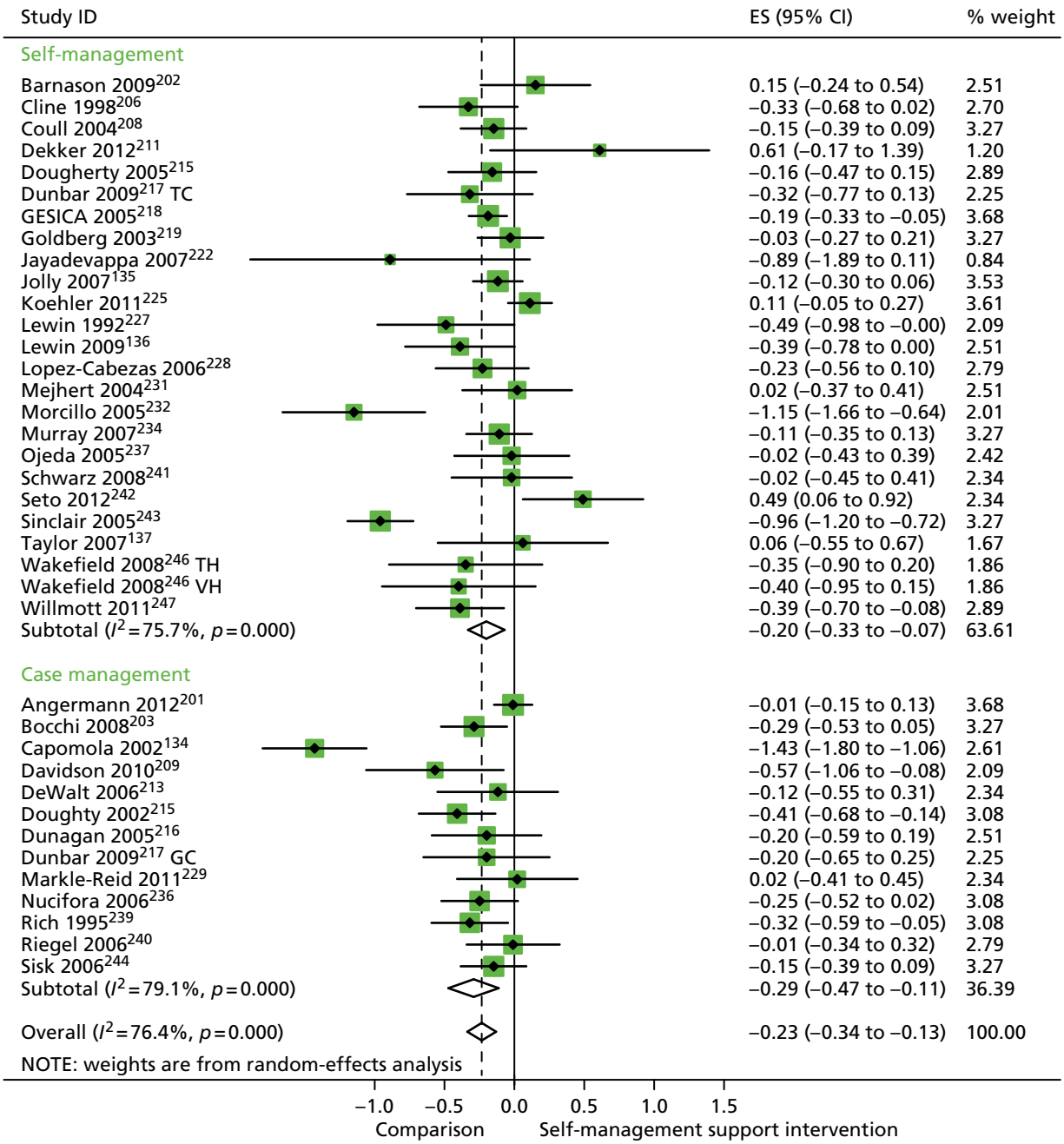

FIGURE 16 Forest plot: cardiovascular (hospital use). CI, confidence interval; ES, effect size; GC, group counselling intervention; TC, individual telephone counselling intervention; TH, telehealth post-discharge support; VH, video health post-discharge support. Note: when studies are reported twice, this refers to different arms within the same study.

In analyses including all studies, self-management support interventions for patients with cardiovascular problems were associated with small but significant reductions in costs. Variation across trials was moderate (*Figure 17*).

In analyses exploring the impact of different types of self-management support, there was evidence that 'case management' interventions produced small but significant improvements in QoL and reductions in hospital use and costs. 'Self-management' interventions showed small but significant improvements in QoL and reductions in hospital use, but no significant reductions in costs.

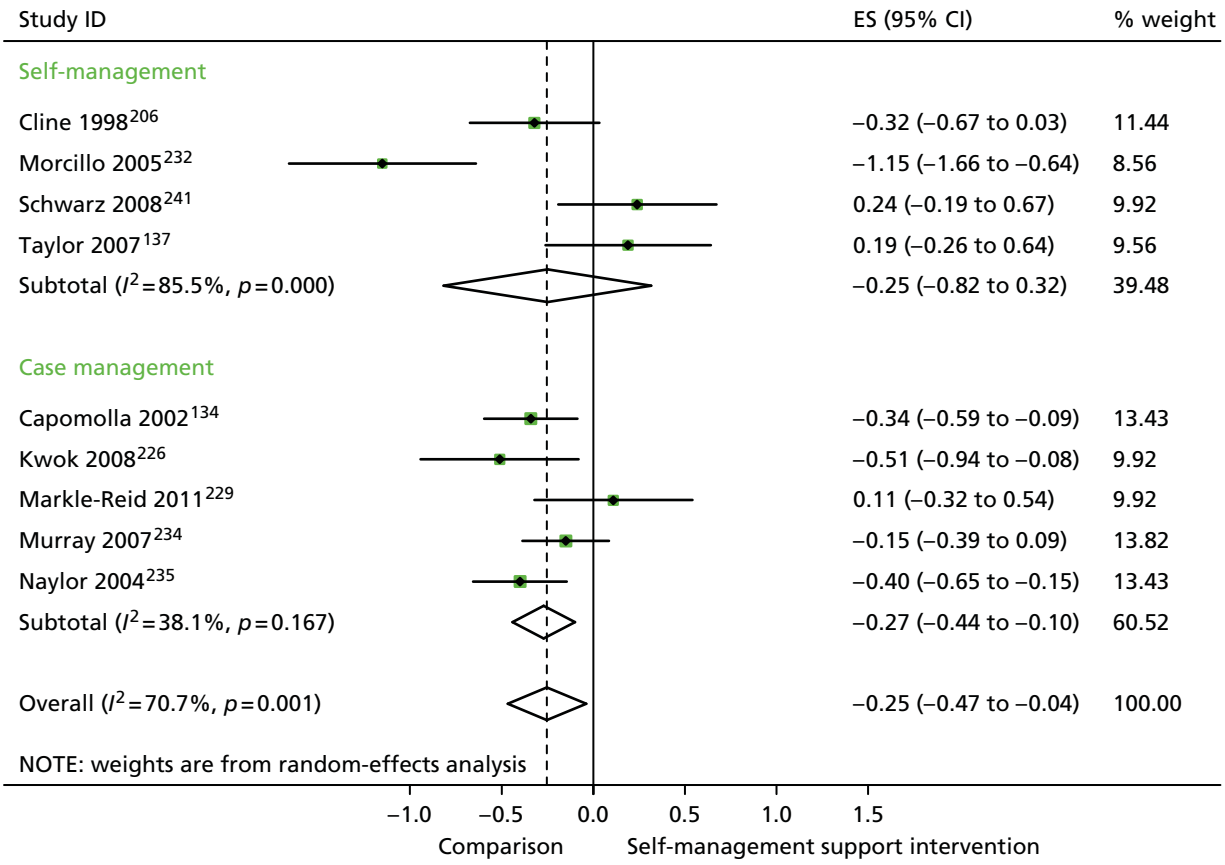

FIGURE 17 Forest plot: cardiovascular (costs). CI, confidence interval; ES, effect size.

Analyses of studies for patients with arthritis problems

The studies identified in respiratory problems are detailed in *Figure 18*.[146,148–151,153–155,248,249]

Figures 19 and *20* show the permutation plots for patients with arthritis problems.

Most studies were in the top right quadrant of the plots, reporting improvements in QoL and increases in costs.

In analyses including all studies, self-management support interventions for patients with arthritis problems were associated with small but significant improvements in QoL. There was no significant variation across trials beyond that expected by chance (*Figure 21*).

In analyses including all studies, self-management support interventions for patients with arthritis problems were associated with non-significant reductions in hospital use. Variation across trials was moderate (*Figure 22*).

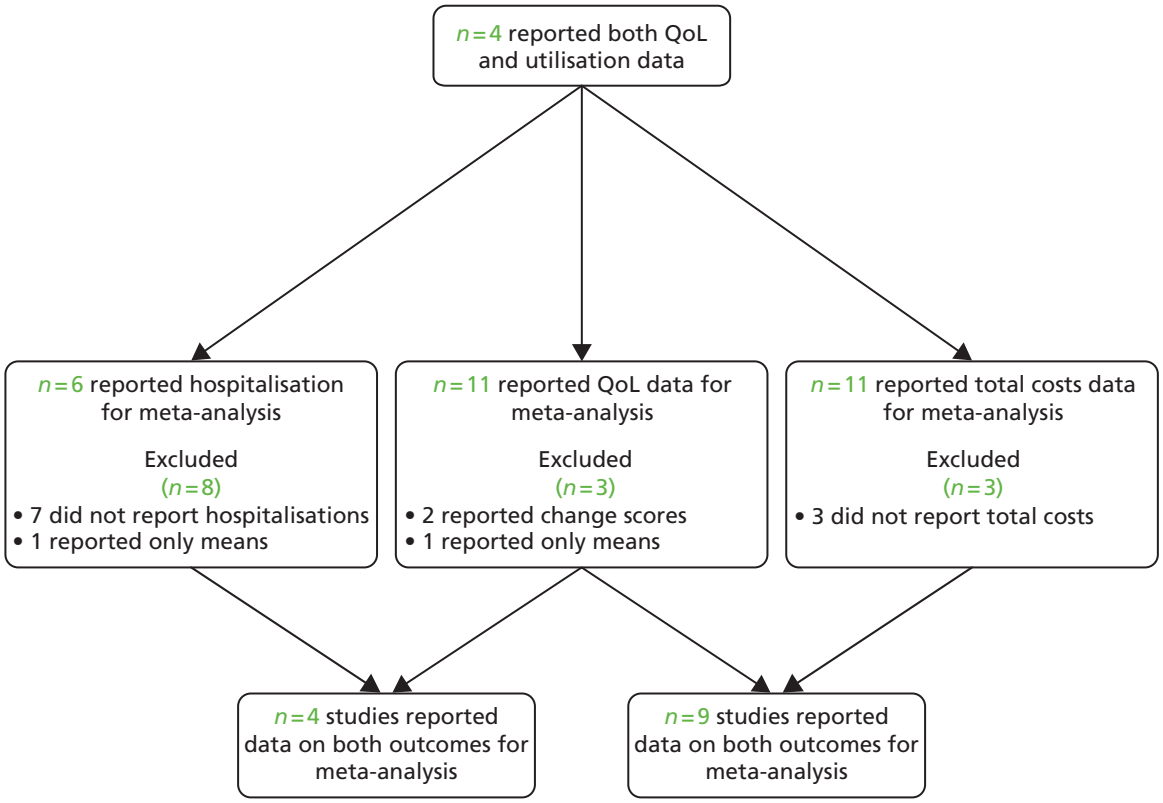

FIGURE 18 Flow chart of studies in patients with arthritis problems.

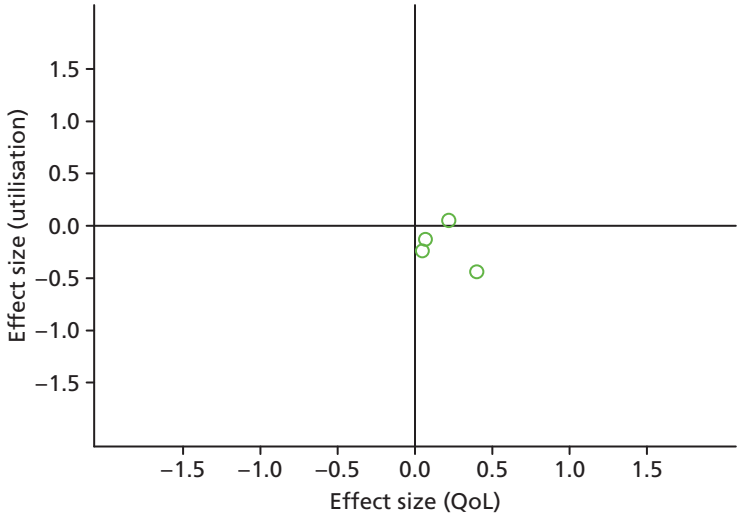

FIGURE 19 Permutation plot: arthritis (hospital use and QoL).

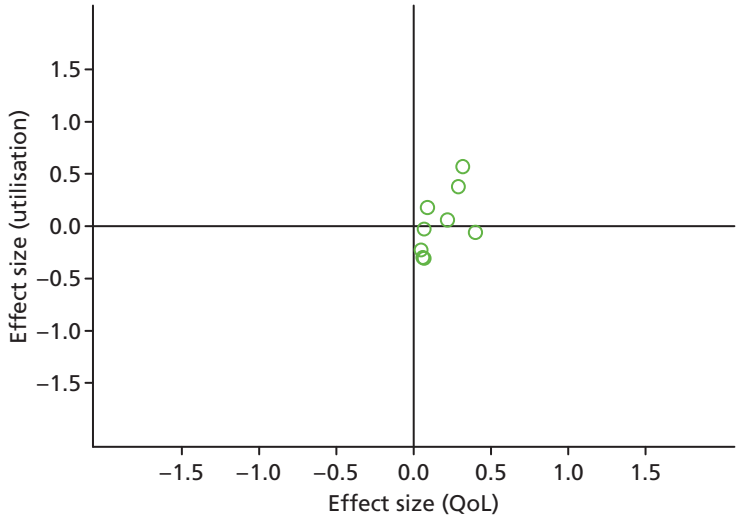

FIGURE 20 Permutation plot: arthritis (total costs and QoL).

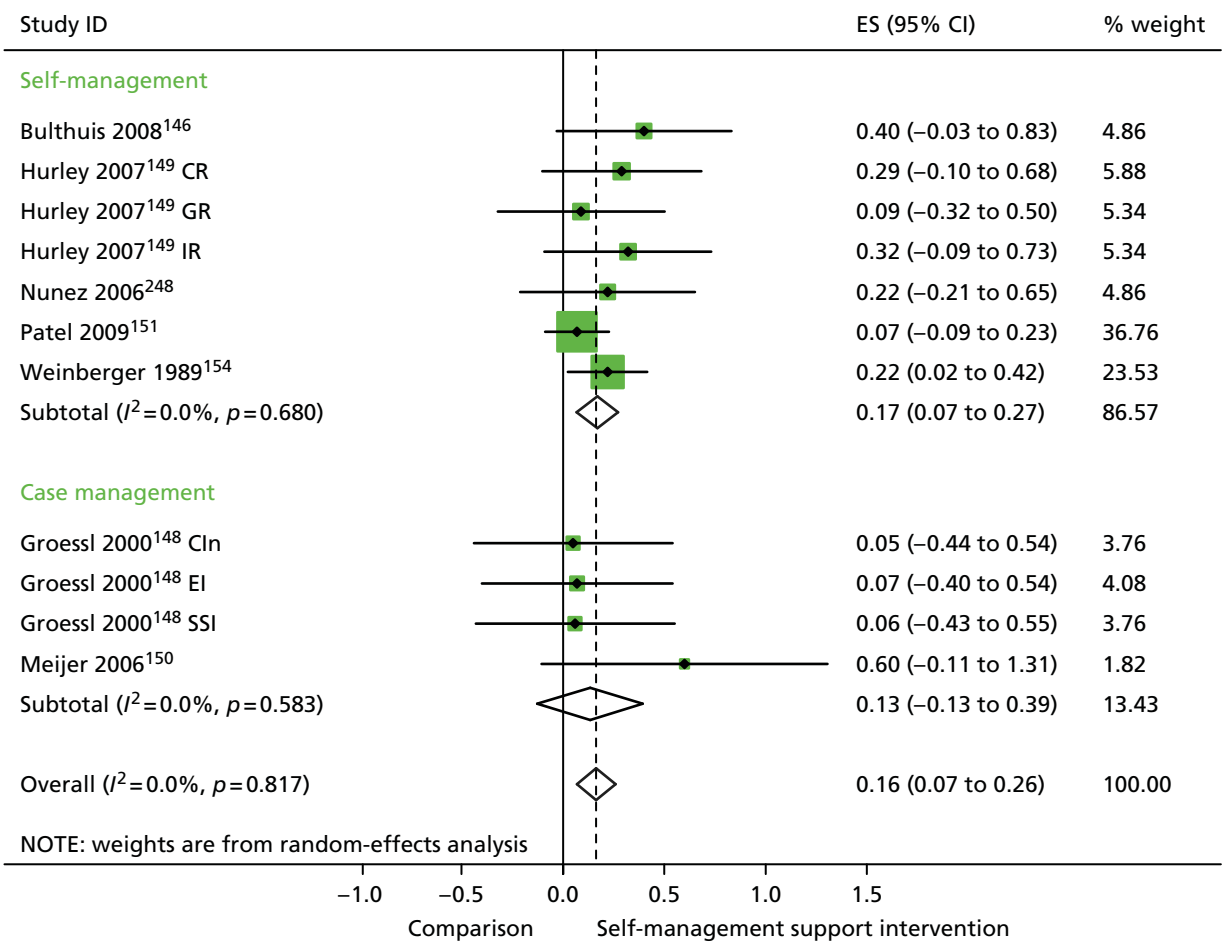

FIGURE 21 Forest plot: arthritis (QoL). CI, confidence interval; CIn, combined (education and social support) intervention; CR, combined (group and individual) rehabilitation; EI, educational intervention; ES, effect size; GR, group rehabilitation; IR, individual rehabilitation; SSI, social support intervention. Note: when studies are reported twice, this refers to different arms within the same study.

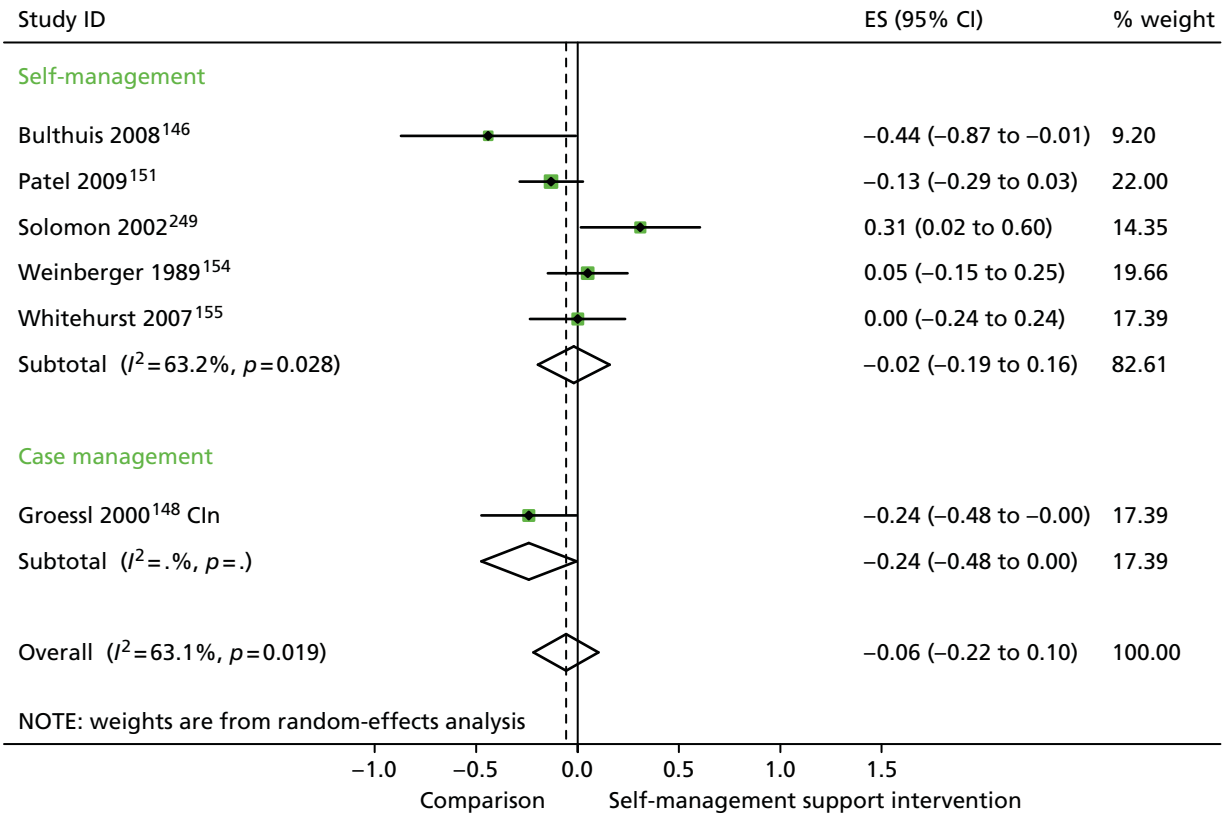

FIGURE 22 Forest plot: arthritis (hospital use). CI, confidence interval; CIn, combined (education and social support) intervention; ES, effect size. Note: when studies are reported twice, this refers to different arms within the same study.

In analyses including all studies, self-management support interventions for patients with arthritis problems were associated with non-significant increases in costs. Variation across trials was moderate (*Figure 23*).

In analyses exploring the impact of different types of self-management support, there was evidence that 'case management' interventions produced non-significant improvements in QoL and small but significant reductions in hospital use and costs, while 'self-management' interventions had small but significant benefits on QoL, non-significant effects on hospital use and small but significant increases in costs.

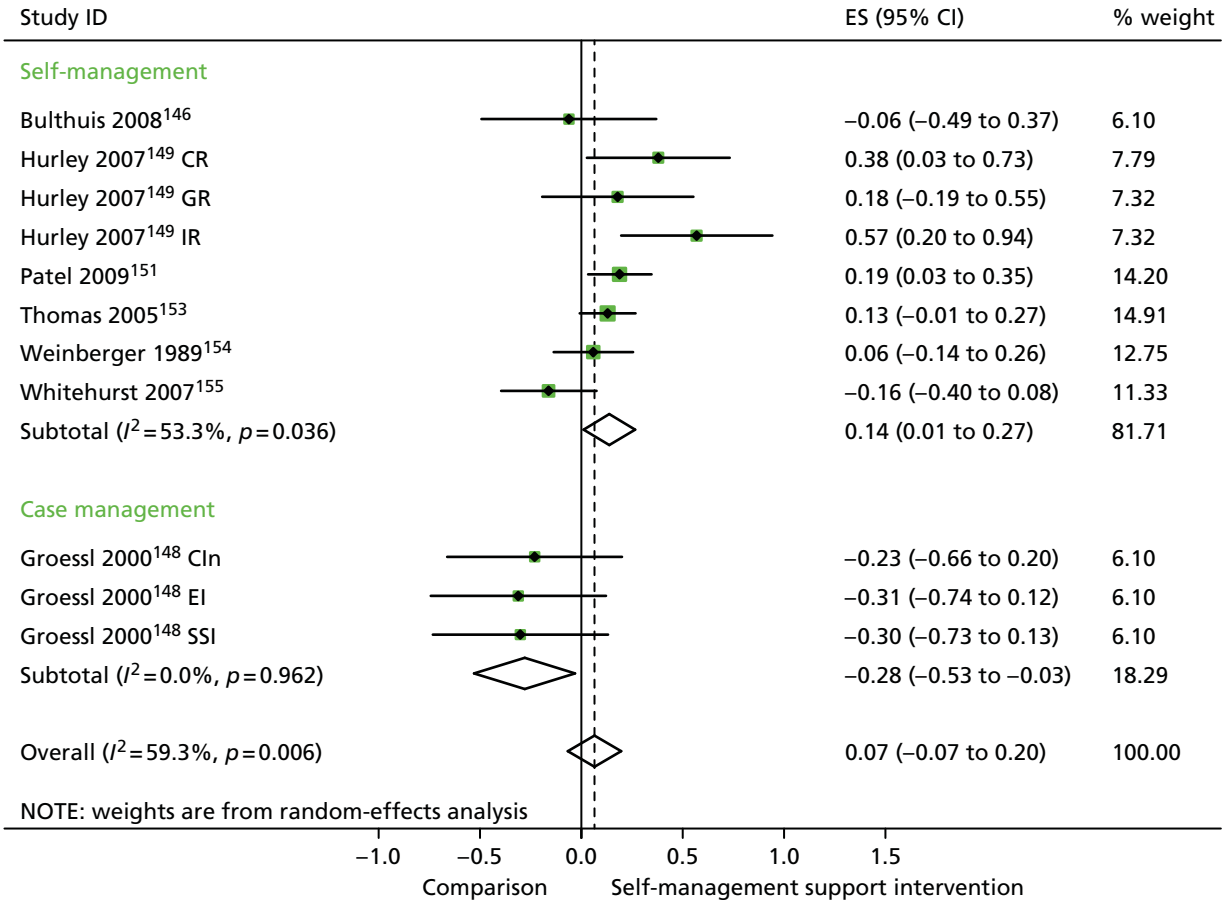

FIGURE 23 Forest plot: arthritis (costs). CI, confidence interval; CIn, combined (education and social support) intervention; CR, combined (group and individual) rehabilitation; EI, educational intervention; ES, effect size; GR, group rehabilitation; IR, individual rehabilitation; SSI, social support intervention. Note: when studies are reported twice, this refers to different arms within the same study.

Analyses of studies for patients with pain problems

The studies identified in pain problems are detailed in *Figure 24*.[156–160,250–256]

Figures 25 and *26* show the permutation plots for patients with pain problems.

Most studies were in the top right quadrant of the plots, reporting improvements in QoL and increases in utilisation.

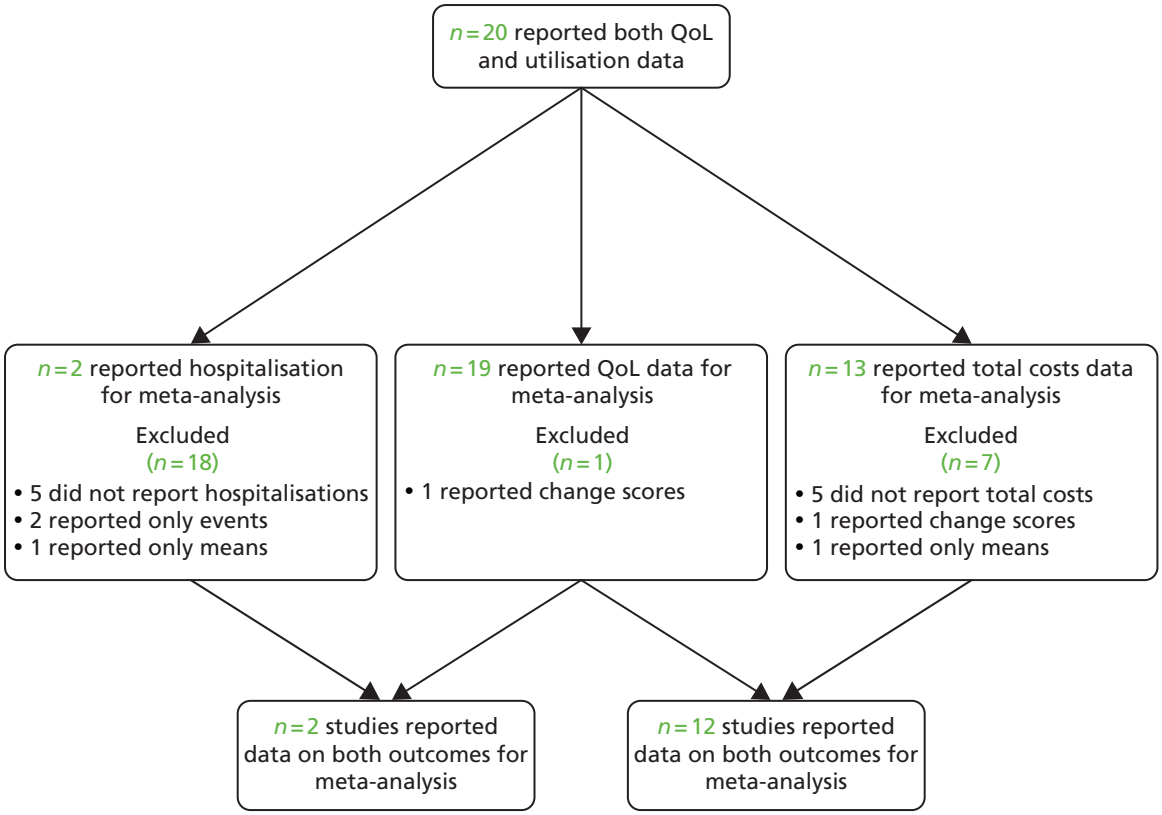

FIGURE 24 Flow chart of studies in patients with pain problems.

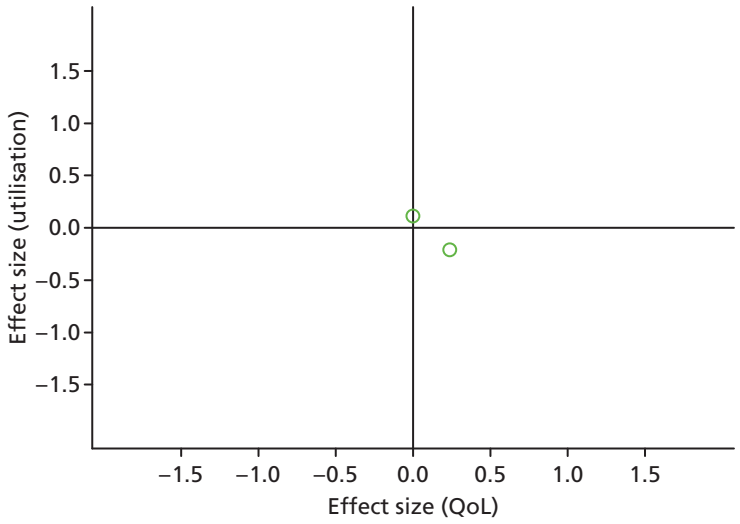

FIGURE 25 Permutation plot: pain (hospital use and QoL).

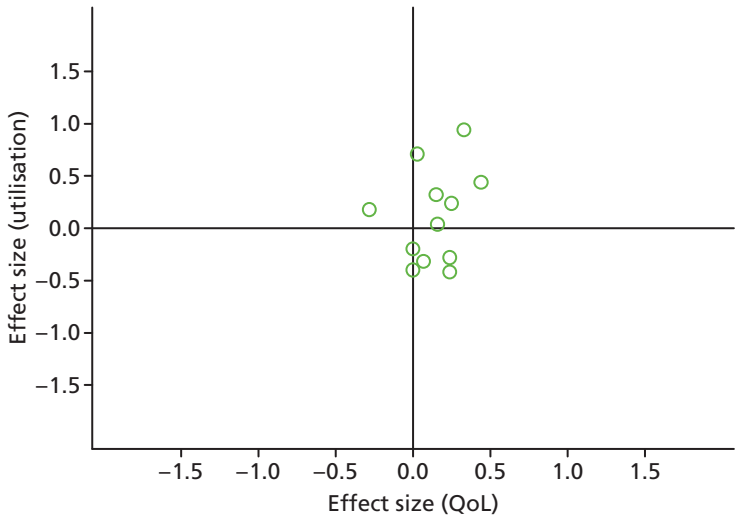

FIGURE 26 Permutation plot: pain (total costs and QoL).

In analyses including all studies, self-management support interventions for patient with pain problems were associated with small but significant improvements in QoL. Variation across trials was low (*Figure 27*).

In analyses including all studies, self-management support interventions for patients with pain problems were associated with non-significant reductions in hospital use. Variation across trials was low (*Figure 28*).

In analyses including all studies, self-management support interventions for patients with pain problems were associated with non-significant increases in costs. Variation across trials was high (*Figure 29*).

In analyses exploring the impact of different types of self-management support, the effects of 'case management' interventions on QoL and hospital use were non-significant, but showed moderate and significant reductions in costs. 'Self-management' interventions showed small but significant improvements in QoL but non-significant effects in costs.

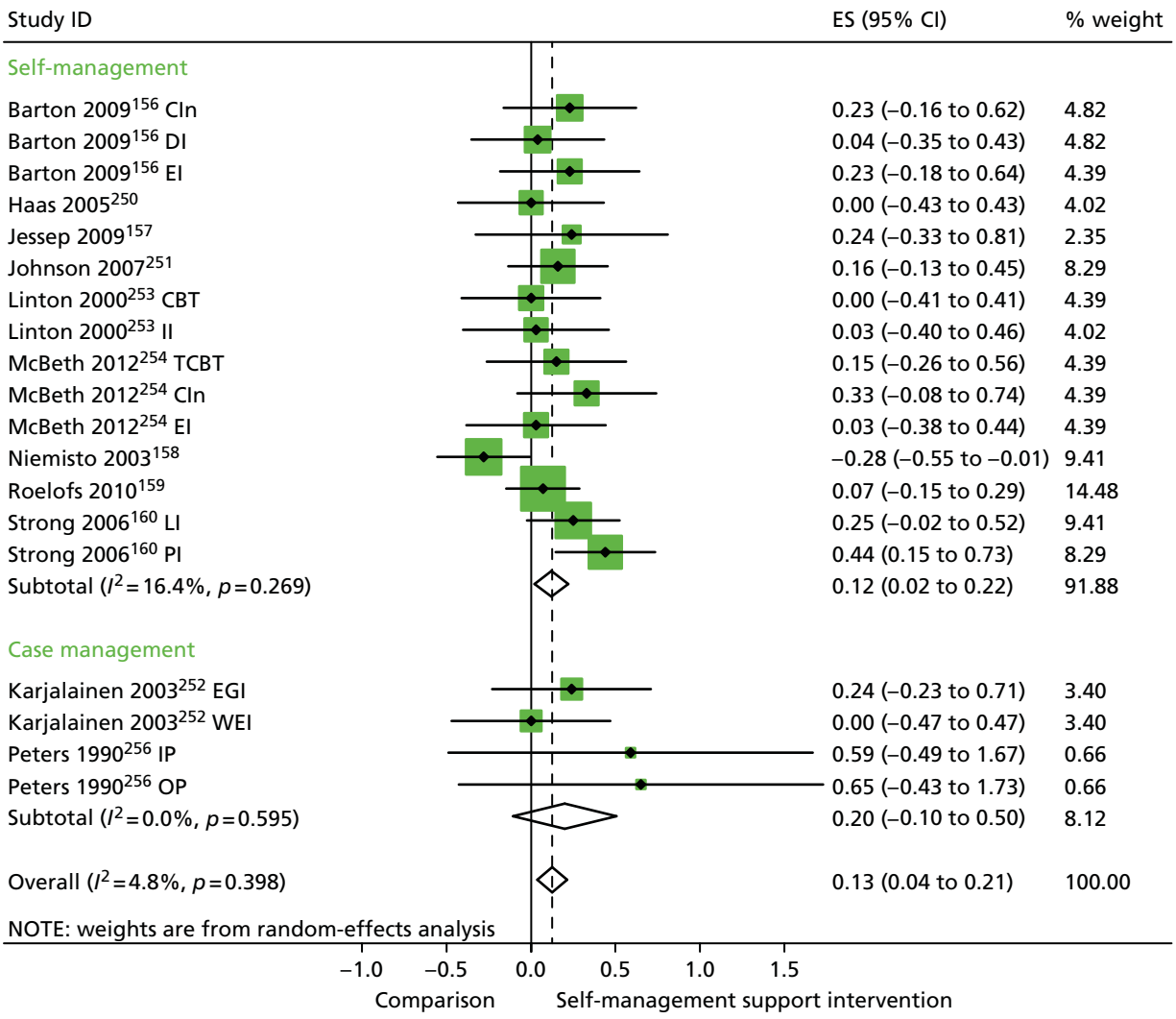

FIGURE 27 Forest plot: pain (QoL). CBT, group cognitive–behavioural therapy intervention; CI, confidence interval; CIn, combined intervention; DI, dietary intervention; EGI, exercise and graded activity intervention; EI, exercise intervention; ES, effect size; II, information-only intervention; IP, inpatient pain management programme; LI, lay-led self-care intervention; OP, outpatient pain management programme; PI, psychologist-led self-care intervention; TCBT, telephone-delivered cognitive–behavioural therapy; WEI, work-based exercise and graded activity intervention. Note: when studies are reported twice, this refers to different arms within the same study.

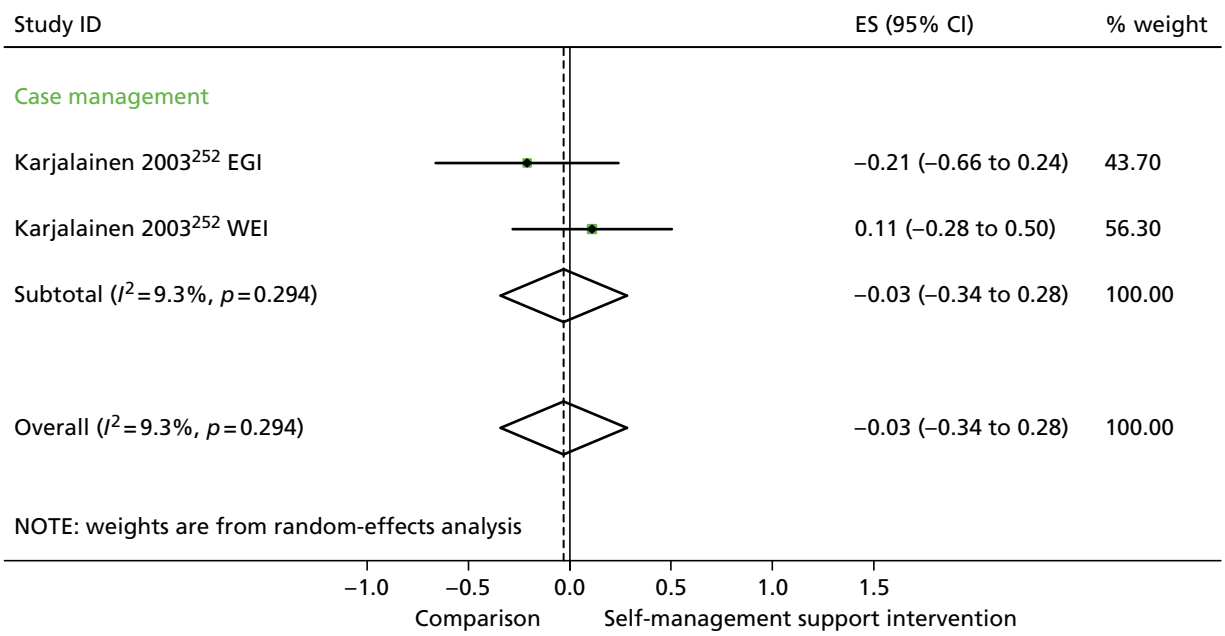

FIGURE 28 Forest plot: pain (hospital use). CI, confidence interval; EGI, exercise and graded activity intervention; ES, effect size; WEI, work-based exercise and graded activity intervention. Note: when studies are reported twice, this refers to different arms within the same study.

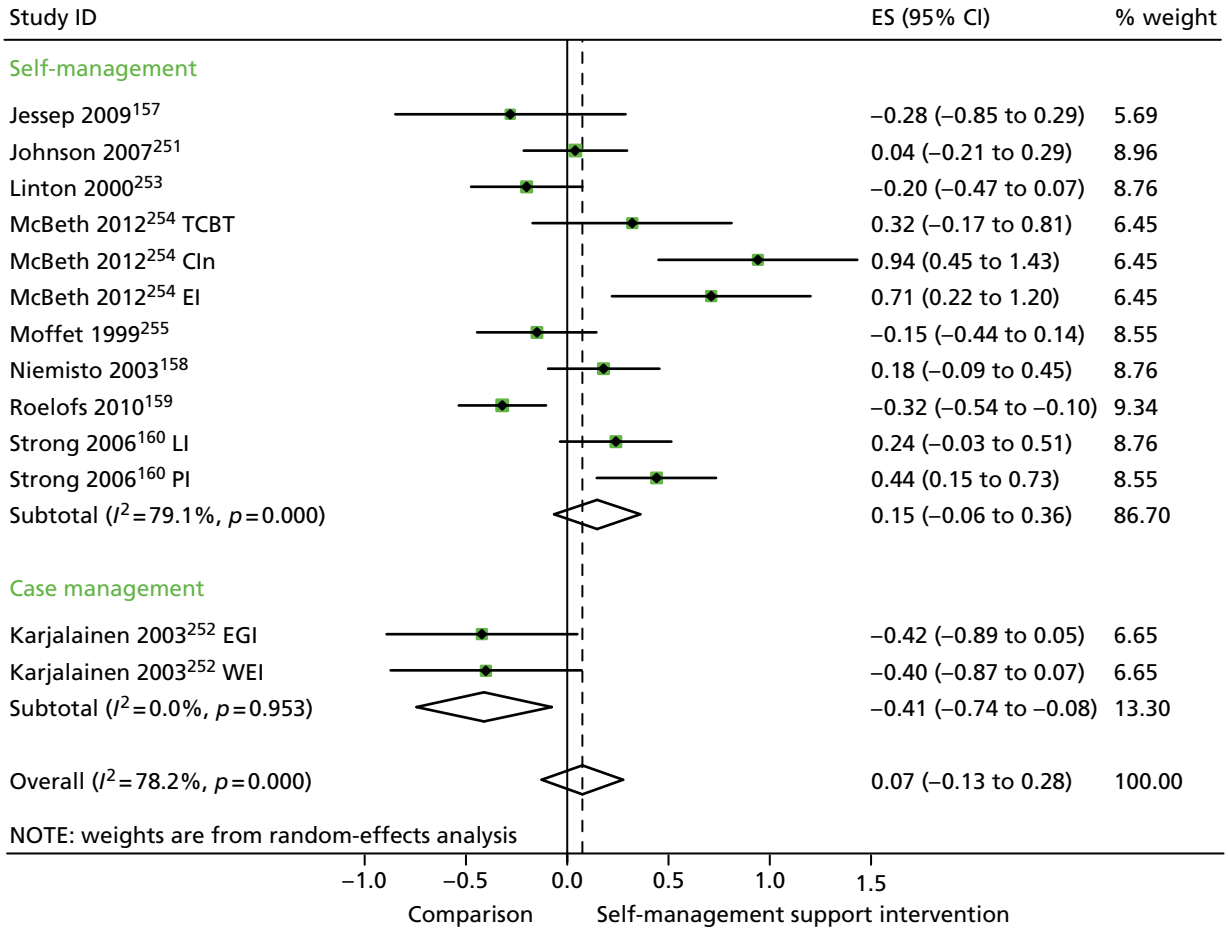

FIGURE 29 Forest plot: pain (costs). CI, confidence interval; CIn, combined (telephone-delivered cognitive–behavioural therapy and exercise) intervention; EGI, exercise and graded activity intervention; EI, exercise intervention; ES, effect size; LI, lay-led self-care intervention; PI, psychologist-led self-care intervention; TCBT, telephone-delivered cognitive–behavioural therapy; WEI, work-based exercise and graded activity intervention. Note: when studies are reported twice, this refers to different arms within the same study.

Analyses of studies for patients with diabetes problems

The studies identified in diabetes problems are detailed in *Figure 30*.[130–133,257–262]

Figures 31 and *32* show the permutation plots for patients with diabetes problems.

Most studies were in the bottom right quadrant of the plots, reporting improvements in QoL and equal or decreased utilisation.

In analyses including all studies, self-management support interventions for patients with diabetes problems were associated with significant improvements in QoL. Variation across trials was high (*Figure 33*).

In analyses including all studies, self-management support interventions for patients with diabetes problems were associated with non-significant reductions in hospital use. Variation across trials was moderate (*Figure 34*).

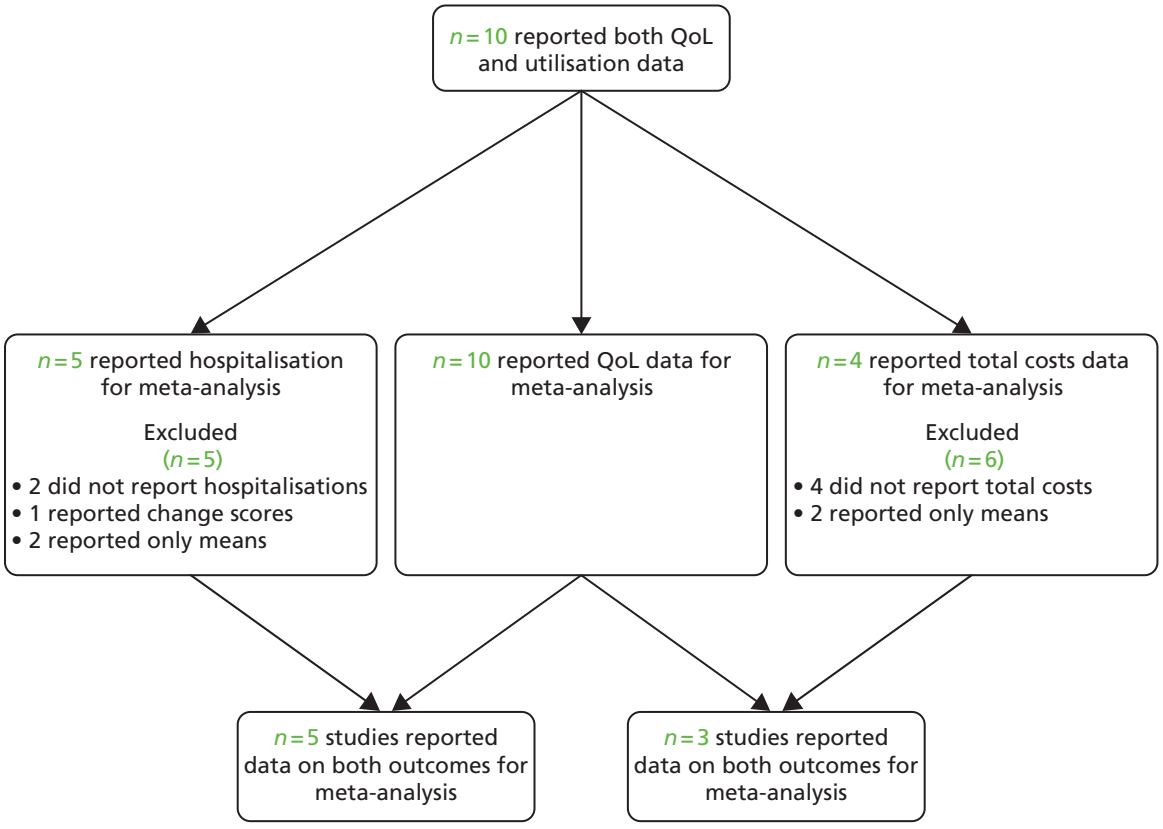

FIGURE 30 Flow chart of studies in patients with diabetes problems.

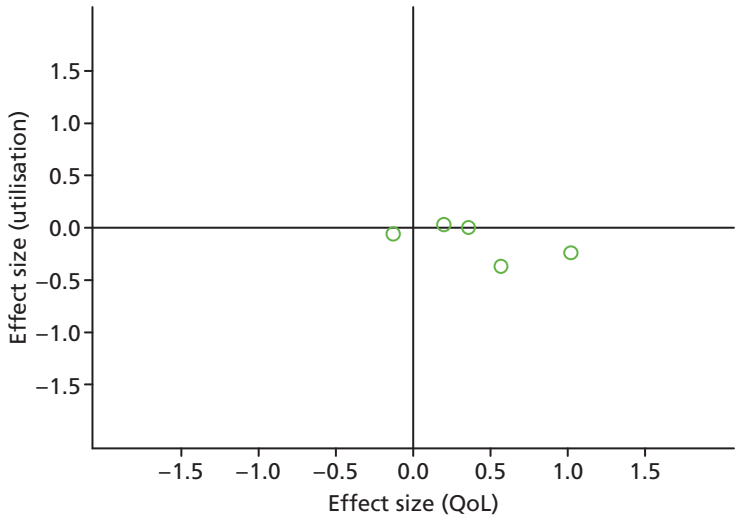

FIGURE 31 Permutation plot: diabetes (hospital use and QoL).

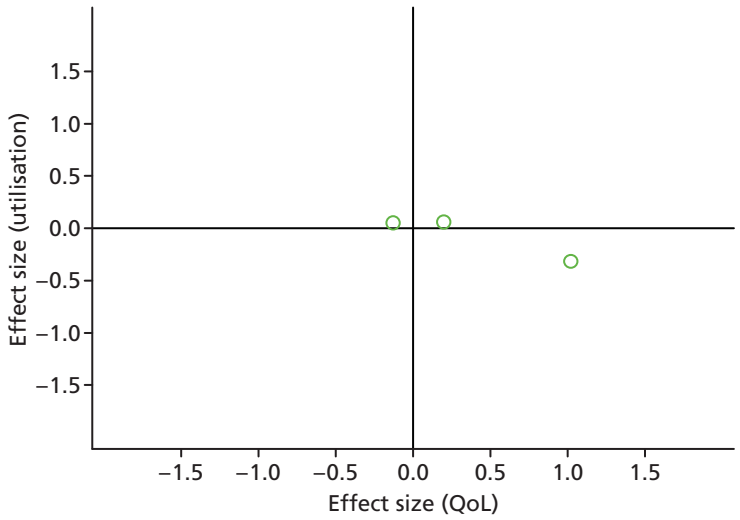

FIGURE 32 Permutation plot: diabetes (total costs and QoL).

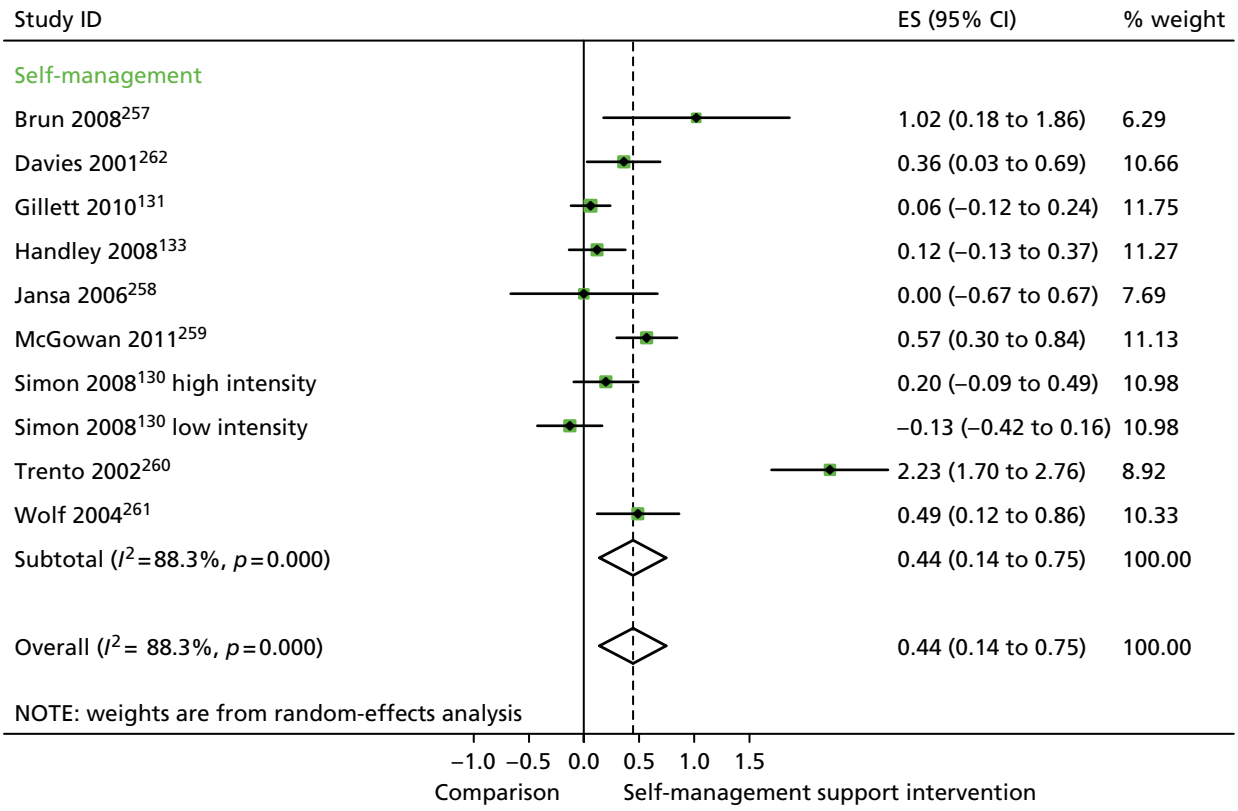

FIGURE 33 Forest plot: diabetes (QoL). CI, confidence interval; ES, effect size. Note: when studies are reported twice, this refers to different arms within the same study. 'Low intensity' is use of blood glucose meter and advice to contact GP for interpretation; 'high intensity' is use of blood glucose meter and training to interpret results.

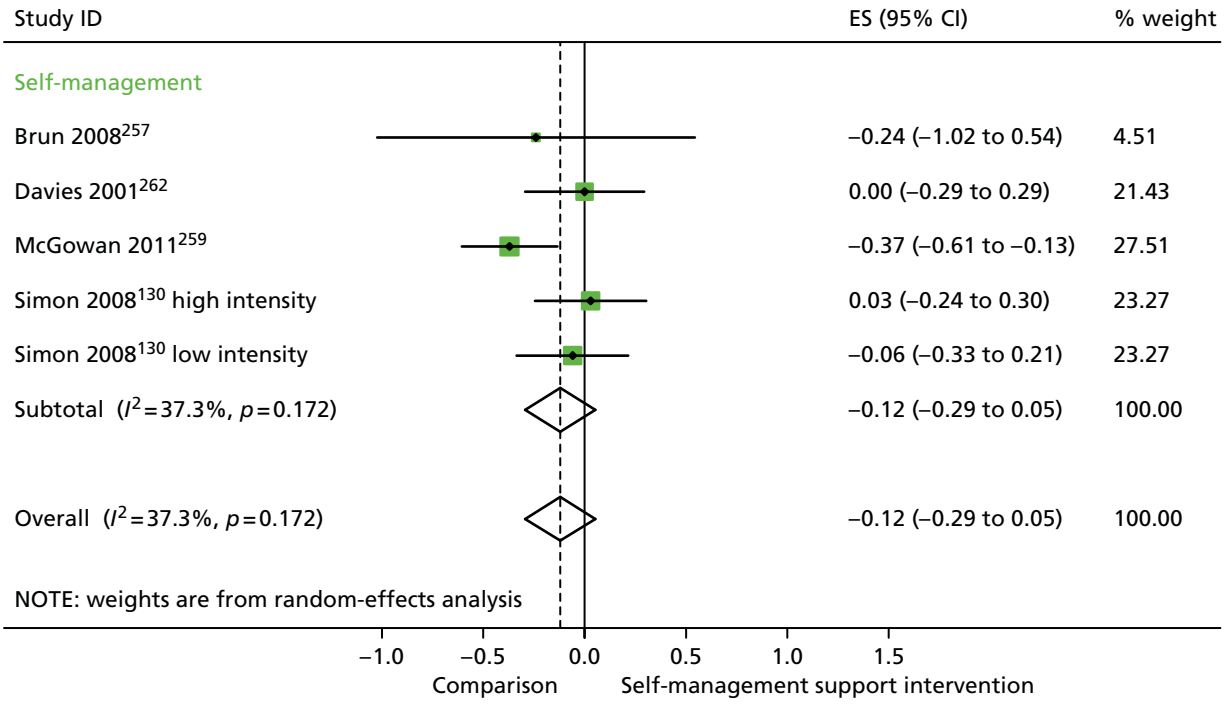

FIGURE 34 Forest plot: diabetes (hospital use). CI, confidence interval; ES, effect size. Note: when studies are reported twice, this refers to different arms within the same study. 'Low intensity' is use of blood glucose meter and advice to contact GP for interpretation; 'high intensity' is use of blood glucose meter and training to interpret results.

In analyses including all studies, self-management support interventions for patients with diabetes problems were associated with non-significant reductions in costs. Variation across trials was moderate (*Figure 35*).

In analyses exploring the impact of different types of self-management support, 'self-management' interventions showed significant improvements in QoL but non-significant reductions in hospital use or costs.

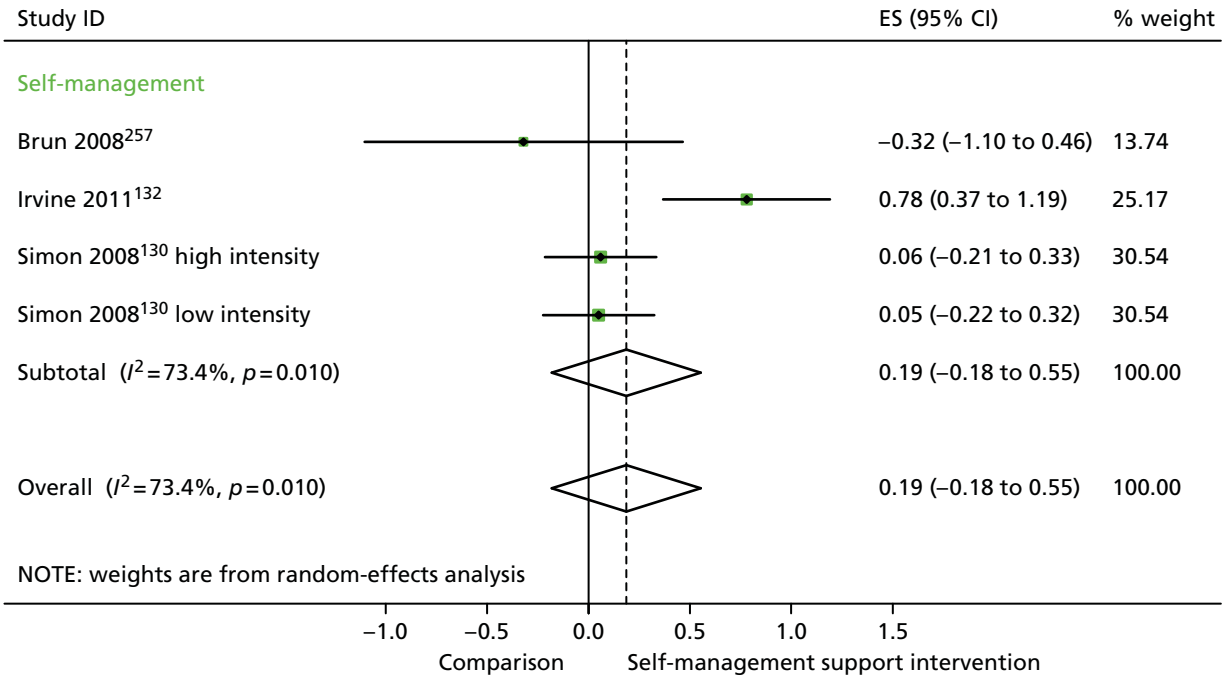

FIGURE 35 Forest plot: diabetes (costs). CI, confidence interval; ES, effect size. 'Low intensity' is use of blood glucose meter and advice to contact GP for interpretation; 'high intensity' is use of blood glucose meter and training to interpret results.

Analyses of studies for patients with mental health problems

The studies identified in mental health problems are detailed in *Figure 36*.[138–143,145,165,263–281]

Figures 37 and *38* show the permutation plots for patients with mental health problems.

Most studies were in the right quadrant of the plots, reporting improvements in QoL with varied effect on utilisation or costs.

In analyses including all studies, self-management support interventions for patients with mental health problems were associated with small but significant improvements in QoL. Variation across trials was moderate (*Figure 39*).

In analyses including all studies, self-management support interventions for patients with mental health problems were associated with non-significant reductions in hospital use. Variation across trials was low (*Figure 40*).

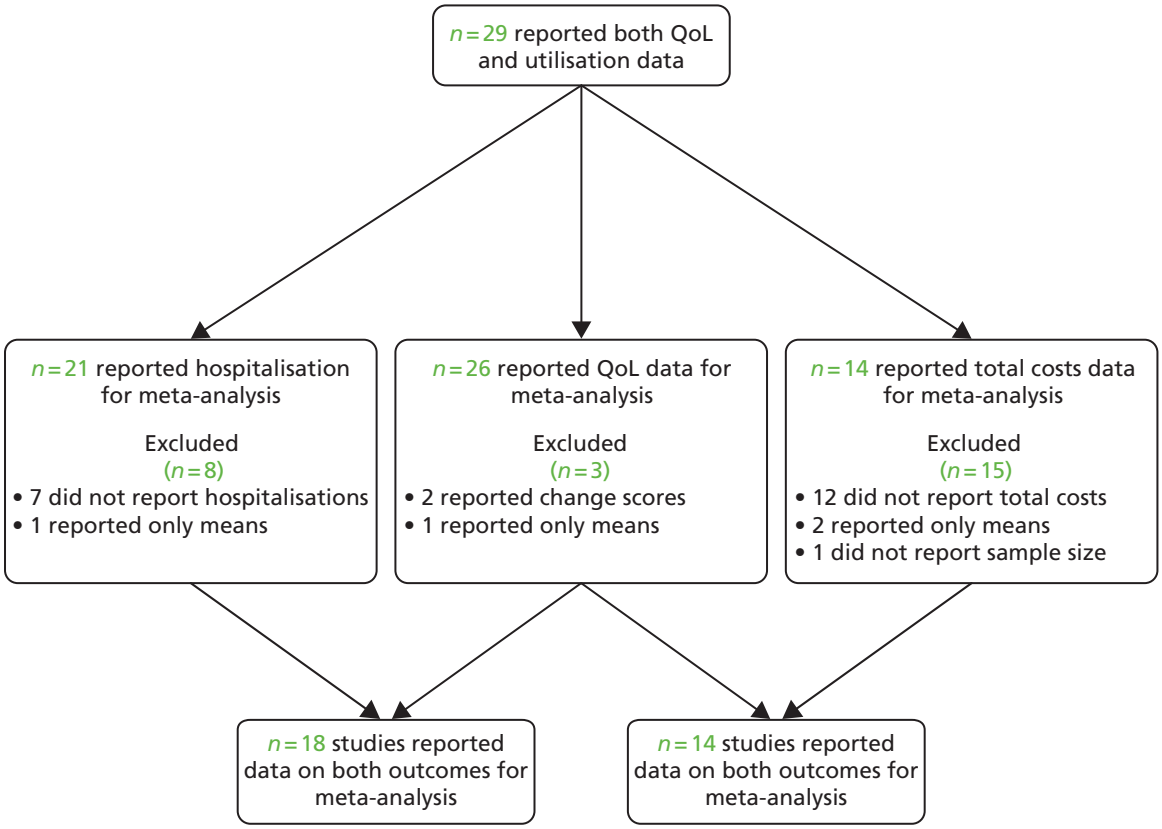

FIGURE 36 Flow chart of studies in patients with mental health problems.

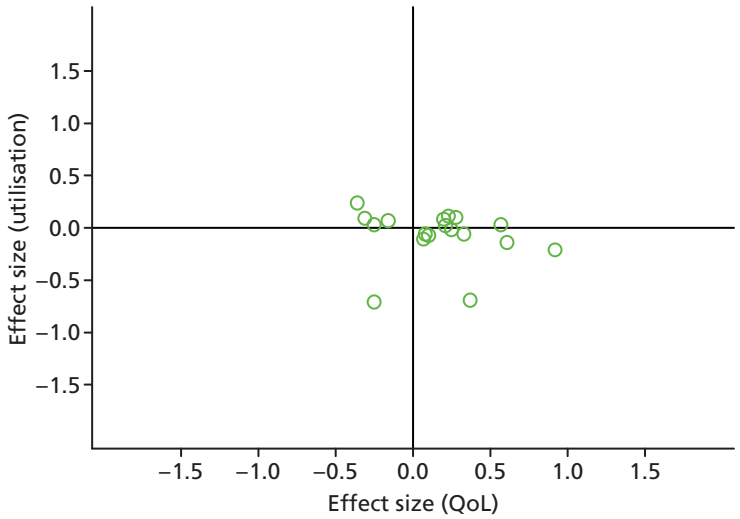

FIGURE 37 Permutation plot: mental health (hospital use and QoL).

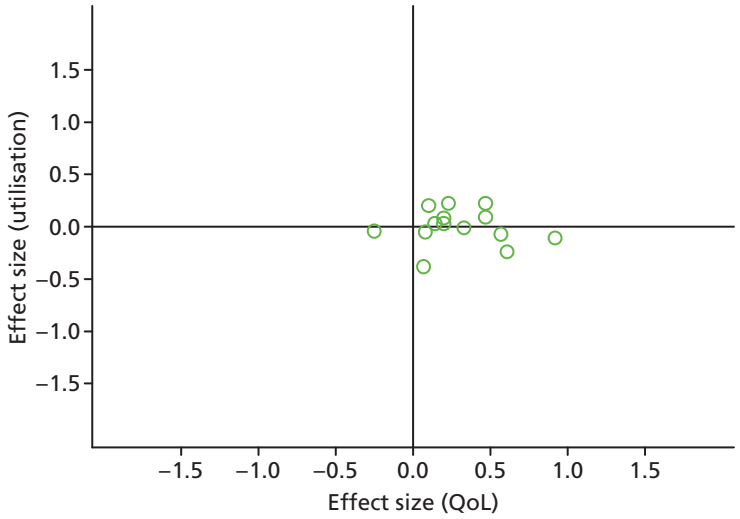

FIGURE 38 Permutation plot: mental health (total costs and QoL).

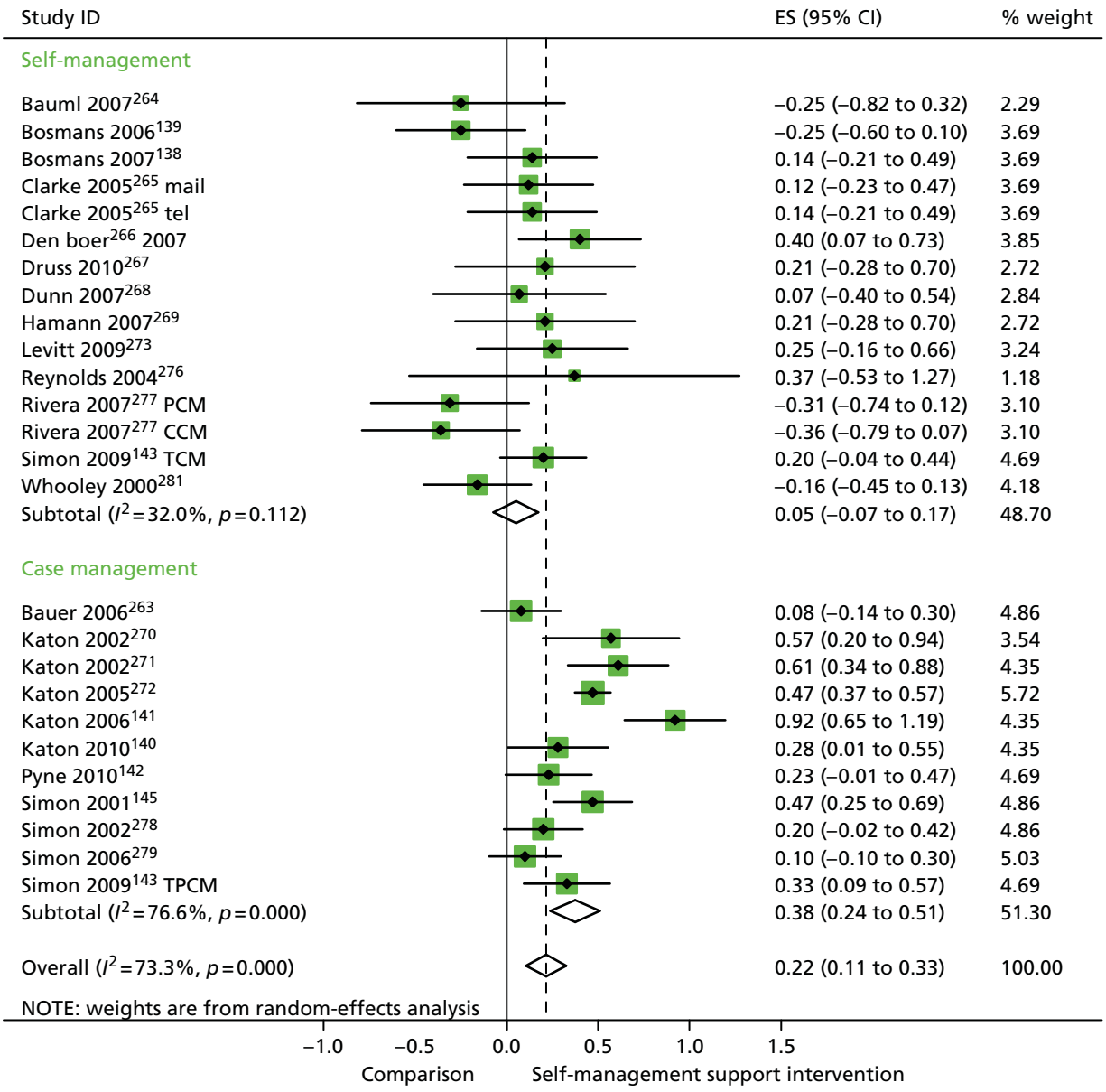

FIGURE 39 Forest plot: mental health (QoL). CCM, case management supported by a consumer; CI, confidence interval; ES, effect size; mail, internet self-help and mailed reminders; PCM, case management supported by a professional; TCM, telephone care management; tel, internet self-help and telephone reminders; TPCM, telephone psychotherapy and care management. Note: when studies are reported twice, this refers to different arms within the same study.

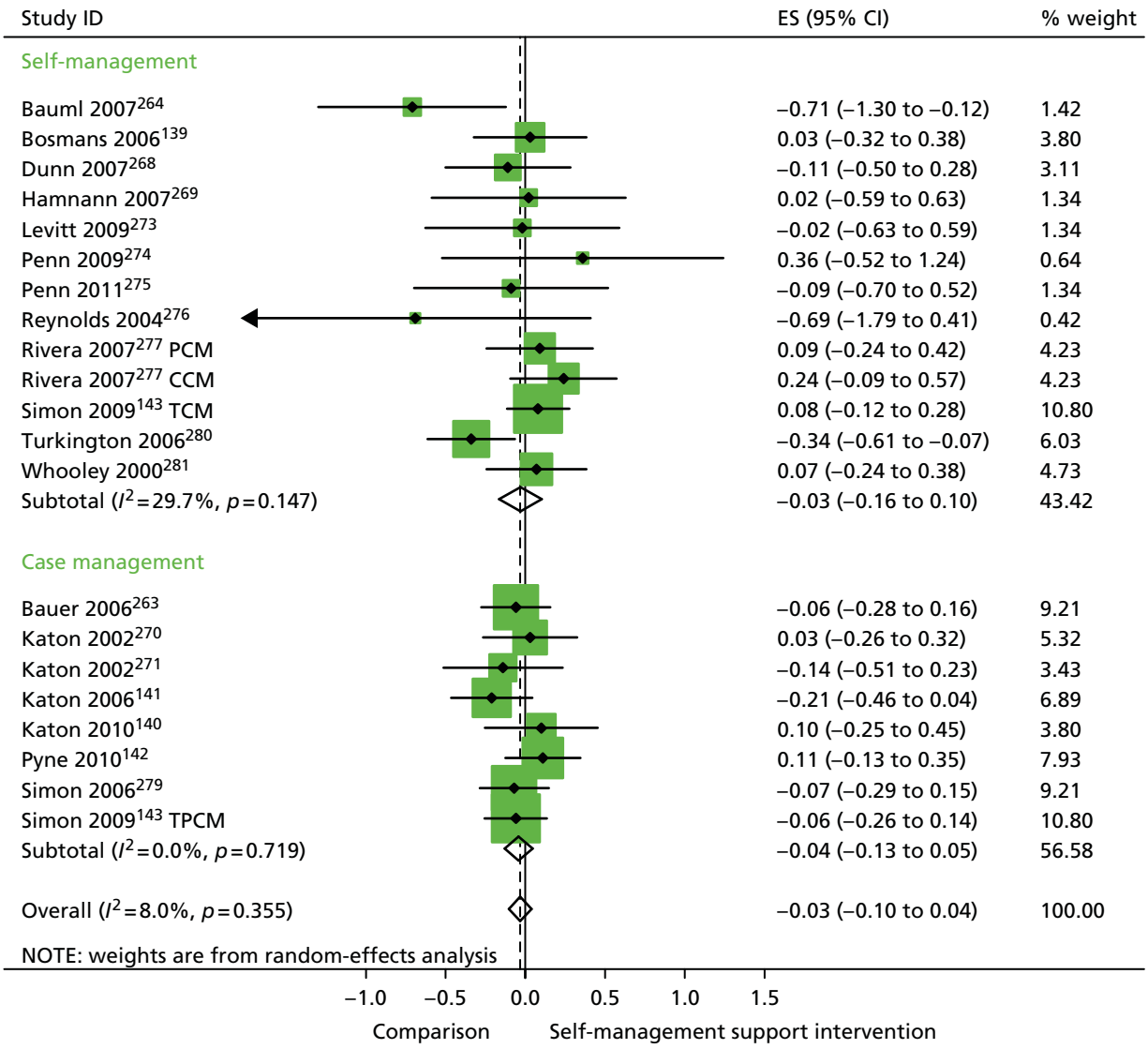

FIGURE 40 Forest plot: mental health (hospital use). CCM, case management supported by a consumer; CI, confidence interval; ES, effect size; PCM, case management supported by a professional; TCM, telephone care management; TPCM, telephone psychotherapy and care management. Note: when studies are reported twice, this refers to different arms within the same study.

In analyses including all studies, self-management support interventions for patients with mental health problems were associated with non-significant increases in costs. Variation across trials was low (*Figure 41*).

In analyses exploring the impact of different types of self-management support, there was evidence that 'case management' interventions produced significant improvements in QoL but no significant reductions in hospital use and costs. 'Self-management' interventions showed no significant improvements in QoL and no significant reductions in hospital use or costs.

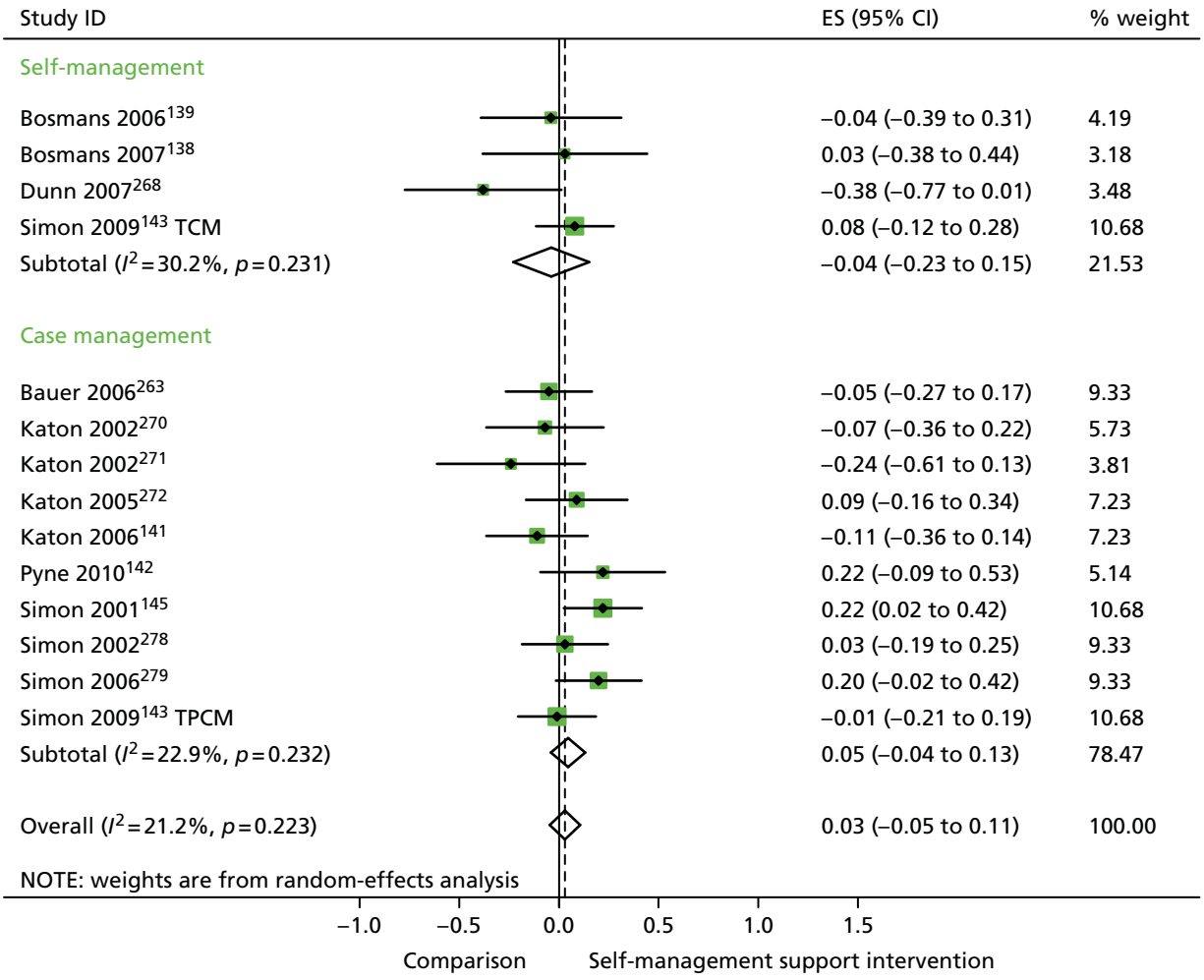

FIGURE 41 Forest plot: mental health (costs). CI, confidence interval; ES, effect size; TCM, telephone care management; TPCM, telephone psychotherapy and care management. Note: when studies are reported twice, this refers to different arms within the same study.

Analyses of studies for patients with mixed problems

The studies identified in mixed problems are detailed in *Figure 42*.[162,163,282–290]

Figures 43 and *44* show the permutation plots for patients with mixed problems.

Most studies were in the right quadrant of the plots, reporting improvements in QoL with no effect on utilisation or costs.

In analyses including all studies, self-management support interventions for patients with mixed problems were associated with small but significant improvements in QoL. Variation across trials was moderate (*Figure 45*).

In analyses including all studies, self-management support interventions for patients with mixed problems were associated with small but significant reductions in hospital use. Variation across trials was moderate (*Figure 46*).

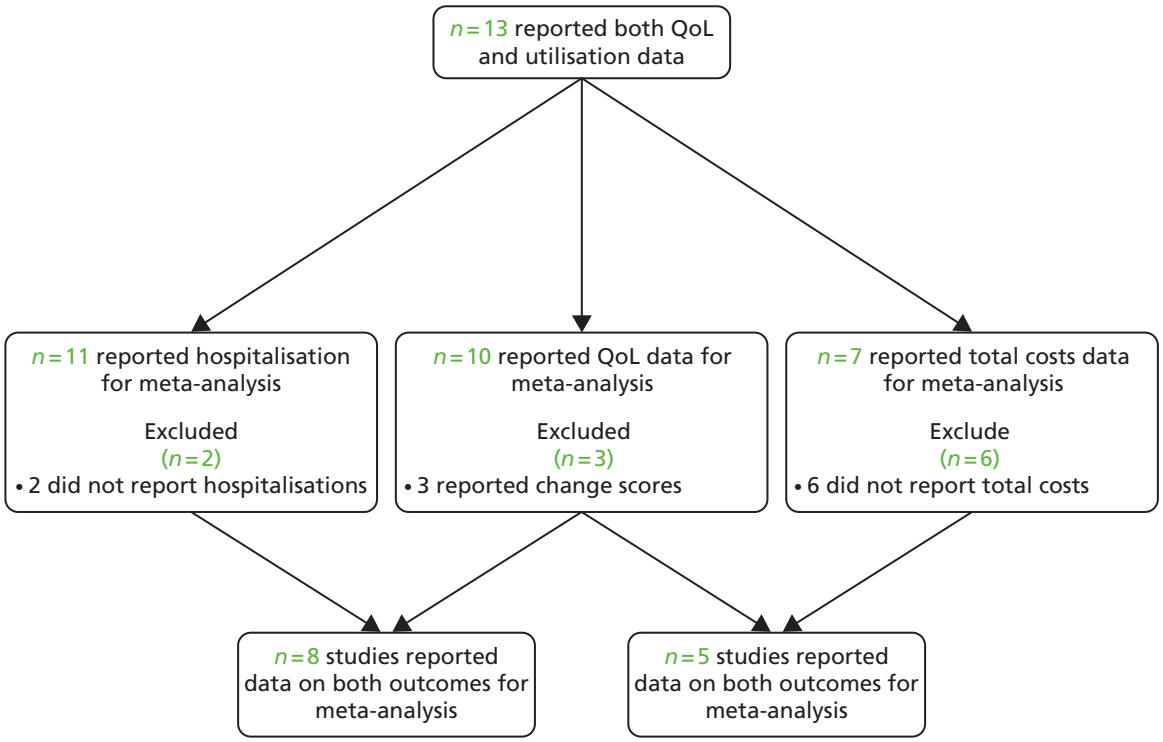

FIGURE 42 Flow chart of studies in patients with mixed problems.

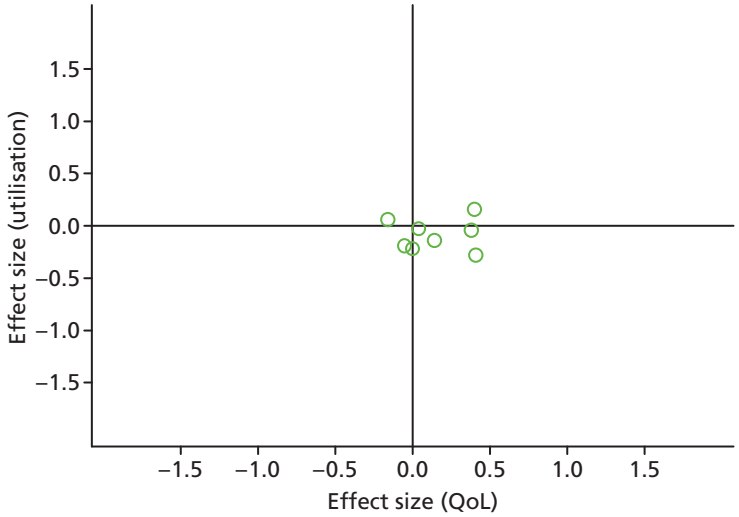

FIGURE 43 Permutation plot: mixed (hospital use and QoL).

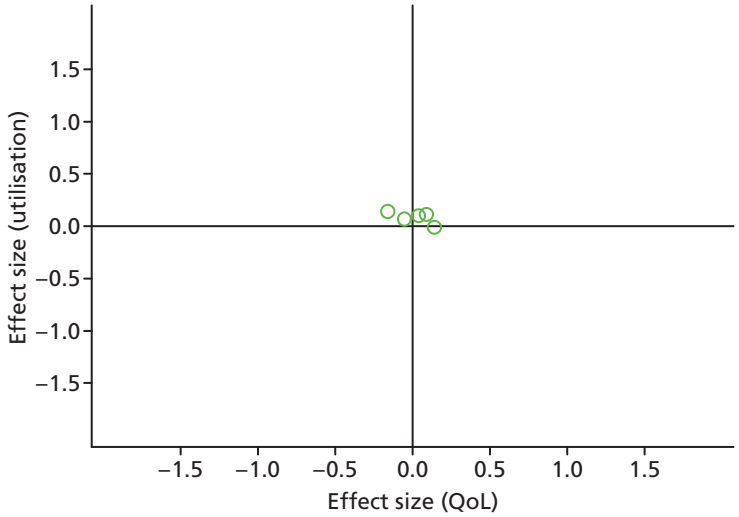

FIGURE 44 Permutation plot: mixed (total costs and QoL).

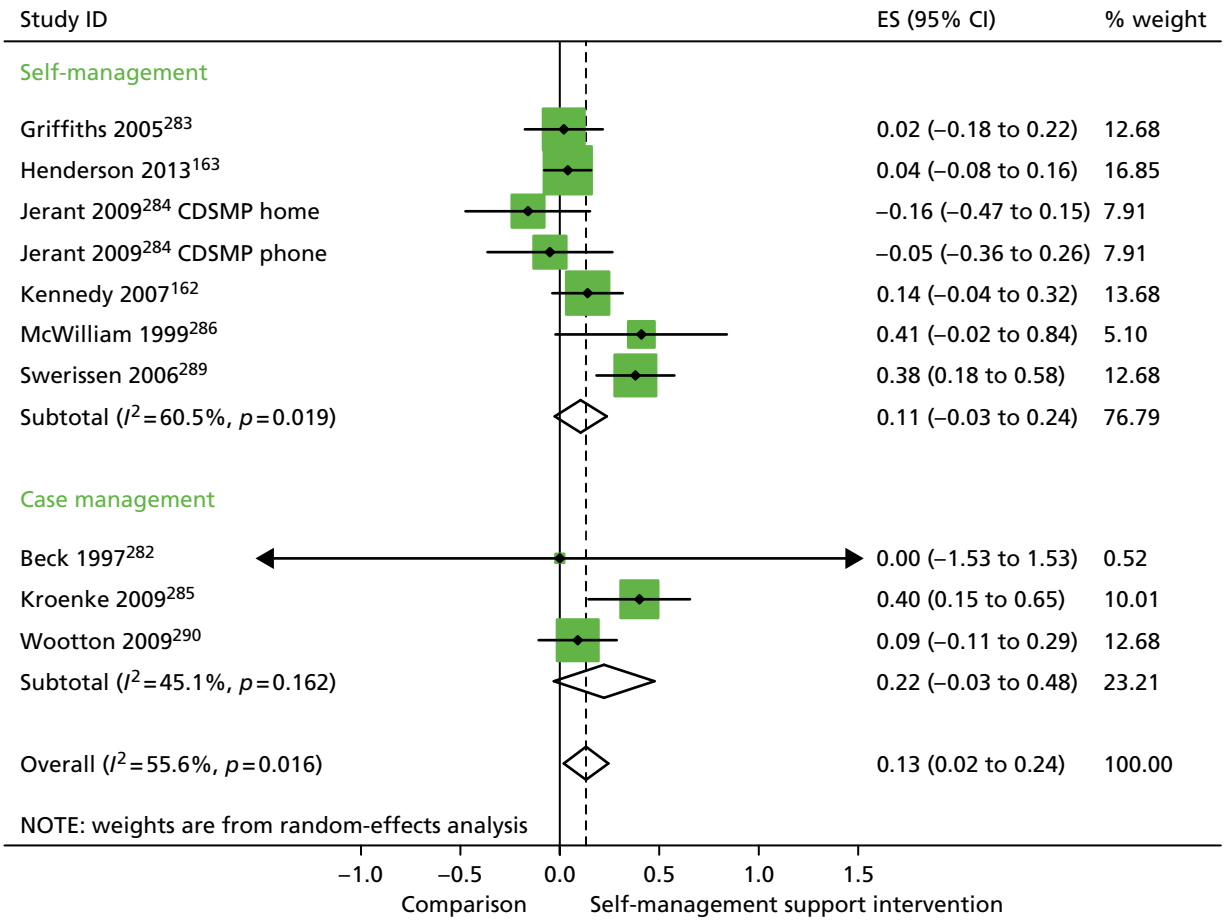

FIGURE 45 Forest plot: mixed (QoL). CDSMP home, peer-led, face-to-face CDSMP variant; CDSMP phone, telephone-based CDSMP variant; CI, confidence interval; ES, effect size. Note: when studies are reported twice, this refers to different arms within the same study.

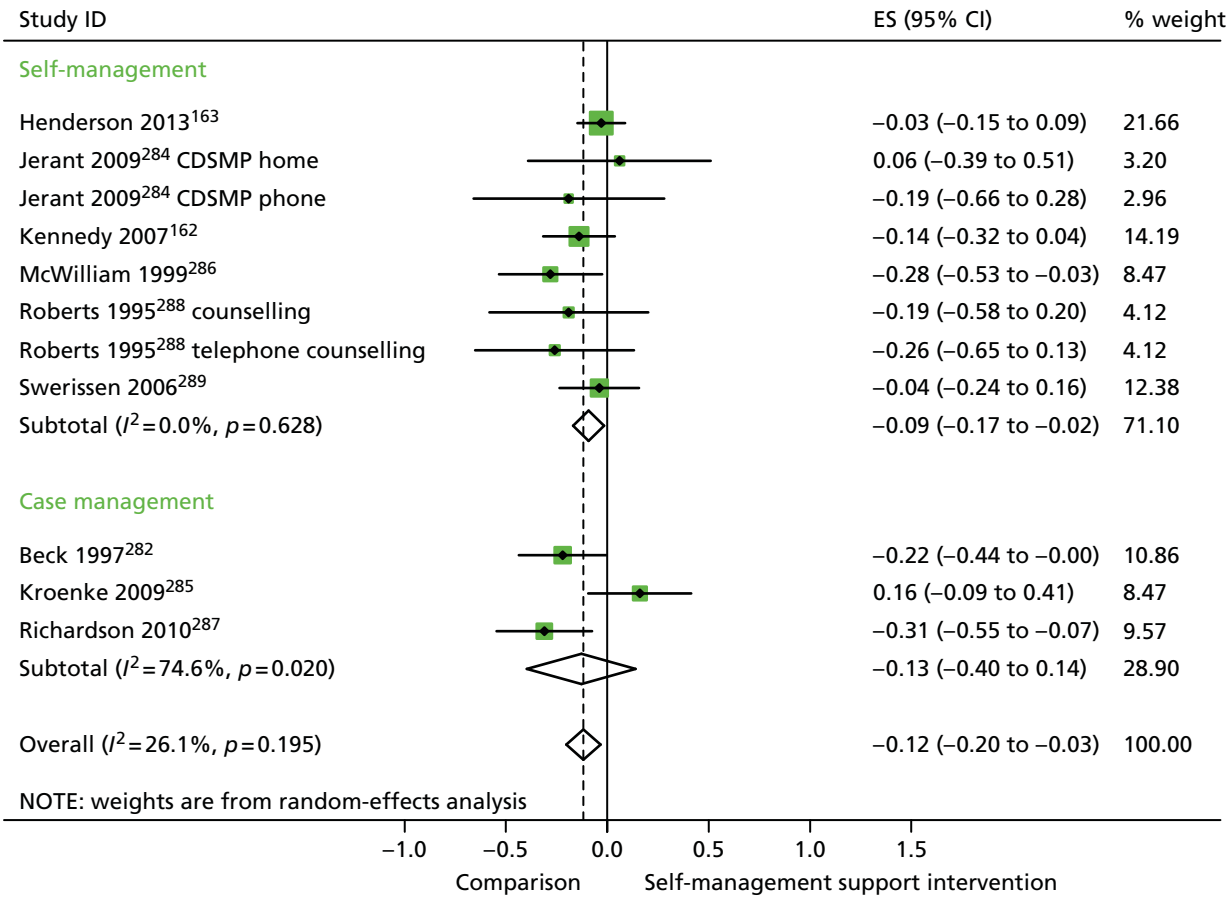

FIGURE 46 Forest plot: mixed (hospital use). Counselling, face-to-face counselling with a nurse; CDSMP home, peer-led, face-to-face CDSMP variant; CDSMP telephone, telephone-based CDSMP variant; CI, confidence interval; ES, effect size; telephone counselling, telephone counselling with a nurse. Note: when studies are reported twice, this refers to different arms within the same study.

In analyses including all studies, self-management support interventions for patients with mixed problems were associated with non-significant increases in costs. There was no significant variation across trials beyond that expected by chance (*Figure 47*).

In analyses exploring the impact of different types of self-management support, 'case management' interventions produced non-significant effects on QoL, hospital use and costs. 'Self-management' interventions showed non-significant improvements in QoL, small but significant reductions in hospital use and non-significant increases in costs.

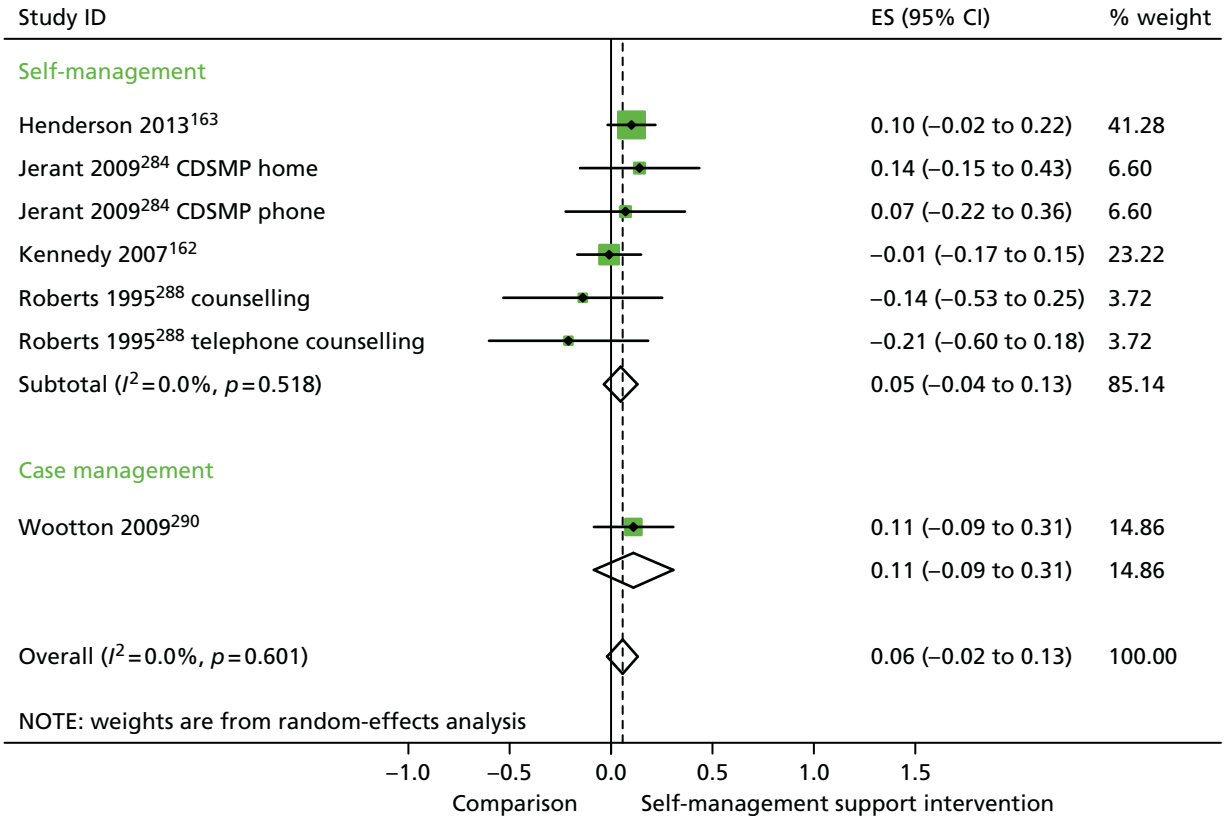

FIGURE 47 Forest plot: mixed (costs). Counselling, face-to face counselling with a nurse; CDSMP home, peer-led, face-to-face CDSMP variant; CDSMP telephone, telephone-based CDSMP variant; CI, confidence interval; ES, effect size; telephone counselling, telephone counselling with a nurse. Note: when studies are reported twice, this refers to different arms within the same study.

Analyses of studies for patients with long-term conditions in PRISMS cluster 1: long-term conditions with marked variability in symptoms over time (see *Table 1*)

Figures 48 and *49* show the permutation plots for patients in PRISMS cluster 1: long-term conditions with marked variability in symptoms over time.

Most studies were in the right quadrant of the plots, reporting improvements in QoL with mixed effects on utilisation or costs.

In analyses including all studies, self-management support interventions for patients with cluster 1 conditions were associated with small but significant improvements in QoL. Variation across trials was moderate (*Figure 50*).

In analyses including all studies, self-management support interventions for patients with cluster 1 conditions were associated with non-significant reductions in hospital use. Variation across trials was moderate (*Figure 51*).

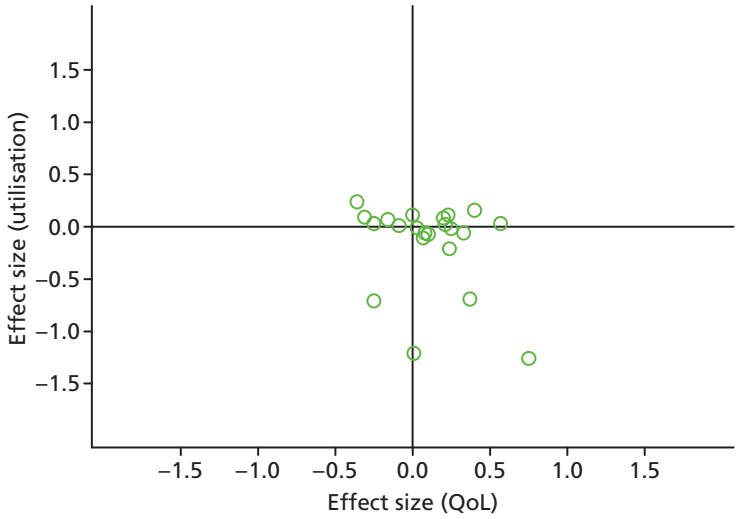

FIGURE 48 Permutation plot: PRISMS cluster 1 (hospital use and QoL).

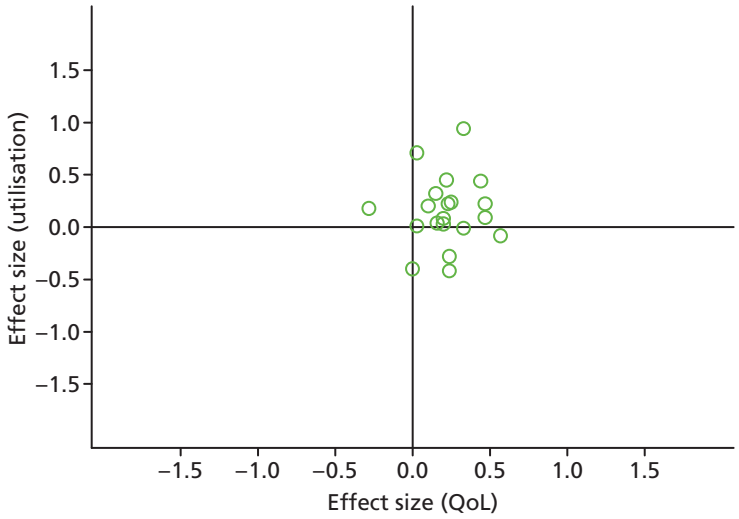

FIGURE 49 Permutation plot: PRISMS cluster 1 (total costs and QoL).

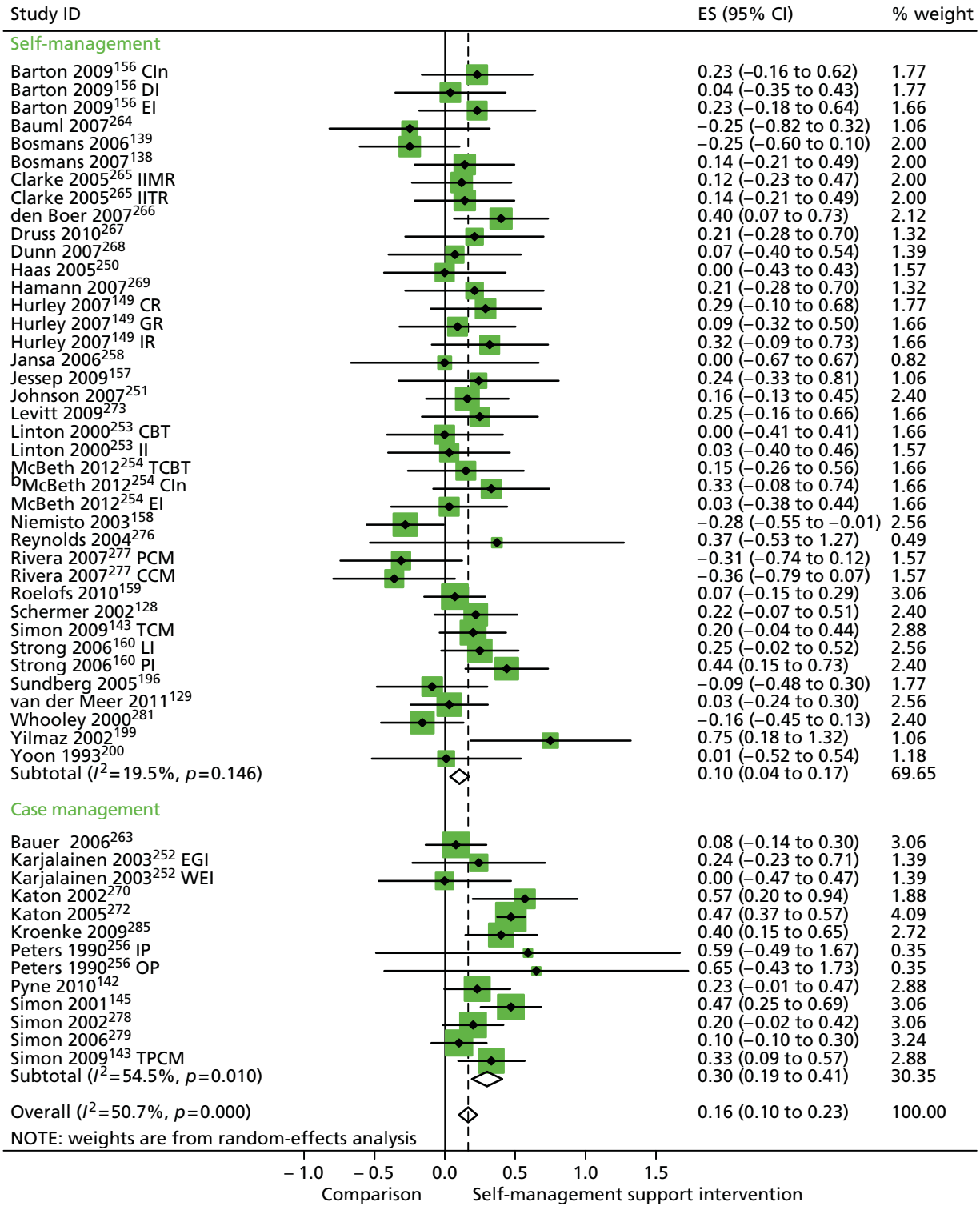

FIGURE 50 Forest plot: PRISMS cluster 1 (QoL). CBT, group cognitive–behavioural therapy intervention; CCM, case management supported by a consumer; CI, confidence interval; CIn, combined intervention; CR, combined (group and individual) rehabilitation; DI, dietary intervention; EGI, exercise and graded activity intervention; EI, exercise intervention; ES, effect size; GR, group rehabilitation; II, information-only intervention; IIMR, internet self-help intervention with mail reminders; IITR, internet self-help intervention with telephone reminders; IP, inpatient pain management programme; IR, individual rehabilitation; LI, lay-led self-care intervention; OP, outpatient pain management programme; PCM, case management supported by a professional; PI, psychologist-led self-care intervention; TCBT, telephone-delivered cognitive–behavioural therapy; TCM, telephone care management; TPCM, telephone psychotherapy and care management; WEI, work-based exercise and graded activity intervention. Note: when studies are reported twice, this refers to different arms within the same study.

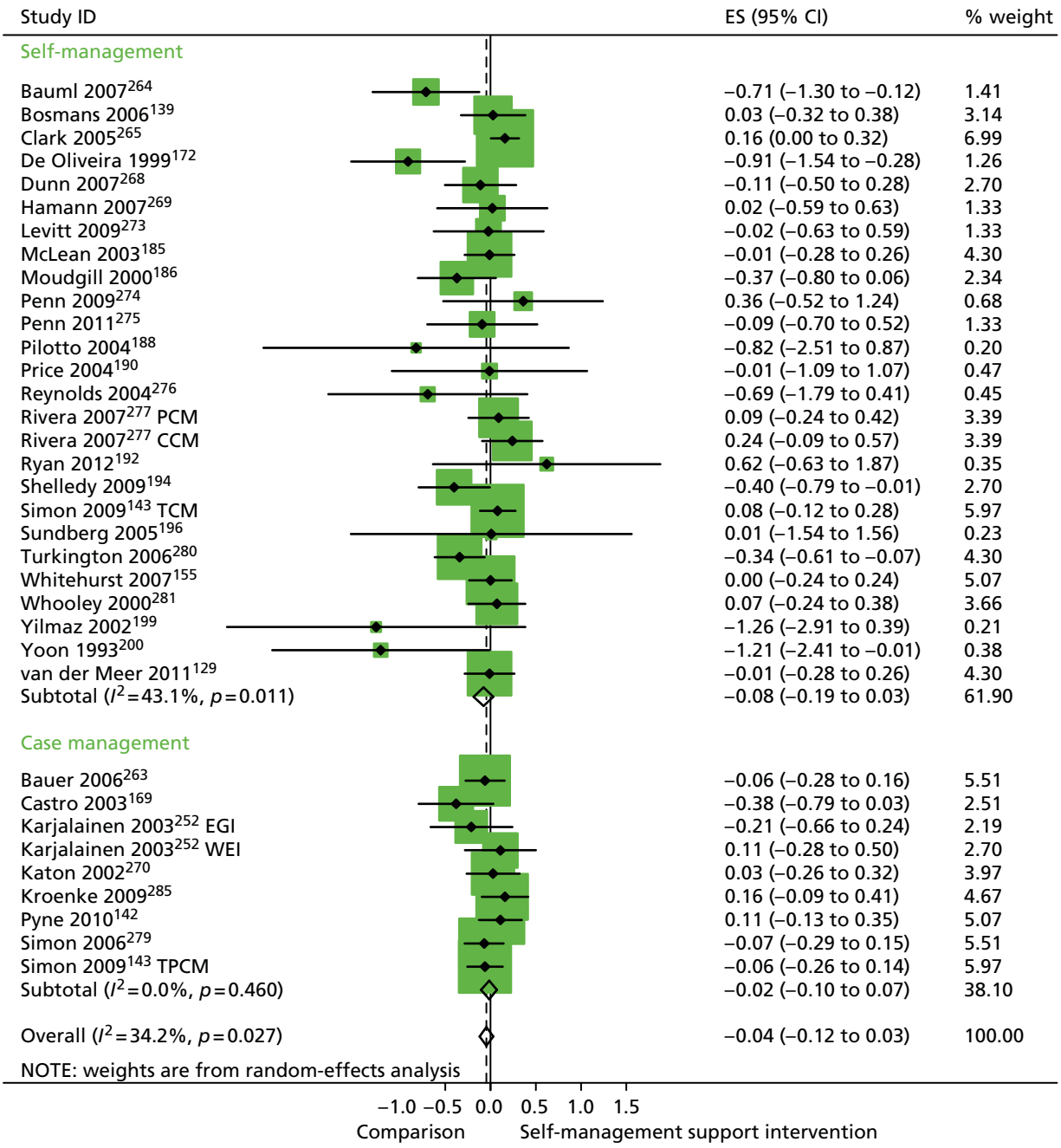

FIGURE 51 Forest plot: PRISMS cluster 1 (hospital use). CCM, case management supported by a consumer; CI, confidence interval; EGI, an exercise and graded activity intervention; ES, effect size; PCM, case management supported by a professional; TCM, telephone care management; TPCM, telephone psychotherapy and care management; WEI, work-based exercise and graded activity intervention. Note: when studies are reported twice, this refers to different arms within the same study.

In analyses including all studies, self-management support interventions for patients with cluster 1 conditions were associated with non-significant increases in costs. Variation across trials was moderate (*Figure 52*).

In analyses exploring the impact of different types of self-management support, 'case management' interventions produced small but significant improvements in QoL and had no significant effects in hospital use and costs. 'Self-management' interventions showed very small but significant improvements in QoL and no significant effects in hospital use or costs.

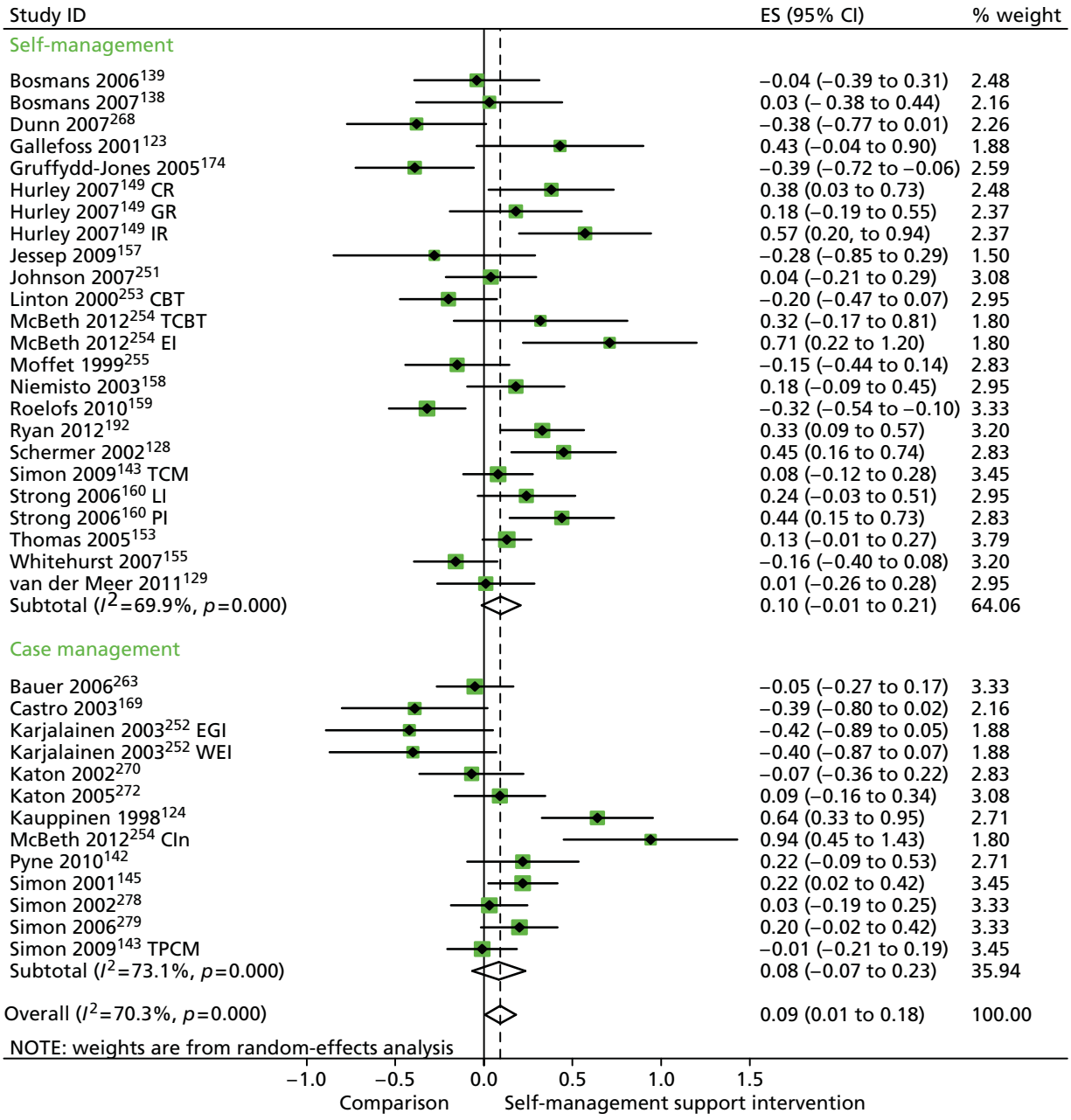

FIGURE 52 Forest plot: PRISMS cluster 1 (costs). CBT, group cognitive–behavioural therapy intervention; CI, confidence interval; CIn, combined (telephone-delivered cognitive–behavioural therapy and exercise) intervention; CR, combined (group and individual) rehabilitation; EGI, exercise and graded activity intervention; EI, exercise intervention; ES, effect size; GR, group rehabilitation; IR, individual rehabilitation; LI, lay-led self-care intervention; PI, psychologist-led self-care intervention; TCBT, telephone-delivered cognitive–behavioural therapy; TCM, telephone care management; TPCM, telephone psychotherapy and care management; WEI, work-based exercise and graded activity intervention. Note: when studies are reported twice, this refers to different arms within the same study.

Analyses of studies for patients with long-term conditions in PRISMS cluster 3: ongoing long-term conditions with exacerbations (see *Figure 4*)

Figures 53 and *54* show the permutation plots for patients in PRISMS cluster 3: ongoing long-term conditions with exacerbations.

Most studies were in the bottom right quadrant of the plots, reporting improvements in QoL with reductions in utilisation or costs.

In analyses including all studies, self-management support interventions for patients with cluster 3 conditions were associated with small but significant improvements in QoL. Variation across trials was moderate (*Figure 55*).

In analyses including all studies, self-management support interventions for patients with cluster 3 conditions were associated with small but significant reductions in hospital use. Variation across trials was moderate (*Figure 56*).

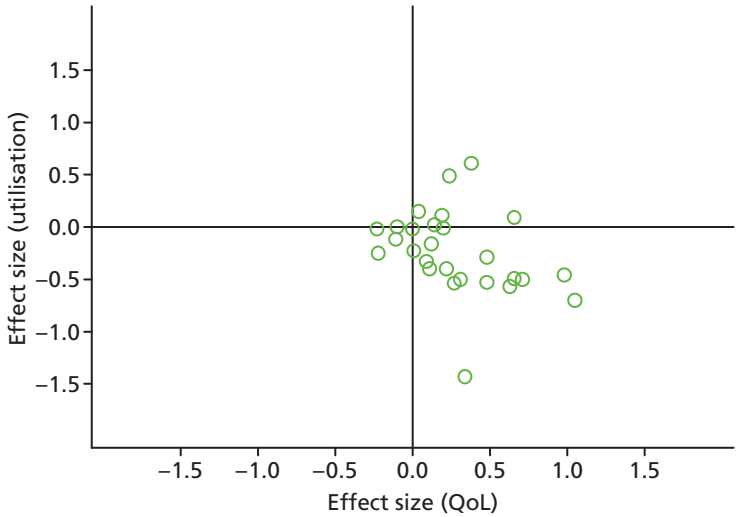

FIGURE 53 Permutation plot: PRISMS cluster 3 (hospital use and QoL).

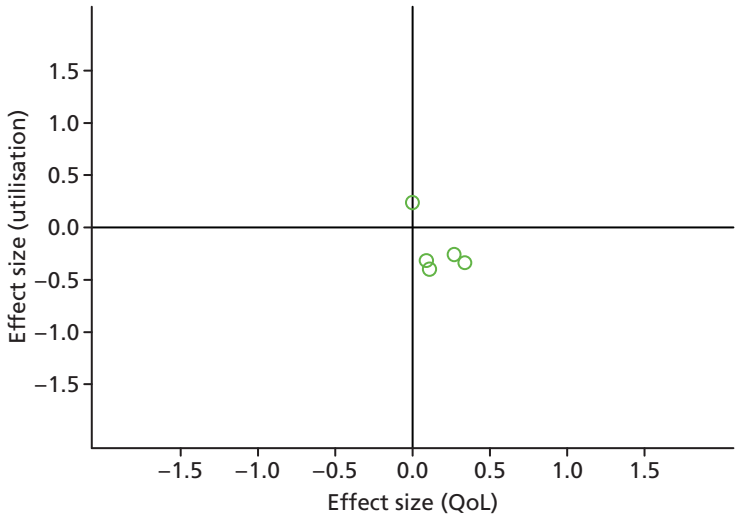

FIGURE 54 Permutation plot: PRISMS cluster 3 (total costs and QoL).

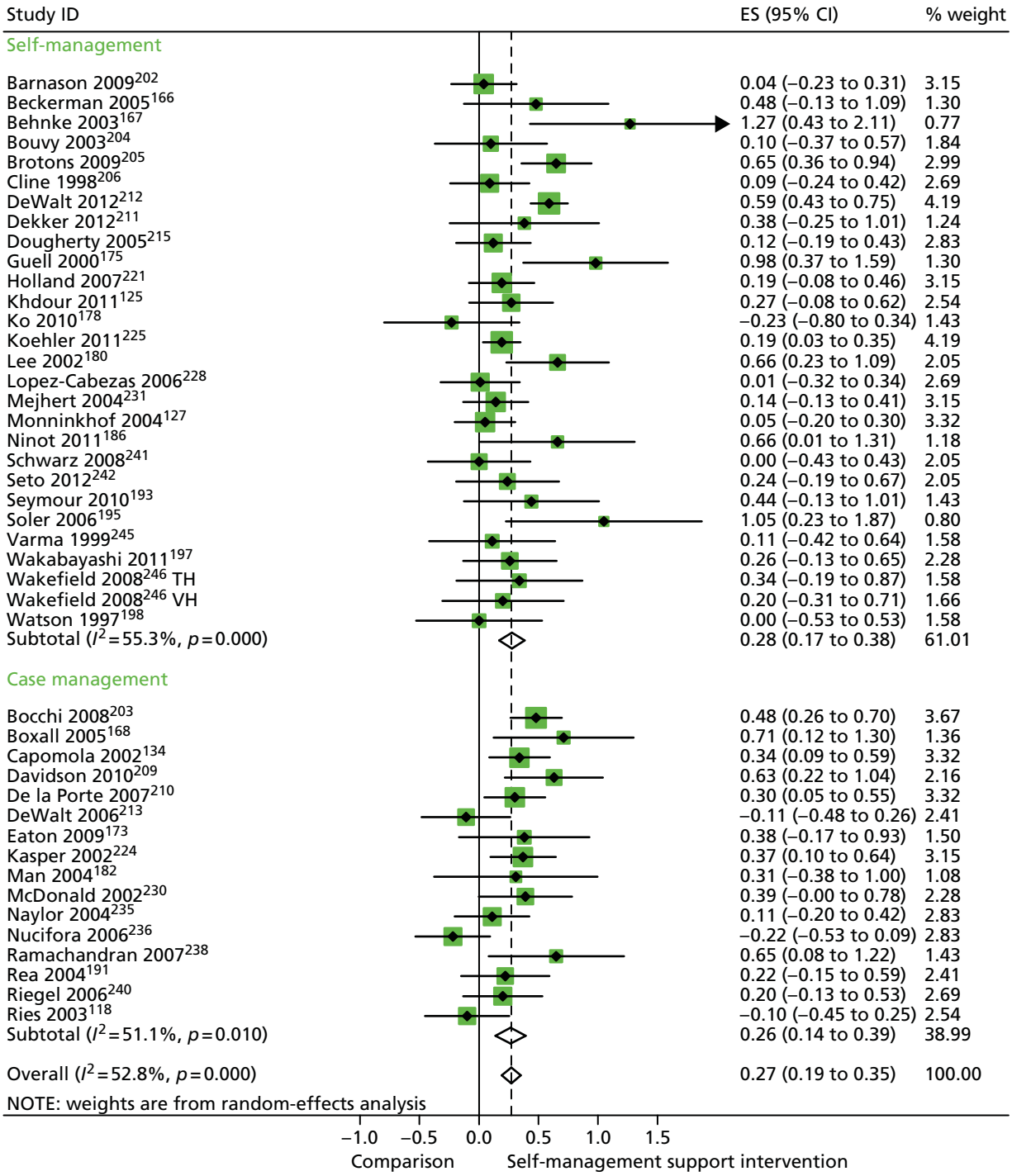

FIGURE 55 Forest plot: PRISMS cluster 3 (QoL). CI, confidence interval; ES, effect size; TH, telehealth post-discharge support; VH, video health post-discharge support. Note: when studies are reported twice, this refers to different arms within the same study.

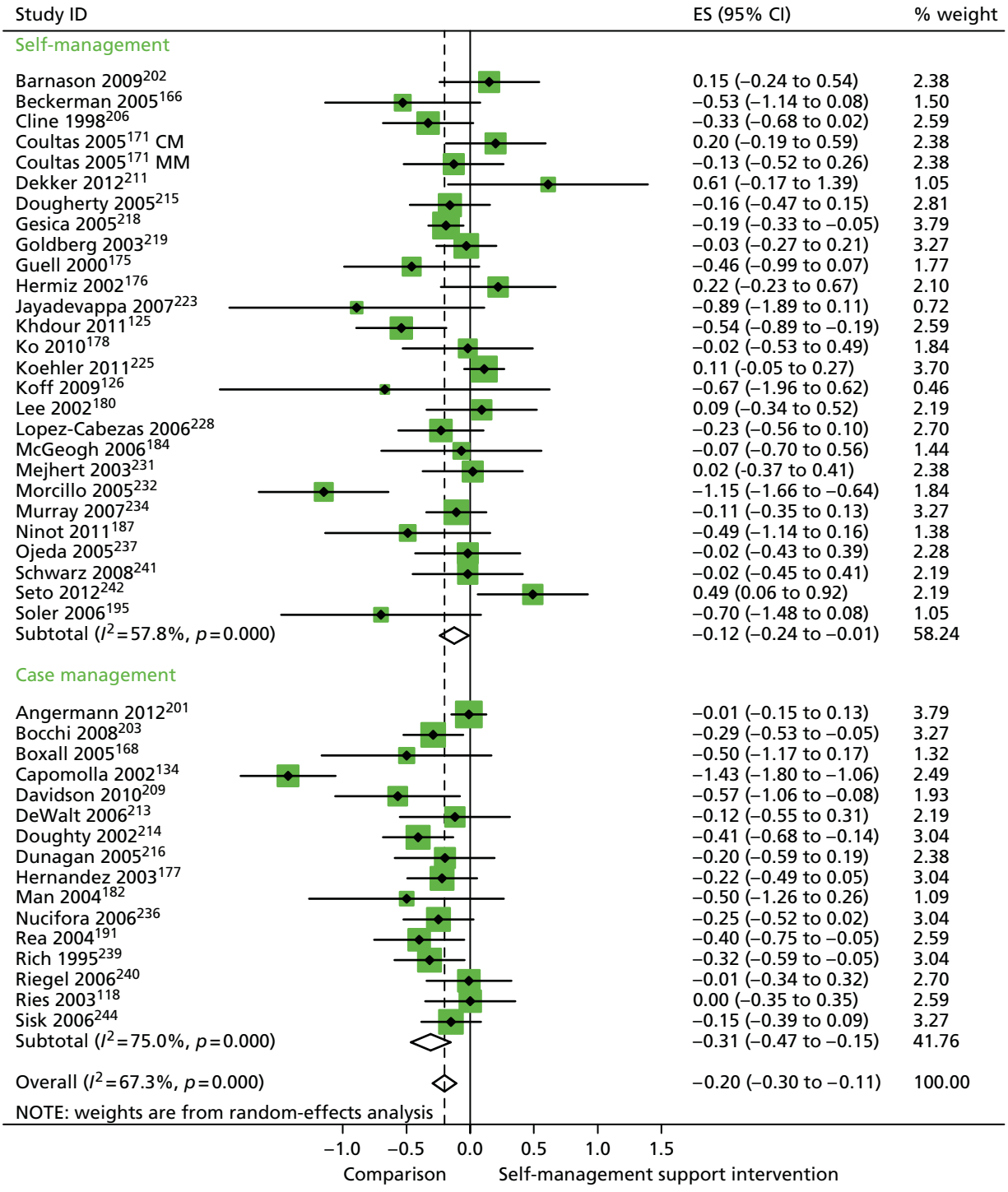

FIGURE 56 Forest plot: PRISMS cluster 3 (hospital use). CI, confidence interval; CM, nurse-assisted collaborative management; ES, effect size; MM, nurse-assisted medical management. Note: when studies are reported twice, this refers to different arms within the same study.

In analyses including all studies, self-management support interventions for patients with cluster 3 conditions were associated with small but significant reductions in costs. Variation across trials was moderate (*Figure 57*).

In analyses exploring the impact of different types of self-management support, there was evidence that 'case management' interventions produced small but significant improvements in QoL and small but significant reductions in hospital use and costs. 'Self-management' interventions showed small but significant improvements in QoL and reductions in hospital use but no significant reductions in costs.

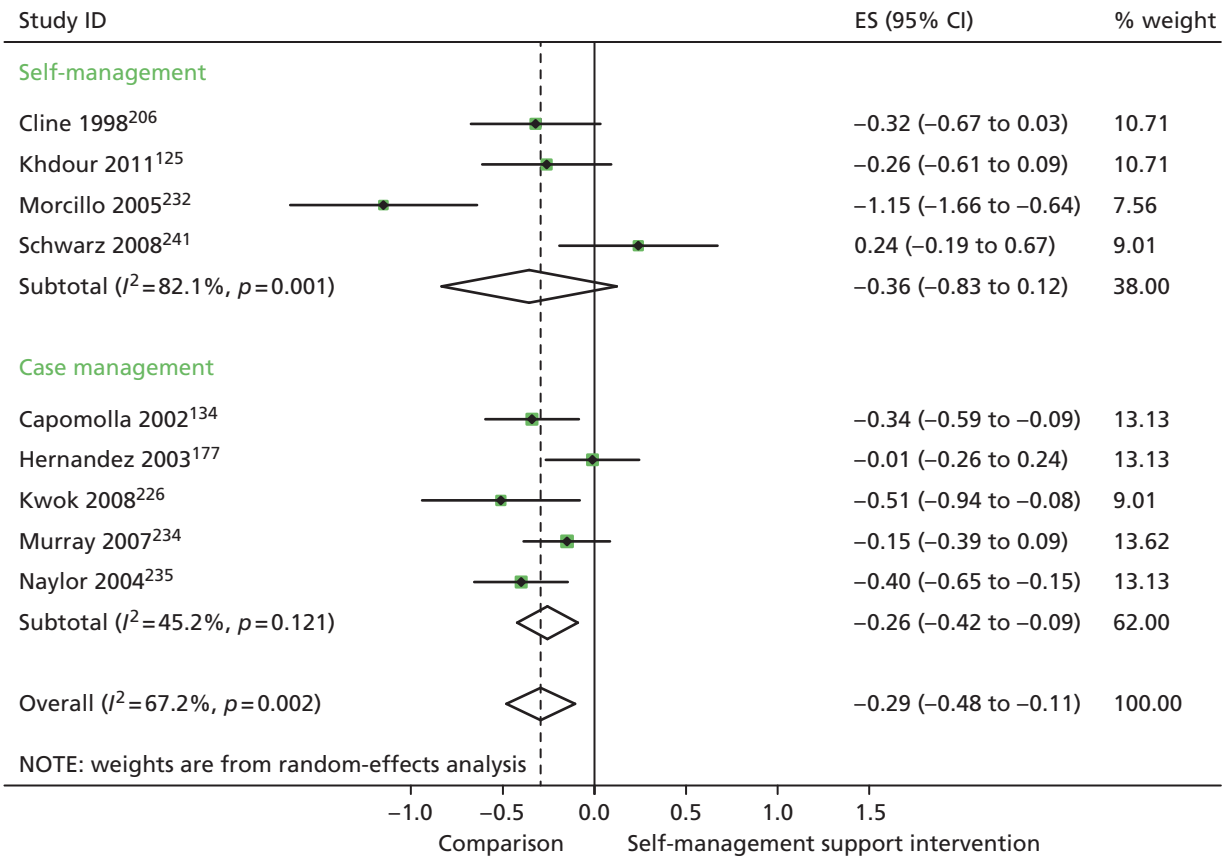

FIGURE 57 Forest plot: PRISMS cluster 3 (costs). CI, confidence interval; ES, effect size.

Summary of the results

The core results are summarised in *Tables 5–7*.

Table 5 shows the impact of self-management support on hospital use and QoL. Results are highlighted in the table that show an effect size of 0.2 (at least a 'small' effect by current convention), for which the effect is statistically significant. As can be seen from *Table 5*, such impacts are found in a number of cells in relation to QoL, but are restricted to interventions in respiratory and cardiovascular populations in relation to hospital use.

Table 6 is structured in the same way, but details the impact of self-management support on costs and QoL. Significant reductions in costs are found only in relation to cardiovascular problems overall, and in case management interventions in cardiovascular, pain and arthritis problems.

It should be noted that some of the differences between *Tables 5* and *6* reflect changes in the number of studies included in the analysis and associated precision of the estimates.

Table 7 represents a sensitivity analyses, testing whether or not the broad results in *Tables 5* and *6* endure when analyses are restricted to studies which report both QoL and utilisation/cost data. The results were very similar, suggesting that the main analyses were robust.

Study outcomes and risk of bias

Table 8 shows the effects of self-management support on the three core outcomes, grouped according to our risk of bias measure (based on reported allocation concealment). Studies judged at high risk of bias reported better effects on QoL and greater reductions in hospitalisation and costs than those judged at low risk of bias, although they were also associated with increases in total costs.

TABLE 5 Summary: hospital use. Shaded cells have an effect size of ≥ 0.2 and are statistically significant

Condition	Combined QoL, overall ES (95% CI, *n*, I^2)	Self-management QoL, overall ES (95% CI, *n*, I^2)	Case management QoL, overall ES (95% CI, *n*, I^2)	Combined hospital use, overall ES (95% CI, *n*, I^2)	Self-management hospital use, overall ES (95% CI, *n*, I^2)	Case management hospital use, overall ES (95% CI, *n*, I^2)
Respiratory	0.27 (0.16 to 0.37, 34, moderate)	0.28 (0.16 to 0.41, 27, moderate)	0.19 (0.02 to 0.36, 7, low)	–0.21 (–0.32 to –0.09, 31, moderate)	–0.19 (–0.33 to –0.05, 25, moderate)	–0.26 (–0.42 to –0.10, 6, zero)
Cardiac	0.21 (0.14 to 0.28, 40, moderate)	0.19 (0.10 to 0.27, 27, moderate)	0.26 (0.12 to 0.39, 13, moderate)	–0.23 (–0.34 to –0.13, 38, high)	–0.20 (–0.33 to –0.07, 25, high)	–0.29 (–0.47 to –0.11, 13, high)
Arthritis	0.16 (0.07 to 0.26, 11, zero)	0.17 (0.07 to 0.27, 7, zero)	0.13 (–0.13 to 0.39, 4, zero)	–0.06 (–0.22 to 0.10, 6, moderate)	–0.02 (–0.19 to 0.16, 5, moderate)	–0.24 (–0.48 to 0.00, 1, N/A)
Pain	0.13 (0.04 to 0.21, 19, low)	0.12 (0.02 to 0.22, 15, low)	0.20 (–0.10 to 0.50, 4, zero)	–0.03 (–0.34 to 0.28, 3, low)	No data reported	–0.03 (–0.34 to 0.28, 3, low)
Diabetes	0.44 (0.14 to 0.75, 10, high)	0.44 (0.14 to 0.75, 10, high)	No data reported	–0.12 (–0.29 to 0.05, 5, moderate)	–0.12 (–0.29 to 0.05 5, moderate)	No data reported
Mental health	0.22 (0.11 to 0.33, 26, high)	0.05 (–0.07 to 0.17, 15, moderate)	0.38 (0.24 to 0.51, 11, high)	–0.03 (–0.10 to 0.04, 21, low)	–0.03 (–0.16 to 0.10, 13, moderate)	–0.04 (–0.13 to 0.05, 8, zero)
Mixed	0.13 (0.02 to 0.24, 10, moderate)	0.11 (–0.03 to 0.24, 7, moderate)	0.22 (–0.03 to 0.48, 3, moderate)	–0.12 (–0.20 to –0.03, 11, moderate)	–0.09 (–0.17 to –0.02, 8, zero)	–0.13 (–0.40 to 0.14, 3, moderate)

CI, confidence interval; ES, effect size; N/A, not applicable.

TABLE 6 Summary: costs. Shaded cells have an effect size of ≥ 0.2 and are statistically significant

	Combined QoL, overall ES (95% CI, *n*, I^2)	Self-management QoL, overall ES (95% CI, *n*, I^2)	Case management QoL, overall ES (95% CI, *n*, I^2)	Combined costs, overall ES (95% CI, *n*, I^2)	Self-management costs, overall ES (95% CI, *n*, I^2)	Case management costs, overall ES (95% CI, *n*, I^2)
Respiratory	0.27 (0.16 to 0.37, 34, moderate)	0.28 (0.16 to 0.41, 27, moderate)	0.19 (0.02 to 0.36, 7, low)	0.09 (–0.14 to 0.33, 9, high)	0.09 (–0.19 to 0.37, 6, high)	0.09 (–0.46 to 0.64, 3, high)
Cardiac	0.21 (0.14 to 0.28, 40, moderate)	0.19 (0.11 to 0.27, 27, moderate)	0.26 (0.12 to 0.39, 13, moderate)	–0.25 (–0.47 to –0.04, 9, moderate)	–0.25 (–0.82 to 0.32, 4, high)	–0.27 (–0.44 to –0.10, 5, moderate)
Arthritis	0.16 (0.07 to 0.26, 11, zero)	0.17 (0.07 to 0.27, 7, zero)	0.13 (–0.13 to 0.39, 4, zero)	0.07 (–0.07 to 0.20, 11, moderate)	0.14 (0.01 to 0.27, 8, moderate)	–0.28 (–0.53 to –0.03, 3, zero)
Pain	0.13 (0.04 to 0.21, 19, zero)	0.12 (0.02 to 0.22, 15, low)	0.20 (–0.11 to 0.51, 4, zero)	0.07 (–0.13 to 0.28, 13, high)	0.15 (–0.06 to 0.36, 11, high)	–0.41 (–0.74 to –0.08), 2, zero)
Diabetes	0.44 (0.14 to 0.75, 10, high)	0.44 (0.14 to 0.75, 10, high)	No data reported	0.19 (–0.18 to 0.55, 4, moderate)	0.19 (–0.18 to 0.55, 4, moderate)	No data reported
Mental health	0.22 (0.11 to 0.33, 26, high)	0.05 (–0.07 to 0.17, 15, moderate)	0.38 (0.24 to 0.51, 11, high)	0.03 (–0.05 to 0.11, 14, low)	–0.04 (–0.23 to 0.15, 4, moderate)	0.05 (–0.04 to 0.13, 10, low)
Mixed	0.13 (0.02 to 0.24, 10, moderate)	0.11 (–0.03 to 0.24, 7, moderate)	0.22 (–0.03 to 0.48, 3, low)	0.06 (–0.02 to 0.13, 7, zero)	0.05 (–0.04 to 0.13, 6, zero)	0.11 (–0.09 to 0.31, 1, N/A)

CI, confidence interval; ES, effect size; N/A, not applicable.

TABLE 7 Outcomes in all studies and those reporting both outcomes

Disease, outcome, analysis	Combined QoL, overall ES (95% CI, *n*, I^2)	Self-management QoL, overall ES (95% CI, *n*, I^2)	Case management QoL, overall ES (95% CI, *n*, I^2)	Combined utilisation, overall ES (95% CI, *n*, I^2)	Self-management utilisation, overall ES (95% CI, *n*, I^2)	Case management utilisation, overall ES (95% CI, *n*, I^2)
Respiratory, hospital use, all	0.27 (0.16 to 0.37, 34, moderate)	0.28 (0.16 to 0.41, 27, moderate)	0.19 (0.02 to 0.36, 7, low)	–0.21 (–0.32 to –0.09, 31, moderate)	–0.19 (–0.33 to –0.05, 25, moderate)	–0.26 (–0.42 to –0.10, 6, zero)
Respiratory, hospital use, both	0.28 (0.14 to 0.43, 22, moderate)	0.31 (0.14 to 0.48, 17, high)	0.18 (–0.07 to 0.43, 5, moderate)	–0.26 (–0.41 to –0.11, 22, moderate)	–0.25 (–0.44 to –0.07, 17, moderate)	–0.29 (–0.48 to –0.09, 5, zero)
Cardiac, hospital use, all	0.21 (0.14 to 0.28, 40, moderate)	0.19 (0.10 to 0.27, 27, moderate)	0.26 (0.12 to 0.39, 13, moderate)	–0.23 (–0.34 to –0.13, 38, high)	–0.20 (–0.33 to –0.07, 25, high)	–0.29 (–0.47 to –0.11, 13, high)
Cardiac, hospital use, both	0.17 (0.08 to 0.26, 26, moderate)	0.15 (0.06 to 0.23, 18, low)	0.21 (0.00 to 0.41, 8, moderate)	–0.23 (–0.38 to –0.08, 26, high)	–0.18 (–0.35 to 0.00, 18, high)	–0.36 (–0.66 to –0.05, 8, high)
Pain, costs, all	0.13 (0.04 to 0.21, 19, zero)	0.12 (0.02 to 0.22, 15, low)	0.20 (–0.11 to 0.50, 4, zero)	0.07 (–0.13 to 0.28, 13, high)	0.15 (–0.06 to 0.36, 11, high)	–0.41 (–0.74 to –0.08, 2, zero)
Pain, costs, both	0.13 (0.00 to 0.25, 12, moderate)	0.13 (–0.01 to 0.27, 10, moderate)	0.12 (–0.21 to 0.45, 2, zero)	0.10 (–0.12 to 0.31, 12, high)	0.18 (–0.05 to 0.41, 10, high)	–0.41 (–0.74 to –0.08, 2, high)
Mental health, hospital use, all	0.22 (0.11 to 0.33, 26, high)	0.05 (–0.07 to 0.17, 15, moderate)	0.38 (0.24 to 0.51, 11, high)	–0.03 (–0.10 to 0.04, 21, low)	–0.03 (–0.16 to 0.10, 13, moderate)	–0.04 (–0.13 to 0.05, 8, zero)
Mental health, hospital use, both	0.18 (0.02 to 0.33, 18, high)	–0.04 (–0.20 to 0.12, 10, moderate)	0.38 (0.18 to 0.57, 8, high)	–0.01 (–0.08, 0.06, 18, zero)	0.03 (–0.10 to 0.15, 10, low)	–0.04 (–0.13 to 0.05, 8, zero)

CI, confidence interval; ES, effect size.

TABLE 8 Overall effects by risk of bias

Outcome	Overall effect size (I^2, 95% CI)	Effect size (high risk of bias) (I^2, 95% CI)	Effect size (low risk of bias) (I^2, 95% CI)
QoL	0.22 (0.17 to 0.26)	0.23 (0.18 to 0.29)	0.18 (0.12 to 0.25)
Hospital use	–0.16 (–0.20 to –0.11)	–0.18 (–0.24 to –0.11)	–0.10 (–0.16 to –0.04)
Costs	0.02 (–0.05 to 0.08)	0.07 (–0.05 to 0.18)	–0.01 (–0.09 to –0.07)

CI, confidence interval.

Small-study bias

The funnel plot for the studies reporting QoL outcomes is presented in *Figure 58*. The plot was symmetrical and the regression statistics did not show evidence of small-study bias [intercept 0.47, 95% confidence interval (CI) –0.16 to 1.10; $p = 0.14$].

The funnel plot for the studies reporting hospital use outcomes is presented in *Figure 59*. The plot was not symmetrical and the regression statistics showed evidence of small-study bias (intercept –0.91, 95% CI –1.55 to –0.27; $p = 0.01$).

The funnel plot for the studies reporting costs is presented in *Figure 60*. The plot was symmetrical and the regression statistics did not show evidence of small-study bias (intercept –0.46, 95% CI –1.71 to 0.79; $p = 0.47$).

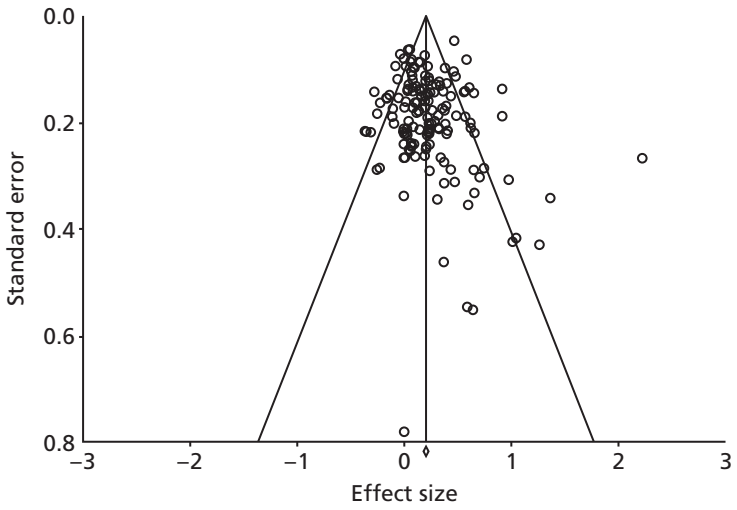

FIGURE 58 Funnel plot: QoL.

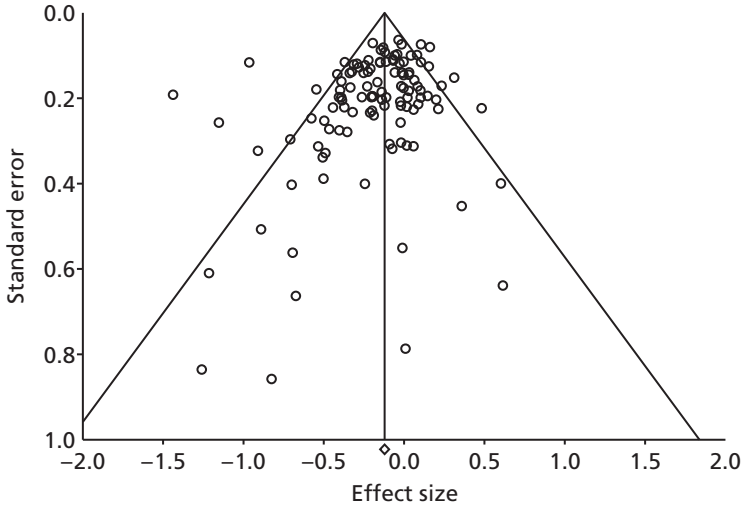

FIGURE 59 Funnel plot: hospital use.

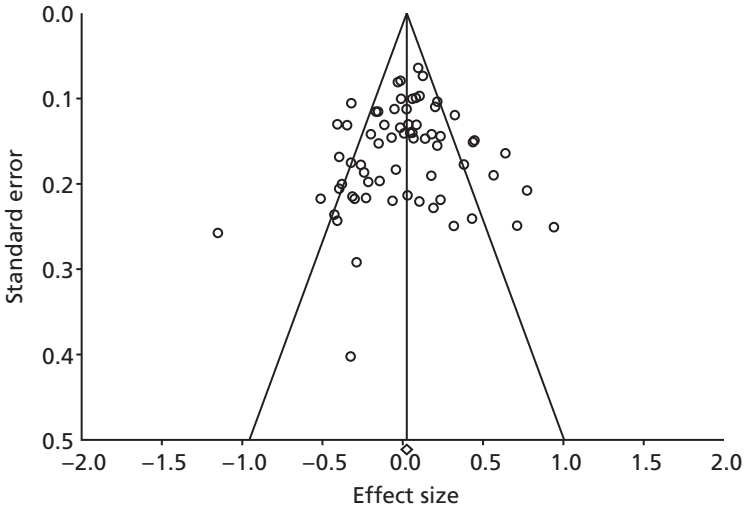

FIGURE 60 Funnel plot: total costs.

External validity and reach

The degree to which the results of a trial conducted in a particular setting can be generalised to a different setting (that is the external validity) is always an issue in the interpretation of findings of systematic reviews. The impact of variation in context may be greater when considering complex service-related interventions that are designed to impact on individual behaviour, or when the focus is on utilisation outcomes that may themselves reflect important differences in the context in which the study is run.

To explore this issue, we calculated a permutation plot for the hospitalisation data, identifying UK studies in the plot to assess whether the pattern of results was different. The plot is shown in *Figure 61*.

The comparison is somewhat crude, as there may be similarities in the systems of care between the UK and other countries (e.g. the Dutch health-care system is similar in having a strong primary care focus). Nevertheless, there was no strong evidence from the plot that the pattern of findings about the relationship between QoL outcomes and utilisation was markedly different in UK studies from the wider international literature.

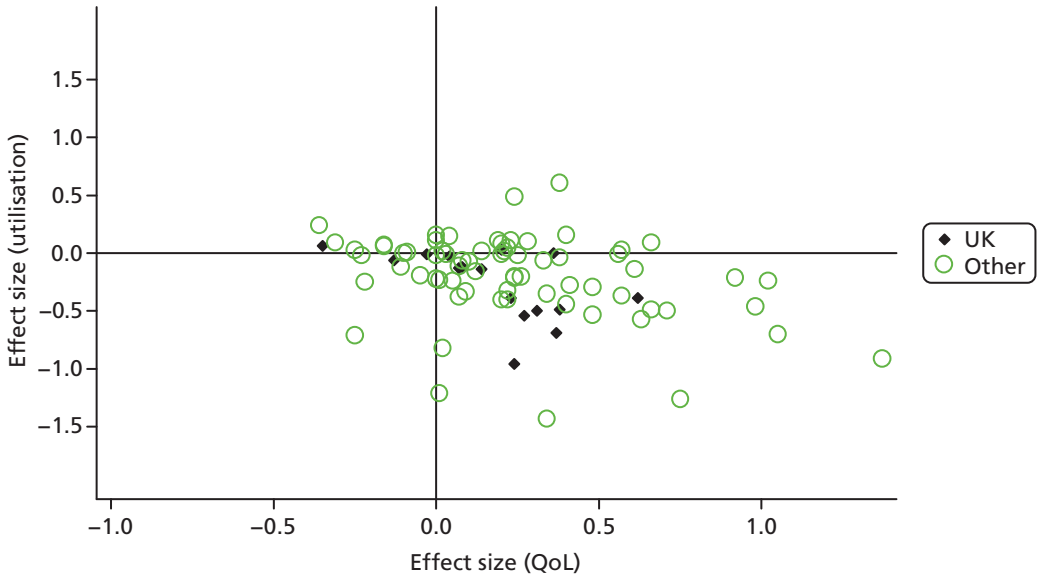

FIGURE 61 Permutation plot: hospitalisation (UK vs. other studies).

We also calculated the overall effect sizes for QoL, hospitalisation and total costs by country, to assess whether or not the effect of self-management interventions on these individual outcomes varied markedly in UK and non-UK settings. The results are shown in *Table 9*.

The results suggest that studies in the UK demonstrated smaller effects on QoL. Conversely, studies in the UK demonstrated larger reductions in hospitalisation, but those were not matched by cost data, for which UK studies showed a moderate increase in overall costs. It should be noted that these differences are associations only and may reflect other differences in studies conducted in the UK, other than the context.

The original study protocol sought to assess studies according to the Reach Effectiveness Adoption Implementation Maintenance (RE-AIM) framework (http://re-aim.org/[291]), in terms of the 'percentage and risk characteristics of persons who receive or are affected by a policy or program'.[292,293] Generally, data on such issues are poorly reported in trials and often the data that are reported are not comparable between studies. We extracted data from trials on the proportion of eligible patients who did not take part and those data are presented in *Appendix 6*. However, interpretation of such data is difficult, as it requires knowledge of the exact recruitment procedures involved for effective comparison.

TABLE 9 Overall effects by country

Outcome	Overall effect size (95% CI)	Effect size, UK studies (95% CI)	Effect size, non-UK studies (95% CI)
QoL	0.22 (0.17 to 0.26)	0.10 (0.05 to 0.14)	0.25 (0.19 to 0.30)
Hospital use	−0.16 (−0.20 to −0.11)	−0.23 (−0.35 to −0.11)	−0.14 (−0.19 to −0.09)
Costs	0.02 (−0.05 to 0.08)	0.13 (0.02 to 0.24)	−0.04 (−0.12 to 0.04)

Chapter 5 Conclusions and recommendations

Summary

We identified a significant number of studies reporting data amenable to our analyses exploring self-management interventions that reduce utilisation without compromising outcomes. Analyses involved a very wide range of self-management interventions, varying in terms of the content of the self-management intervention, the amount of support provided and the amount of self-management support compared with other aspects of the intervention.

In summary, self-management support interventions generally had a small but positive impact on QoL; only a small minority of studies included in the review reported decrements in outcomes in the permutation plots. In terms of the primary utilisation outcome of hospital use, the evidence was most robust in both scope and effect in relation to interventions in respiratory and cardiovascular problems. The magnitude of those effects was similar in cost outcomes in cardiovascular problems.

Strengths and limitations

The study was conducted and reported in line with current guidance, although the relatively short timescale of the review, combined with a very broad scope (and consequent very large number of studies), meant that a number of deviations from the protocol had to be made (see *Table 6*). These involved a less comprehensive quality assessment (in which we used an indicator of trial quality rather than the full risk of bias assessment) and a less detailed series of sensitivity analyses. We do not expect these to have led to any major risks of bias in the main analyses overall, although it does mean that quality assessment was very dependent on the exact descriptions of concealment provided in the papers, which may not be an entirely accurate indicator of overall quality. Therefore, the more limited quality assessment may not be an entirely reliable assessment compared with a fuller assessment including issues such as attrition bias.

We had planned to use two independent researchers for all eligibility assessment and data extraction, but the large number of studies and the timeline of the review meant that for some aspects a single coder was used or a second coder checked the extraction of the first rather than extracting independently. We tested the reliability of our assessments of eligibility and found high levels of agreement. Our experience was that, in cases for which outcome data were independently extracted, error rates were low and any errors would have led to imprecision rather than bias.

Self-management is a complex concept to define and consequently is a challenge for designing effective searches and inclusion criteria. Our search was broad, but was dependent on the existence of key terms in the titles and abstracts of papers. Studies that met our definition, but did not use accepted terms in the section of the electronic record that was searched, will not necessarily have been identified, although it is possible that a proportion would have been identified from other systematic reviews or through references in other included studies identified by the review. Similarly, it is not clear how the search terms for utilisation or other economic outcomes perform in terms of standard criteria such as sensitivity or specificity, although some testing was conducted as part of their development.

It is difficult to assess the extent of bias that this may have created, as it is possible that interventions in certain areas of the literature (e.g. in certain disease areas) would be reported in a certain way. As an indicator of the size of the total literature in self-management support in long-term conditions, the parallel PRISMS review found 17 systematic reviews in the area of diabetes, including 179 unique RCTs, whereas

RECURSIVE found only 11 of relevance to these analyses (6%). However, this gap represents the fact that RECURSIVE would have legitimately excluded a large number of trials because they did not meet our exact criteria (QoL and economic outcomes and data amenable to meta-analysis). For example, the bulk of the outcomes in diabetes reviews in the PRISMS study relate to HbA_{1c} or other clinical measures (e.g. weight, cholesterol), with far fewer reporting QoL. The effects of self-management of QoL in the reviews reported in PRISMS (an effect size of around 0.31) is broadly similar to that reported in RECURSIVE.[294]

Our analyses explored differences in outcomes in more and less intensive versions of self-management interventions, but such analyses are limited to the degree that many other factors may differ between studies. The optimal assessment of the relative clinical effectiveness and cost-effectiveness of more and less intensive versions of self-management interventions would be through comparison in the same trial, but we found only a single study utilising this comparison.[295]

The analysis also ignored differences in the likely impact of self-management over the years covered by the review. This may involve the development of self-management interventions (such as the impact of increasing use of technology), or the impact of wider changes in patient populations (literacy, empowerment) and health services.

Our analyses of small-study bias across all studies did not find evidence of bias in relation to QoL outcomes or costs, but there was evidence of bias in hospital use data. Selective publication of positive studies is one potential reason for asymmetry in the plot.

The optimal assessment of the hypothesis underlying the review would have been to restrict to full economic analyses, and synthesise high-quality, comprehensive economic analyses through appropriate modelling. The analytic approach adopted in this study was based on the assumptions that full economic analyses would be relatively rare and many more studies would report relevant data about utilisation and a more comprehensive assessment of the wider literature would allow preliminary findings to inform policy while waiting for the development of a more significant evidence base.

The meta-analytic model did apply certain criteria to study inclusion, which meant that many studies with potentially relevant data were excluded. Alternative models of synthesis could have used a more narrative approach,[296] although the ability of such methods to cope with a very large literature and draw valid conclusions about relationships between outcomes in a replicable way is unclear. Examination of the effects of studies not amenable to meta-analysis is possible through variants of the box score approach, but such studies are vulnerable to a number of biases and, in the context of small studies, are prone to conservative conclusions.[296]

Of course, the requirement that data were reported in a way that was amenable to meta-analysis for two outcomes would have potentially caused selection effects in the studies included in the final analysis. We were unable to formally test differences between eligible studies reporting data amenable to meta-analysis, as the relevant data on studies that did not meet our exact eligibility requirements were not extracted because of resource limitations. Additionally, such tests would have been of limited utility, as by definition we would have been unable to assess differences in outcomes in studies that did not enter into the meta-analyses.

The assessment of trials for RECURSIVE in terms of their ability to reduce costs without compromising outcomes does not map neatly onto current economic analyses, which focus on the incremental cost-effectiveness ratio (ICER) and associated net mean benefit statistic. The sorts of interventions that met the criteria underlying the brief (reducing costs without compromising outcomes) would not exhaust those judged attractive in usual economic analyses. In conventional terms, an intervention that increases costs, while providing significant additional health benefits, might well attract support from decision-makers, who would then face decisions about what other interventions, with less attractive cost-effectiveness

profiles, might be halted. The commissioning of the current research has been undertaken in the context of interest in shifting utilisation in long-term conditions from hospitals to other locations, rather than identifying the optimal intervention in a broadest sense used by conventional cost-effectiveness analyses.

The most comprehensive assessment of costs would include those related to the intervention, those related to wider use of NHS services, social care and other costs, and (potentially) patient direct costs and costs of lost productivity. However, such comprehensive costing is relatively infrequent and generally restricted to formal economic analyses, rather than those analyses that include some costing and utilisation data. Hospital costs are generally a major driver of costs. However, caution must be exercised in interpretation of studies reporting partial cost data, as there is always the danger of cost shifting rather than genuine reduction, for example when lower hospital utilisation actually reflects shifting of care to other sectors, or loading additional costs onto patients, rather than a genuine reduction in overall utilisation. There was some evidence from the plots in *Figures 3* and *4* that patterns in reductions in hospital use do not map exactly onto patterns in reductions in overall costs. This may reflect the fact that the latter may include the costs of the intervention itself that is required to generate reductions in hospital use, as well as other cost shifting. The caution required in the assessment of individual aspects of health-care utilisation was highlighted by the recent whole-systems demonstrator evaluations, where analyses indicated impacts of telehealth on admissions and mortality,[297] but a more formal cost-effectiveness analysis conducted on the same trial found that overall costs were increased, with low probability of cost-effectiveness in terms of current willingness to pay.[163]

Implicit in the brief was a focus on self-management as a way of avoiding 'inappropriate' or 'avoidable' utilisation of expensive health-care resources, rather than a reduction in all utilisation. However, the analysis has essentially treated all utilisation as equivalent, as most trials did not distinguish between these types, and assessment of the 'appropriateness' of utilisation is not straightforward.[298] Therefore, when self-management leads to appropriate or desired utilisation (e.g. better attendance at outpatients), that will have been conceptualised as a negative outcome.

The NHS distinguishes between three tiers of patients. It might be assumed that reductions in utilisation are most relevant for those at the highest tier who are most at risk of unscheduled admissions and it is possible that our analysis conflates these populations and misses impacts that may occur within tiers. Our classification of 'self-management' and 'case management' may map broadly onto the NHS tiers, although no studies formally classify patients in that way (and the NHS classification does not have a strong empirical basis). It should also be noted that, although the risk of admission is increased in the higher tiers of the model, the numbers of patients in those tiers puts limits on the overall impacts of interventions, such that substantive impacts on hospital use will require intervention among more prevalent patients who are at lower individual risk.[298]

Recent studies have highlighted the prevalence and impact of multimorbidity among patients with long-term conditions. A recent review of interventions for patients with multimorbidity found a very limited evidence base.[299] There have been suggestions that many trials exclude patients with multimorbidity. We found variable reporting of comorbidity, although some trials (such as those around the Expert Patients Programme)[18] include patients with a variety of clinical conditions and many patients included in the current database will undoubtedly have multimorbidity, even though the nature of that multimorbidity may be poorly reported and patients have not been included on the basis of multimorbidity per se. Our main analysis has been in terms of disease categories. It is difficult to judge whether the results will be significantly moderated by multimorbidity, or whether moderation might involve attenuation or enhancement of effects in patients with more than one condition.[300]

The analytic approach has focused on summarising the maximum amount of quantitative evidence related to the aims of the brief, with a consequent broad perspective on patterns of effects on utilisation and outcomes. We have explored basic moderators of effects, such as the broad dichotomies of 'self-management' and 'case management', as well as clinical conditions and study quality. However, there are a large number

of factors on which studies differ. Metaregression techniques that extend analyses to explore active ingredients are possible, but are generally very limited by available power, given that the unit of analysis is the study. Although we have used metaregression techniques to explore the 'active ingredients' of interventions,[301,302] these have generally been in disease-specific areas where the content of the intervention, while variable, is at least bounded. The interventions in the current review showed much higher levels of variability. Combined with poor and inconsistent reporting and the lack of a common language to describe self-management support, the utility of those methods in the context of the current review is less clear.

The RECURSIVE review has treated self-management support as a form of 'health technology' that is potentially discrete, defined and capable of being delivered in a standardised form. Arguments have been made that certain types of health service interventions are far less amenable to these methods, partly because they defy effective description and partly because it is hypothesised that their effects are far more sensitive to context. In self-management, there is also the issue that self-management behaviour occurs in the context of many other influences. It has been suggested that the evaluation of the impact of health services interventions needs an assessment of the contexts in which mechanisms are made active and a better understanding of 'what works for whom' for which different review methods, such as realist review, may be better suited.[303,304] The accompanying PRISMS review has explored many of these issues and the current report should be understood alongside the PRISMS document.

Implications of the study for policy and practice

Self-management interventions generally did not compromise patient outcomes

Very few self-management interventions compromised patient outcomes at the level of the group, at least among those populations consenting to take part in trials. Of course, outcomes within groups in any trial will vary, and reporting of adverse outcomes (such as the proportion of patients showing negative effects) is not conventional. However, it seems reasonable to conclude that, at the level of policy, implementation of self-management should not be limited by concerns that such interventions routinely lead to greater burden, restrictions or anxiety which impact on QoL. Studies in self-management[305] and recent work on minimally disruptive medicine[306] have suggested that self-management can lead to such reactions in some patients and there are concerns that these effects will be particularly heightened in patients with multimorbidity,[307–309] but the present evidence would not suggest that this is a general or consistent outcome. It may be important for professionals to assess these issues as part of the clinical assessment and ongoing review of patients with long-term conditions. Those designing interventions might usefully explore the process and content of those interventions identified in the review which did compromise outcomes to assess implications for future delivery.

Self-management interventions generally led to small but significant reductions in some forms of utilisation in patients with respiratory and cardiovascular conditions

Given that robust reductions in outcomes were rare, the core issue relates to the impact of self-management support on reducing utilisation. Across conditions, the most robust effects (in terms of both number of studies and the size of the effects) related to interventions in respiratory and cardiovascular patients, for whom there was a significant evidence base suggesting consistent (albeit small) reductions in hospital use and costs, which seemed consistent in trials using both lower-intensity self-management interventions and more intensive case management. The results were in line with other reports in this area[310] and the PRISMS report. Mental health was also an area that reported a significant number of studies, but these reported lower levels of impact on utilisation and no impact from self-management interventions. Evidence of effects on utilisation in diabetes, arthritis and mixed disorders was more limited in scope and the evidence suggested little impact of either type of intervention.

The impact of self-management interventions on certain forms of utilisation (such as hospital admission) may overstate the overall impact on total costs

The permutation plots and comparison of the effects in *Tables 5* and *6* suggest that analysis of the impact of self-management interventions on individual utilisation outcomes may overstate effects, by ignoring the cost of the self-management intervention itself, as well as other types of cost shifting.

These broad results raise questions about the mechanisms underlying the impact of self-management interventions.

Implicit in the brief, and in many self-management interventions, is the suggestion that better self-management will lead to reductions in utilisation, without compromising patient outcomes. This implies that providing patients with knowledge, skills and confidence (enhanced by professional input and appropriate technology) will lead to either indirect benefits (for which changes in behaviour will result in better overall health and reduction in risk factors for utilisation) or more direct effects (e.g. more effective response to exacerbations and crises, such that less expensive forms of utilisation will be sufficient, compared with high-cost use such as hospital admission).

There are a number of issues with this implicit causal model, one of which is that interventions may vary in the degree to which they target utilisation behaviour, for example use of self-management plans to control exacerbations in respiratory disorders often has a core function of avoiding unnecessary hospital use, whereas self-management in diabetes may be more focused on empowerment and the improvement of clinical outcomes. Of course, the fact that many self-management outcomes have limited impacts on patient outcomes may also serve to limit their longer-term impact on utilisation.

There is an assumption that developing knowledge, skills and confidence will lead to enduring behaviour change, such that professional support can be reduced over time, although it is equally plausible that effects of self-management support will not endure and may require augmentation. Ongoing support is a possibility, but then the critical economic question is whether or not the reductions in utilisation achieved are significantly greater than the service input required to maintain gains in knowledge, skills and confidence. It is noteworthy that very few studies in the review assessed outcomes over a time period of greater than 12 months, a common problem in randomised trials. Modelling of long-term economic consequences of improved health outcomes would be necessary to assess the implications of a longer time horizon, given the logistical difficulties associated with very long-term follow-up in clinical trials.

The idea of self-management as a demand management strategy is also based on an assumption that utilisation behaviour is patient-led, when some aspects of utilisation (such as clinical attendance) are also a function of professional behaviours and may not be affected by changes in patients or carers.[311] There is also evidence that health service innovations may create supplier-induced demand, even when the original aim was to have the opposite effect.[312]

Some of the variation in the effects of self-management on utilisation between conditions may reflect usual clinical practice. For example, hospital use related to depression may be relatively rare compared with some conditions, with little scope for self-management interventions to have a major impact. The review included all hospital use in analyses and did not explore differences in effects of elective and unplanned admissions, although the impact of self-management may be different.

Insights into the processes underlying utilisation can be derived from qualitative studies accompanying trials that showed decreases in aspects of utilisation. Data suggest that reductions in utilisation are based in part on shifting conceptions of reliance on traditional services and supporting the acquisition of skills and practices that become everyday routines, successfully managed within the life worlds of patients. Prior experiences and methods of contact with services need explicit attention to transition successfully to greater self-management in non-hospital settings.[313] Giving legitimacy to personal self-management strategies is a key way for providers to give support.[314] A means to access the system for help when

self-management becomes insufficient can be central to shifting reliance away from traditional outpatient services and managing perceptions of risk are, therefore, likely to be important.[315]

Although many demand management interventions have been focused on those who frequently use health care, factors such as regression to the mean can reduce the supposed benefits of intervening in some groups. Additionally, high-risk patients are only a very small proportion of the overall population, which further limits impact compared with the much larger numbers at lower levels of the long-term conditions 'pyramid'.[312] Self-management support thus has the potential to make a large impact on utilisation, if it is reliably associated with reductions that are achieved without compromising other outcomes, and can be disseminated widely.

The potential for effective models of self-management support to be disseminated very widely remains to be seen, as many trials are based on small, selected samples of volunteer patients, who may display certain characteristics (although data for a comprehensive assessment of 'reach' were rarely reported). There are examples in the literature of attempts to implement models in a much more widespread fashion,[316] with some examples of success in terms of effects on utilisation. For example, simple telephone support provided to large numbers of patients with long-term conditions targeted on the basis of risk of utilisation showed reductions in utilisation for limited per patient costs, although QoL measures were not assessed, and it is unclear how such interventions would translate to the NHS context. The companion PRISMS review has assessed the relevant studies on implementation.

Implications of the study for research

Limitations in the data meant that we were unable to determine particular types of self-management intervention that were consistently associated with reductions in utilisation without compromising outcomes, beyond the general finding that interventions in patients with respiratory and cardiovascular conditions were most reliably associated with positive effects. Our ability to conduct the analyses has been hampered by poor reporting of outcome data in primary studies, with over half excluded from the core analyses. These problems are common and not restricted to the methods adopted in RECURSIVE, although the requirement that data on two outcomes were available did serve to make the issues more acute. More consistent and comprehensive reporting of data would allow much more effective syntheses.

Although our coding of types of self-management interventions was relatively simple, application was complicated by variation in the detail provided, such that even relatively straightforward assessments of issues such as the amount of support provided were often difficult. Again, more consistent, comprehensive and theory-led reporting of intervention content and process would allow much more effective analyses of the importance or unimportance of particular active ingredients.

Although improved reporting is important, it is likely to be a long-term issue. We would suggest the following four key short-term research priorities.

Understanding methods of achieving wider implementation of self-management

In those disorders for which evidence of impacts on utilisation seems consistent, the research priorities would relate to implementation of self-management at a wider population level to assess whether or not those benefits found in selected populations can be achieved more widely and in an enduring fashion.

Understanding the impact of self-management in multimorbidity

Most of the studies reported in terms of particular clinical conditions, and the review was structured along those lines, with additional analyses exploring the utility of the categorisations developed in the PRISMS study. The analyses suggested that the ability of self-management support to impact on utilisation was related to the type of clinical condition under test. However, the utility of disease-specific analyses may be

attenuated in the context of a high prevalence of multimorbidity. Further research (either primary studies or secondary research on existing data) would be needed to explore whether or not the impacts identified here were influenced by the presence of multimorbidity. This is especially important because patients with multimorbidity potentially face significant barriers to self-management support, but may also have the greatest capacity to benefit.

Developing new self-management interventions more effective in reducing expensive and inappropriate forms of utilisation

Clearly, further primary research is indicated to explore other models of self-management support that could achieve more powerful and consistent effects on utilisation, following conventional models for the development of complex interventions and drawing on relevant behavioural and social science models relating to patient experience of long-term conditions, as well as those relating to access to care and utilisation. The data presented might suggest that disease-specific models are required to maximise impact on utilisation (e.g. in respiratory or cardiovascular conditions), although the needs of services and patients might be better met through more generic approaches that could be used with a number of disorders and in patients with multiple conditions.

Understanding the role of self-management in the context of health systems

Complementing the ongoing development of complex interventions, there is a need for broader assessments of the value of self-management in the context of wider service redesign for long-term conditions, as the PRISMS review highlights that self-management support cannot be divorced from the wider delivery of care, and many models in this area highlight the interrelationships between patients, professionals and the wider service context.[9,10] Such studies might usefully be complemented by work exploring the role of wider social and community resources in developing assets within the community to better manage long-term conditions in ways that may have a useful impact on utilisation.

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Contributions of authors

Maria Panagioti assessed studies for inclusion, extracted data on all studies, conducted analyses and wrote the report.

Gerry Richardson contributed to the protocol for the study, extracted data on economic evaluations, advised on economic methodology and contributed to the writing of the report.

Elizabeth Murray contributed to the protocol for the study, advised on study procedures and contributed to the writing of the report.

Anne Rogers contributed to the protocol for the study, advised on study procedures and contributed to the writing of the report.

Anne Kennedy contributed to the protocol for the study, advised on study procedures and contributed to the writing of the report.

Stanton Newman contributed to the protocol for the study, advised on study procedures and contributed to the writing of the report.

Nicola Small assessed studies for inclusion, extracted data on all studies and assisted with analyses.

Peter Bower wrote the protocol for the study, managed the project and had primary responsibility for writing the report.

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Appendix 1 Summary of the review protocol

Review question(s)

Which models of self-management interventions are associated with significant reductions in health services utilization (including admissions) without compromising outcomes in people with long-term conditions?

Searches

We have searched CENTRAL, CINAHL, Econlit, EMBASE, HEED, MEDLINE, MEDLINE in process, NHS EED and PsycINFO from inception

Additionally, a separately funded study is conducting a review of reviews of self-management, and if resources allow we will also check published reviews of self-management interventions identified by this second review for relevant primary studies

Types of study to be included

Inclusion: Randomized controlled trials providing details of health related outcomes AND health care utilization or costs

Exclusion: All other study designs

Condition or domain being studied

Long-term conditions: Cost-effectiveness of self-management interventions.

Long-term conditions in this study include conditions that cannot be cured but can be managed through medication and/or therapy

Participants/ population

Inclusion: Adults with long-term conditions.

Exclusion: Children and adolescents (under 18 years of age).

Intervention(s), exposure(s)

We will focus on self-management support interventions in long-term conditions.

A self-management support intervention is one primarily designed to develop the abilities of patients to undertake management of health conditions through education, training and support to develop patient knowledge, skills or psychological and social resources.

We will include all formats and delivery methods (group or individual, face to face or remote, professional or peer led).

We will include interventions across the pyramid of care for long-term conditions, ranging from self-management, monitoring in primary care, and intensive support (such as case management) for older people with complex needs.

We will exclude interventions where the self-management component is only a minor component of the intervention, and we will distinguish studies where self-management is the primary intervention from those where the effects of self-management support cannot be distinguished from broader interventions for long-term conditions.

Comparator(s)/ control

Other (non self-management) intervention groups, usual/routine care control groups and waiting list control groups.

Context

Studies from developing world countries will be excluded from the review.

Outcome(s)

Primary outcomes

Differences between the intervention and control group in hospitalization rates and costs, total costs and quality of life outcomes at follow-up.

Differences between the intervention and control group in hospitalization rates and costs and quality of life measures at follow-up.

Quality of life measures: will include validated self-reports of quality of life (EuroQol), self-report measures of general health status and (psychological) well being.

Secondary outcomes

Differences between the intervention and control group in other major types of costs (e.g. inpatients, outpatients, primary care, community care, out-of pocket expenditure) at follow-up.

Characteristics of models of self-management including characteristics of the population (e.g. type of long-term condition, age, gender, deprivation and multimorbidity), the intervention (e.g. skillmix, intervention content, and delivery method) and the study context (e.g. geographical location, type of health system, date of study) that may moderate the effectiveness of self-management interventions.

Data extraction, (selection and coding)

Abstracts of studies retrieved using the search strategy will be screened independently by two reviewers to identify studies that potentially meet the inclusion criteria of the review. The full text of these potentially eligible studies will be retrieved and independently assessed for eligibility by two reviewers. Any

disagreement between the reviewers over the eligibility of particular studies will be resolved through discussion and involvement of a third reviewer.

A data extraction sheet developed for the purposes of this study will be used to extract data from the included studies for assessment of study quality and evidence synthesis.

Extracted information will include: study setting; study population and participant demographics; details of the intervention and control conditions; study methodology; recruitment and study completion rates; outcomes and times of measurement and information for assessment of the risk of bias.

Moreover, we will extract data on the effect of self-management interventions on core types of health care utilisation (hospital visits and admissions, primary care visits, medication use, other health care use, other costs including patient costs), as well as data on total costs, cost-effectiveness, cost-utility, and patient well-being and health outcomes. Two reviewers will extract data independently, discrepancies will be identified and resolved through discussion (with a third author where necessary).

Risk of bias (quality) assessment

Depending on the number of studies identified, we intend to extract data to assist in the quality assessment of primary studies using the Cochrane risk of bias tool which considers the following study characteristics: sequence generation-randomization, treatment allocation concealment, blinding, completeness of outcome data, selective outcome reporting and other sources of bias. If large numbers of studies are identified, we will limit quality assessment to those characteristics which are most relevant to self-management interventions and most clearly related to bias (allocation concealment)

Two review authors will independently assess the risk of bias in included studies. Disagreements between the review authors over the risk of bias in particular studies will be resolved by discussion and with involvement of a third review author where necessary. Sensitivity analysis will be applied on the high-quality studies based on the outcomes of the methodological quality assessment.

Strategy for data synthesis

In this review, meta-analytic procedures will be used to synthesize and present the data from individual studies.

We will apply standardised measures of effect (such as the standardised mean difference) so that the results of different self-management interventions can be compared by decision-makers to assess their relative value.

The primary analysis will consider the ability of models of self-management to reduce hospitalisation rates and costs, without compromising patient outcomes.

We will present the results using a modification of the permutation matrix, plotting the effect of interventions (together with their associated confidence intervals) on

utilisation and outcomes simultaneously and placing them in the relevant quadrants of the matrix depending on the pattern of outcomes.

We will explore statistical heterogeneity thoroughly in such analyses through use of appropriate statistics such as I-squared. We will consider an I-squared value greater than 50% indicative of substantial heterogeneity. We will conduct sensitivity analyses based on study quality. We will also assess evidence of publication bias.

Analysis of subgroups or subsets

We will conduct meta-analyses pooling data relating to particular models of self-management support where the models, populations and study contexts are sufficiently similar to make such analyses appropriate and interpretable.

We will explore the characteristics of models of self-management showing favourable patterns of outcomes in the matrix through narrative review or through subgroup analysis and meta-regression techniques if the data are amenable.

Characteristics will include those of the population (e.g. type of long-term condition, age, gender, deprivation and multimorbidity), the intervention (e.g. skillmix, intervention content, and delivery method) and the study context (e.g. geographical location, type of health system, date of study).

Subject index terms

Humans; Patient Education as Topic; Self Care

Reference and/or URL for protocol
http://www.crd.york.ac.uk/PROSPEROFILES/2694_PROTOCOL_20120910.pdf

Date of registration in PROSPERO

10 October 2012

Date of publication of this revision

10 October 2012

Appendix 2 Database search strategy

Cochrane Central Register of Controlled Trials

Searched 20 June 2012 via The Cochrane Library.

ID	Search
#1	(self NEXT administer*) in Trials
#2	MeSH descriptor Self Administration, this term only
#3	MeSH descriptor Self Care, this term only
#4	"self care" or (selfcare) or (self NEXT manage*) or (selfmonitor*) or (self NEXT monitor*) in Trials
#5	(selfhelp) or "self help" or (self NEXT diagnos*) or (selfdiagnos*) in Trials
#6	(self NEXT assess*) or (selfassess*) in Trials
#7	MeSH descriptor Blood Glucose Self-Monitoring, this term only
#8	"self initiated intervention" in Trials
#9	(self NEXT initiated NEXT intervent*) in Trials
#10	MeSH descriptor Self Efficacy, this term only
#11	MeSH descriptor Self Medication explode all trees
#12	"self efficacy" or (pharmacist* or pharmacy or pharmacies) NEAR/2 support* in Trials
#13	(pharmacist* or pharmacy or pharmacies) NEAR/2 assist* or (pharmacist* or pharmacy or pharmacies) NEAR/2 (advice or advis* or inform*) or "pharmaceutical care" in Trials
#14	(self NEXT medicat*) or (selfmedicat*) or (self NEXT remed*) or (selfremed*) in Trials
#15	(self NEXT treat*) or (selftreat*) or "self cure" or (selfcure) in Trials
#16	MeSH descriptor Self-Help Groups, this term only
#17	MeSH descriptor Social Support explode all trees
#18	(social NEXT support*) in Trials
#19	(group NEAR/1 (support* or advice or advis* or monitor* or intervention* or train* or instruction or consult* or assist* or education or information)) in Trials
#20	(peer NEAR/1 (support* or advice or advis* or monitor* or intervention* or train* or instruction or consult* or assist* or education or information)) in Trials
#21	(expert NEXT patient*) or "psychosocial support" or (befriend*) or (health NEXT trainer*) in Trials
#22	MeSH descriptor Telemedicine, this term only
#23	(telemedicine) or (telecare) or (telenursing) or (telemonitor*) or (telehealth) in Trials
#24	MeSH descriptor Remote Consultation, this term only
#25	(telephon* or remote or phone) NEAR/2 (follow* or support or consult* or advice or advis* or intervention or train* or instruction or assist* or educate or education or information or monitor*) in Trials
#26	"case management" or (action NEXT plan*) or (management NEXT plan*) or (management NEXT program*) or (care NEXT plan*) in Trials
#27	(nurse NEAR/2 educator*) in Trials
#28	"patient education" in Trials
#29	MeSH descriptor Patient Education as Topic, this term only
#30	MeSH descriptor Case Management, this term only
#31	(patient NEAR/2 (education or advice or advis* or instruct* or educate or train*)) in Trials

APPENDIX 2

ID	Search
#32	"consumer health information" or "patient information" in Trials
#33	(financial or monetary or money) NEAR/2 (incentive* or competition* or contest* or lotter* or reward* or prize*) in Trials
#34	(contingent NEXT payment*) or (deposit NEXT contract*) or (decision NEAR/2 support*) or (decision NEAR/2 aid*) or (shared NEAR/2 decision*) in Trials
#35	MeSH descriptor Decision Making, this term only
#36	(#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 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 OR #33 OR #34 OR #35)
#37	MeSH descriptor Hospitalization explode all trees
#38	MeSH descriptor Health Resources, this term only
#39	(length NEAR/2 stay) or (duration NEAR/2 stay) or (hospital NEAR/1 (visit* or contact* or attendance* or admission* or episode*)) or (time NEAR/2 discharge) or (hospital NEXT day*) in Trials
#40	(patient* or inpatient* or in-patient*) NEAR/1 (cost* or stay) or (number NEAR/2 (nights or days)) in Trials
#41	"primary care" NEAR/2 (visit* or contact* or attendance* or admission* or episode*) or (surgery NEAR/2 (visit* or contact* or attendance* or admission* or episode*)) in Trials
#42	(clinic or surgery or hospital or "accident and emergency") NEAR/2 (work-flow or "work flow") in Trials
#43	(consultation* NEAR/2 (time or length)) or (hospitalization* or hospitalisation* or rehospitalization* or rehospitalisation* or re-hospitalization* or re-hospitalisation*) or "hospital costs" in Trials
#44	(#37 OR #38 OR #39 OR #40 OR #41 OR #42 OR #43)
#45	(#36 AND #44)
#46	MeSH descriptor Economics, this term only
#47	MeSH descriptor Costs and Cost Analysis explode all trees
#48	MeSH descriptor Value of Life, this term only
#49	MeSH descriptor Economics, Dental, this term only
#50	MeSH descriptor Economics, Hospital explode all trees
#51	MeSH descriptor Economics, Medical, this term only
#52	MeSH descriptor Economics, Nursing, this term only
#53	MeSH descriptor Economics, Pharmaceutical, this term only
#54	(#46 OR #47 OR #48 OR #49 OR #50 OR #51 OR #52 OR #53)
#55	econom* or cost or costs or costly or costing or price or prices or pricing or pharmacoeconomic* in Trials
#56	expenditure NOT energy in Trials
#57	value NEAR/2 money in Trials
#58	budget* in Trials
#59	(#55 OR #56 OR #57 OR #58)
#60	(#54 OR #59)
#61	metabolic NEAR/1 cost in Trials
#62	(energy or oxygen) NEAR/1 cost in Trials
#63	(#61 OR #62)
#64	(#60 AND NOT #63)
#65	(#45 AND #60)

Note: medical subject heading (MeSH) searches cannot be limited to CENTRAL, so some results apply the whole library.

Cumulative Index to Nursing and Allied Health

Searched 24 May 2012 via EBSCO*host*.

ID	Search
1	TI (econom* or cost or costs or costly or costing or price or prices or pricing or pharmacoeconomic*) OR AB (econom* or cost or costs or costly or costing or price or prices or pricing or pharmacoeconomic*)
2	TI (expenditure* not energy) OR AB (expenditure* not energy)
3	TI value N1 money OR AB value N1 money
4	TI budget* OR AB budget*
5	S1 or S2 or S3 or S4
6	TI metabolic N1 cost OR AB metabolic N1 cost
7	TI ((energy or oxygen) N1 cost) OR AB ((energy or oxygen) N1 cost)
8	S6 or S7
9	S5 not S8
10	(MH "Economics") OR (MH "Costs and Cost Analysis+") OR (MH "Economic Value of Life") OR (MH "Economics, Dental") OR (MH "Economics, Pharmaceutical") OR (MH "Health Resource Allocation")
11	(MH "Hospitalization") OR (MH "Patient Admission") OR (MH "Length of Stay")
12	(MH "Readmission")
13	(MH "Health Resource Utilization")
14	TI length N2 stay OR AB length N2 stay
15	TI duration N2 stay OR AB duration N2 stay
16	TI (hospital N1 (visit* or contact* or attendance* or admission* or episode*)) OR AB (hospital N1 (visit* or contact* or attendance* or admission* or episode*))
17	TI hospital costs OR AB hospital costs
18	TI time N2 discharge OR AB time N2 discharge
19	TI hospital day* OR AB hospital day*
20	TI ((patient* or inpatient* or in-patient*) N1 (cost* or stay)) OR AB ((patient* or inpatient* or in-patient*) N1 (cost* or stay))
21	TI ((number N2 (nights or days)) OR AB ((number N2 (nights or days))
22	TI ("primary care" N1 (visit* or contact* or attendance* or admission* or episode*)) OR AB ("primary care" N1 (visit* or contact* or attendance* or admission* or episode*))
23	TI (surgery N1 (visit* or contact* or attendance* or admission* or episode*)) OR AB (surgery N1 (visit* or contact* or attendance* or admission* or episode*))
24	TI (consultation* N2 (time or length)) OR AB (consultation* N2 (time or length))
25	TI (hospitalization* or hospitalisation* or rehospitalisation* or rehospitalisation* or re-hospitalization* or re-hospitalisation*) OR AB (hospitalization* or hospitalisation* or rehospitalisation* or rehospitalisation* or re-hospitalization* or re-hospitalisation*)
26	S9 or S10 or S11 or S12 or S13 or S14 or S15 or S16 or S17 or S18
27	S19 or S20 or S22 or S23 or S24 or S25
28	S26 or S27
29	(MH "Blood Glucose Self-Monitoring")
30	(MH "Support Groups")
31	(MH "Self Administration")
32	(MH "Self Medication")

ID	Search
33	(MH "Self Diagnosis")
34	(MH "Access to Information+")
35	(MH "Patient Education")
36	(MH "Telemedicine") OR (MH "Telehealth") OR (MH "Telenursing")
37	(MH "Patient Care Plans")
38	TI "self care" OR AB "self care" OR TI selfcare OR AB selfcare
39	TI "self manag*" OR AB "self manag*" OR TI "selfmanag*" OR AB "selfmanag*"
40	TI "self monitor*" OR AB "self monitor*" OR TI "selfmonitor*" OR AB "selfmonitor*"
41	TI "self help" OR AB "self help*" OR TI "selfhelp*" OR AB "selfhelp*"
42	TI "self diagnos*" OR AB "self diagnos*" OR TI "selfdiagnos*" OR AB "selfdiagnos*"
43	TI "self assess*" OR AB "self assess*" OR TI "selfassess*" OR AB "selfassess*"
44	TI "Self initiated intervention*" OR AB "Self initiated intervention*"
45	TI "Self efficacy" OR AB "Self efficacy"
46	TI pharmacist* N2 support* OR AB pharmacist* N2 support* OR TI pharmacy N2 support* OR AB pharmacy N2 support* OR TI pharmacies N2 support* OR AB pharmacies N2 support*
47	TI pharmacist* N2 assist* OR AB pharmacist* N2 assist* OR TI pharmacy N2 assist* OR AB pharmacy N2 assist* OR TI pharmacies N2 assist* OR AB pharmacies N2 assist*
48	TI pharmacist* N2 advice OR AB pharmacist* N2 advice OR TI pharmacy N2 advice OR AB pharmacy N2 advice OR TI pharmacies N2 advice OR AB pharmacies N2 advice
49	TI pharmacist* N2 advis* OR AB pharmacist* N2 advis* OR TI pharmacy N2 advis* OR AB pharmacy N2 advis* OR TI pharmacies N2 advis* OR AB pharmacies N2 advis*
50	TI pharmacist* N2 inform* OR AB pharmacist* N2 inform* OR TI pharmacy N2 inform* OR AB pharmacy N2 inform* OR TI pharmacies N2 inform* OR AB pharmacies N2 inform*
51	TI "pharmaceutical care" OR AB "pharmaceutical care"
52	TI ("self medicat*" or selfmedicat* or "self remed*" or selfremed*) OR AB ("self medicat*" or selfmedicat* or "self remed*" or selfremed*)
53	TI ("self treat*" or selftreat* or "self cure" or selfcure) OR AB ("self treat*" or selftreat* or "self cure" or selfcure)
54	TI "Social support*" OR AB "Social support*"
55	TI (group N1 (support* or advice or advis* or monitor* or intervention* or train* or instruction or consult* or assist* or education or educate or information)) OR AB (group N1 (support* or advice or advis* or monitor* or intervention* or train* or instruction or consult* or assist* or education or educate or information))
56	TI (peer N1 (support* or advice or advis* or monitor* or intervention* or train* or instruction or consult* or assist* or education or educate or information)) OR AB (peer N1 (support* or advice or advis* or monitor* or intervention* or train* or instruction or consult* or assist* or education or educate or information))
57	TI "expert patient*" OR AB "expert patient*"
58	TI "Psychosocial support" OR AB "Psychosocial support"
59	TI Befriend* OR AB Befriend*
60	TI "Health trainer*" OR AB "Health trainer*"
61	TI telemedicine OR AB telemedicine
62	TI telecare OR AB telecare
63	TI telenursing OR AB telenursing
64	TI telemonitor* OR AB telemonitor*
65	TI telehealth OR AB telehealth

ID	Search
66	TI (telephon* N2 (follow* or support or consult* or advice or advis* or intervention* or train* or instruction or assis* or educate or education or information or monitor*)) OR AB (telephon* N2 (follow* or support or consult* or advice or advis* or intervention* or train* or instruction or assis* or educate or education or information or monitor*)) OR TI (remote N2 (follow* or support or consult* or advice or advis* or intervention* or train* or instruction or assis* or educate or education or information or monitor*)) OR AB (remote N2 (follow* or support or consult* or advice or advis* or intervention* or train* or instruction or assis* or educate or education or information or monitor*)) OR TI (phone N2 (follow* or support or consult* or advice or advis* or intervention* or train* or instruction or assis* or educate or education or information or monitor*)) OR AB (phone N2 (follow* or support or consult* or advice or advis* or intervention* or train* or instruction or assis* or educate or education or information or monitor*))
67	TI "case management" OR AB "case management"
68	TI "Action plan*" OR AB "Action plan*"
69	TI "Management plan*" OR AB "Management plan*"
70	TI "care plan*" OR AB "care plan*"
71	TI "nurse adj2 educator*" OR AB "nurse adj2 educator*"
72	TI (patient N2 (education or advice or advis* or instruct* or educate or train*)) OR AB (patient N2 (education or advice or advis* or instruct* or educate or train*))
73	TI "Consumer health information" OR AB "Consumer health information"
74	TI "patient information" OR AB "patient information"
75	TI (financial N2 (incentive* or competition* or contest* or lotter* or reward* or prize*)) OR AB (financial N2 (incentive* or competition* or contest* or lotter* or reward* or prize*)) OR TI (monetary N2 (incentive* or competition* or contest* or lotter* or reward* or prize*)) OR AB (monetary N2 (incentive* or competition* or contest* or lotter* or reward* or prize*)) OR TI (money N2 (incentive* or competition* or contest* or lotter* or reward* or prize*)) OR AB (money N2 (incentive* or competition* or contest* or lotter* or reward* or prize*))
76	TI (financial N2 (incentive* or competition* or contest* or lotter* or reward* or prize*)) OR AB (financial N2 (incentive* or competition* or contest* or lotter* or reward* or prize*)) OR TI (monetary N2 (incentive* or competition* or contest* or lotter* or reward* or prize*)) OR AB (monetary N2 (incentive* or competition* or contest* or lotter* or reward* or prize*)) OR TI (money N2 (incentive* or competition* or contest* or lotter* or reward* or prize*)) OR AB (money N2 (incentive* or competition* or contest* or lotter* or reward* or prize*))
77	TI ("contingent payment*" or "deposit contract*") OR AB ("contingent payment*" or "deposit contract*")
78	TI decision* N2 support* OR AB decision* N2 support*
79	TI decision* N2 aid* OR AB decision* N2 aid*
80	TI shared N2 decision* OR AB shared N2 decision*
81	S29 or S30 or S31 or S32 or S33 or S34 or S35 or S36 or S37 or S38 or S39 or S40 or S41 or S42 or S43 or S44 or S45 or S46 or S47 or S48 or S49 or S50 or S51 or S52 or S53 or S54 or S55 or S56 or S57 or S58 or S59 or S60 or S61 or S62 or S63 or S64 or S65 or S66 or S67 or S68 or S69 or S70 or S71 or S72 or S73 or S74 or S75 or S76 or S77 or S78 or S79 or S80
82	S28 and S81
83	(MH "Clinical Trials+")
84	PT Clinical trial
85	TX clinic* n1 trial*
86	TX ((singl* n1 blind*) or (singl* n1 mask*) or (doubl* n1 blind*) or (doubl* n1 mask*) or (tripl* n1 blind*) or (tripl* n1 mask*) or (trebl* n1 blind*) or (trebl* n1 mask*))
87	TX "randomi* control* trial*"
88	(MH "Random Assignment")
89	TX "random* allocat*"
90	TX placebo*
91	(MH "Placebos")

APPENDIX 2

ID	Search
92	(MH "Quantitative Studies")
93	TX "allocat* random*"
94	S83 or S84 or S85 or S86 or S87 or S88 or S89 or S90 or S91 or S92 or S93
95	S82 and S94

EconLit (1961 to April 2012)

Searched 25 May 2012 via OvidSP.

ID	Search
1	((self administer$ adj2 questionnaire$) or (self administer$ adj2 survey$) or (selfadminister$ adj2 interview$)).ti, ab. (63)
2	self administer$.ti,ab. (80)
3	2 not 1 (17)
4	(self care or selfcare).ti,ab. (24)
5	(self manag$ or selfmanag$).ti,ab. (374)
6	(self monitor$ or selfmonitor$).ti,ab. (33)
7	(self help or selfhelp).ti,ab. (292)
8	(self diagnos$ or selfdiagnos$ or self assess$ or selfassess$).ti,ab. (357)
9	Self initiated intervention$.ti,ab. (0)
10	Self efficacy.ti,ab. (138)
11	((pharmacist$ or pharmacy or pharmacies) adj2 support$).ti,ab. (2)
12	((pharmacist$ or pharmacy or pharmacies) adj2 assist$).ti,ab. (3)
13	((pharmacist or pharmacy or pharmacies) adj2 (advice or advis$ or inform$)).ti,ab. (2)
14	pharmaceutical care.ti,ab. (20)
15	(self medicat$ or selfmedicat$ or self remed$ or selfremed$).ti,ab. (19)
16	(self treat$ or selftreat$ or self cure or selfcure).ti,ab. (7)
17	Social support$.ti,ab. (223)
18	(group adj1 (support$ or advice or advis$ or monitor$ or intervention$ or train$ or instruction or consult$ or assist$ or education or educate or information)).ti,ab. (240)
19	(peer adj1 (support$ or advice or advis$ or monitor$ or intervention$ or train$ or instruction or consult$ or assist$ or education or educate or information)).ti,ab. (86)
20	expert patient$.ti,ab. (1)
21	Psychosocial support.ti,ab. (3)
22	Befriend$.ti,ab. (5)
23	Health trainer$.ti,ab. (0)
24	telemedicine.ti,ab. (18)
25	telecare.ti,ab. (2)
26	telenursing.ti,ab. (0)
27	telemonitor$.ti,ab. (3)
28	telehealth.ti,ab. (3)
29	((telephon$ or remote or phone) adj2 (follow$ or support or consult$ or advice or advis$ or intervention$ or train$ or instruction or assis$ or educate or education or information or monitor$)).ti,ab. (51)
30	case management.ti,ab. (68)
31	Action plan$.ti,ab. (372)
32	Management plan$.ti,ab. (220)
33	Management program$.ti,ab. (319)
34	care plan$.ti,ab. (146)

APPENDIX 2

ID	Search
35	(nurse adj2 educator$).ti,ab. (0)
36	patient education.ti,ab. (4)
37	(patient adj2 (education or advice or advis$ or instruct$ or educate or train$)).ti,ab. (8)
38	Consumer health information.ti,ab. (8)
39	patient informat$.ti,ab. (6)
40	((financial or monetary or money) adj2 (incentive$ or competition$ or contest$ or lotter$ or reward$ or prize$)).ti,ab. (1622)
41	(contingent payment$ or deposit contract$).ti,ab. (100)
42	(decision$ adj2 support$).ti,ab. (1016)
43	(decision$ adj2 aid$).ti,ab. (275)
44	(shared adj2 decision$).ti,ab. (20)
45	or/3-44 (5975)
46	trial$.ti,ab. (1962)
47	random$.ti,ab. (14667)
48	placebo$.ti,ab. (105)
49	46 or 47 or 48 (16281)
50	45 and 49 (226)

EMBASE < 1974 to 2012 May 17 >

Searched 8 May 2012 via OvidSP.

ID	Search
1	((self administer$ adj2 questionnaire$) or (self administer$ adj2 survey$) or (selfadminister$ adj2 interview$)).ti, ab. (14115)
2	self administer$.ti,ab. (23363)
3	2 not 1 (9253)
4	drug self administration/ (6495)
5	self care/ (24244)
6	(self care or selfcare).ti,ab. (10752)
7	(self manag$ or selfmanag$).ti,ab. (8754)
8	(self monitor$ or selfmonitor$).ti,ab. (5119)
9	(self help or selfhelp).ti,ab. (5355)
10	(self diagnos$ or selfdiagnos$ or self assess$ or selfassess$).ti,ab. (11236)
11	self help/ (10320)
12	Self initiated intervention$.ti,ab. (0)
13	Self efficacy.ti,ab. (11617)
14	self medication/ (7565)
15	((pharmacist$ or pharmacy or pharmacies) adj2 support$).ti,ab. (531)
16	((pharmacist$ or pharmacy or pharmacies) adj2 assist$).ti,ab. (559)
17	((pharmacist or pharmacy or pharmacies) adj2 (advice or advis$ or inform$)).ti,ab. (705)
18	pharmaceutical care.ti,ab. (2633)
19	(self medicat$ or selfmedicat$ or self remed$ or selfremed$).ti,ab. (3548)
20	(self treat$ or selftreat$ or self cure or selfcure).ti,ab. (1673)
21	social support/ (48288)
22	Social support$.ti,ab. (22290)
23	(group adj1 (support$ or advice or advis$ or monitor$ or intervention$ or train$ or instruction or consult$ or assist$ or education or educate or information)).ti,ab. (27340)
24	(peer adj1 (support$ or advice or advis$ or monitor$ or intervention$ or train$ or instruction or consult$ or assist$ or education or educate or information)).ti,ab. (2699)
25	expert patient$.ti,ab. (181)
26	Psychosocial support.ti,ab. (2046)
27	Befriend$.ti,ab. (157)
28	Health trainer$.ti,ab. (33)
29	telemedicine/ or telemonitoring/ (8783)
30	telemedicine.ti,ab. (6025)
31	telecare.ti,ab. (334)
32	telenursing.ti,ab. (73)
33	telemonitor$.ti,ab. (629)
34	telehealth.ti,ab. (1305)
35	teleconsultation/ or telehealth/ (4351)

ID	Search
36	(telephon$ or remote or phone) adj2 (follow$ or support or consult$ or advice or advis$ or intervention$ or train$ or instruction or assis$ or educate or education or information or monitor$)).ti,ab. (9507)
37	Case Management/ (6305)
38	case management.ti,ab. (7581)
39	Action plan$.ti,ab. (3954)
40	Management plan$.ti,ab. (4582)
41	Management program$.ti,ab. (9326)
42	care plan$.ti,ab. (9014)
43	(nurse adj2 educator$).ti,ab. (2285)
44	patient education.ti,ab. (12644)
45	Patient Education/ (78754)
46	(patient adj2 (education or advice or advis$ or instruct$ or educate or train$)).ti,ab. (17190)
47	Consumer health information.ti,ab. (217)
48	patient informat$.ti,ab. (5706)
49	patient information/ (16505)
50	((financial or monetary or money) adj2 (incentive$ or competition$ or contest$ or lotter$ or reward$ or prize$)).ti,ab. (3925)
51	(contingent payment$ or deposit contract$).ti,ab. (27)
52	Decision Making/ (118692)
53	(decision$ adj2 support$).ti,ab. (9560)
54	(decision$ adj2 aid$).ti,ab. (2972)
55	(shared adj2 decision$).ti,ab. (2079)
56	or/3-55 (439409)
57	economics/ (203011)
58	"cost benefit analysis"/ (60778)
59	socioeconomics/ (100782)
60	health economics/ (31596)
61	pharmacoeconomics/ (4331)
62	or/57-61 (360904)
63	(econom$ or cost or costs or costly or costing or price or prices or pricing or pharmacoeconomic$).tw. (507165)
64	(expenditure$ not energy).tw. (20336)
65	(value adj1 money).tw. (22)
66	budget$.tw. (20992)
67	or/63-66 (528132)
68	62 or 67 (772561)
69	(metabolic adj cost).ti,ab,sh. (747)
70	((energy or oxygen) adj cost).ti,ab,sh. (3288)
71	68 not (69 or 70) (768749)
72	hospitalization/ or "length of stay"/ or patient admission/ or patient readmission/ (298948)
73	Health Resources/ (71535)

ID	Search
74	(length adj2 stay).ti,ab. (31313)
75	(duration adj2 stay).ti,ab. (2318)
76	(hospital adj (visit$ or contact$ or attendance$ or admission$ or episode$)).ti,ab. (28409)
77	hospital costs.ti,ab. (4555)
78	(time adj2 discharge).ti,ab. (4432)
79	hospital day$.ti,ab. (5004)
80	((patient$ or inpatient$ or in-patient$) adj (cost$ or stay)).ti,ab. (4612)
81	(number adj2 (nights or days)).ti,ab. (9578)
82	(primary care adj (visit$ or contact$ or attendance$ or admission$ or episode$)).ti,ab. (839)
83	(surgery adj (visit$ or contact$ or attendance$ or admission$ or episode$)).ti,ab. (248)
84	((clinic or surgery or hospital or "accident and emergency") adj2 (work-flow or work flow)).ti,ab. (5)
85	(consultation$ adj2 (time or length)).ti,ab. (1090)
86	(hospitalization$ or hospitalisation$ or rehospitalization$ or rehospitalisation$ or re-hospitalization$ or re-hospitalisation$).ti,ab. (109959)
87	or/72-86 (449902)
88	71 or 87 (1147344)
89	56 and 88 (76004)
90	double-blind$.mp. (168936)
91	placebo$.tw. (179392)
92	blind$.tw. (237886)
93	or/90-92 (348272)
94	89 and 93 (1127)

Ovid MEDLINE(R) < 1946 to May week 2 2012 >

Searched 17 May 2012 via OvidSP.

ID	Search
1	((self administer$ adj2 questionnaire$) or (self administer$ adj2 survey$) or (selfadminister$ adj2 interview$)).ti, ab. (11407)
2	self administer$.ti,ab. (18685)
3	2 not 1 (7279)
4	self administration/ (8219)
5	self care/ (20482)
6	(self care or selfcare).ti,ab. (8196)
7	(self manag$ or selfmanag$).ti,ab. (6120)
8	(self monitor$ or selfmonitor$).ti,ab. (3580)
9	(self help or selfhelp).ti,ab. (3903)
10	(self diagnos$ or selfdiagnos$ or self assess$ or selfassess$).ti,ab. (7806)
11	blood glucose self-monitoring/ (3603)
12	Self initiated intervention$.ti,ab. (0)
13	Self efficacy.ti,ab. (9233)
14	Self Efficacy/ (9738)
15	self medication/ (3692)
16	((pharmacist$ or pharmacy or pharmacies) adj2 support$).ti,ab. (260)
17	((pharmacist$ or pharmacy or pharmacies) adj2 assist$).ti,ab. (298)
18	((pharmacist or pharmacy or pharmacies) adj2 (advice or advis$ or inform$)).ti,ab. (404)
19	pharmaceutical care.ti,ab. (1085)
20	(self medicat$ or selfmedicat$ or self remed$ or selfremed$).ti,ab. (2260)
21	(self treat$ or selftreat$ or self cure or selfcure).ti,ab. (1234)
22	self help groups/ (7313)
23	Social Support/ (44651)
24	Social support$.ti,ab. (17533)
25	(group adj1 (support$ or advice or advis$ or monitor$ or intervention$ or train$ or instruction or consult$ or assist$ or education or educate or information)).ti,ab. (19902)
26	(peer adj1 (support$ or advice or advis$ or monitor$ or intervention$ or train$ or instruction or consult$ or assist$ or education or educate or information)).ti,ab. (2096)
27	expert patient$.ti,ab. (124)
28	Psychosocial support.ti,ab. (1391)
29	Befriend$.ti,ab. (127)
30	Health trainer$.ti,ab. (16)
31	Telemedicine/ (9037)
32	telemedicine.ti,ab. (4870)
33	telecare.ti,ab. (266)
34	telenursing.ti,ab. (68)
35	telemonitor$.ti,ab. (411)

ID	Search
36	telehealth.ti,ab. (1095)
37	Remote Consultation/ (3255)
38	((telephon$ or remote or phone) adj2 (follow$ or support or consult$ or advice or advis$ or intervention$ or train$ or instruction or assis$ or educate or education or information or monitor$)).ti,ab. (6832)
39	Case Management/ (7610)
40	case management.ti,ab. (6359)
41	Action plan$.ti,ab. (2774)
42	Management plan$.ti,ab. (3054)
43	Management program$.ti,ab. (6606)
44	care plan$.ti,ab. (7054)
45	(nurse adj2 educator$).ti,ab. (2129)
46	patient education.ti,ab. (9527)
47	Patient Education as Topic/ (64554)
48	(patient adj2 (education or advice or advis$ or instruct$ or educate or train$)).ti,ab. (12724)
49	Consumer health information.ti,ab. (189)
50	patient informat$.ti,ab. (4002)
51	((financial or monetary or money) adj2 (incentive$ or competition$ or contest$ or lotter$ or reward$ or prize$)).ti,ab. (3140)
52	(contingent payment$ or deposit contract$).ti,ab. (22)
53	Decision Making/ (59912)
54	(decision$ adj2 support$).ti,ab. (7383)
55	(decision$ adj2 aid$).ti,ab. (2138)
56	(shared adj2 decision$).ti,ab. (1548)
57	or/3-56 (314750)
58	economics/ (26272)
59	exp "Costs and Cost Analysis"/ (164383)
60	Value of Life/ (5212)
61	economics, dental/ (1840)
62	exp economics, hospital/ (17897)
63	economics, medical/ (8463)
64	economics, nursing/ (3861)
65	economics, pharmaceutical/ (2327)
66	or/58-64 (212386)
67	(econom$ or cost or costs or costly or costing or price or prices or pricing or pharmacoeconomic$).tw. (370078)
68	(expenditure$ not energy).tw. (15044)
69	(value adj1 money).tw. (18)
70	budget$.tw. (15278)
71	or/67-70 (385856)
72	66 or 71 (488196)
73	(metabolic adj cost).ti,ab,sh. (637)

ID	Search
74	((energy or oxygen) adj cost).ti,ab,sh. (2417)
75	72 not (73 or 74) (485227)
76	hospitalization/ or "length of stay"/ or patient admission/ or patient readmission/ (124493)
77	Health Resources/ (7697)
78	(length adj2 stay).ti,ab. (21033)
79	(duration adj2 stay).ti,ab. (1603)
80	(hospital adj (visit$ or contact$ or attendance$ or admission$ or episode$)).ti,ab. (20388)
81	hospital costs.ti,ab. (3345)
82	(time adj2 discharge).ti,ab. (3045)
83	hospital day$.ti,ab. (3626)
84	((patient$ or inpatient$ or in-patient$) adj (cost$ or stay)).ti,ab. (3090)
85	(number adj2 (nights or days)).ti,ab. (7134)
86	(primary care adj (visit$ or contact$ or attendance$ or admission$ or episode$)).ti,ab. (670)
87	(surgery adj (visit$ or contact$ or attendance$ or admission$ or episode$)).ti,ab. (177)
88	((clinic or surgery or hospital or "accident and emergency") adj2 (work-flow or work flow)).ti,ab. (3)
89	(consultation$ adj2 (time or length)).ti,ab. (791)
90	(hospitalization$ or hospitalisation$ or rehospitalization$ or rehospitalisation$ or re-hospitalization$ or re-hospitalisation$).ti,ab. (76212)
91	or/76-90 (214119)
92	75 or 91 (662098)
93	randomized controlled trial.pt. (326816)
94	controlled clinical trial.pt. (84077)
95	randomized.ab. (230964)
96	placebo.ab. (131080)
97	clinical trials as topic.sh. (159974)
98	randomly.ab. (166761)
99	trial.ti. (99783)
100	or/93-99 (757942)
101	(animals not (humans and animals)).sh. (3623284)
102	100 not 101 (698837)
103	57 and 92 and 102 (5804)

Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations < May 16, 2012 >

Searched 7 May 2012 via OvidSP.

ID	Search
1	((self administer$ adj2 questionnaire$) or (self administer$ adj2 survey$) or (selfadminister$ adj2 interview$)).ti, ab. (615)
2	self administer$.ti,ab. (948)
3	2 not 1 (333)
4	self administration/ (0)
5	self care/ (0)
6	(self care or selfcare).ti,ab. (382)
7	(self manag$ or selfmanag$).ti,ab. (511)
8	(self monitor$ or selfmonitor$).ti,ab. (230)
9	(self help or selfhelp).ti,ab. (168)
10	(self diagnos$ or selfdiagnos$ or self assess$ or selfassess$).ti,ab. (431)
11	blood glucose self-monitoring/ (0)
12	Self initiated intervention$.ti,ab. (0)
13	Self efficacy.ti,ab. (629)
14	Self Efficacy/ (0)
15	self medication/ (0)
16	((pharmacist$ or pharmacy or pharmacies) adj2 support$).ti,ab. (18)
17	((pharmacist$ or pharmacy or pharmacies) adj2 assist$).ti,ab. (17)
18	((pharmacist or pharmacy or pharmacies) adj2 (advice or advis$ or inform$)).ti,ab. (16)
19	pharmaceutical care.ti,ab. (64)
20	(self medicat$ or selfmedicat$ or self remed$ or selfremed$).ti,ab. (127)
21	(self treat$ or selftreat$ or self cure or selfcure).ti,ab. (54)
22	self help groups/ (0)
23	Social Support/ (0)
24	Social support$.ti,ab. (960)
25	(group adj1 (support$ or advice or advis$ or monitor$ or intervention$ or train$ or instruction or consult$ or assist$ or education or educate or information)).ti,ab. (1223)
26	(peer adj1 (support$ or advice or advis$ or monitor$ or intervention$ or train$ or instruction or consult$ or assist$ or education or educate or information)).ti,ab. (163)
27	expert patient$.ti,ab. (10)
28	Psychosocial support.ti,ab. (68)
29	Befriend$.ti,ab. (14)
30	Health trainer$.ti,ab. (1)
31	Telemedicine/ (0)
32	telemedicine.ti,ab. (299)
33	telecare.ti,ab. (28)
34	telenursing.ti,ab. (2)

ID	Search
35	telemonitor$.ti,ab. (57)
36	telehealth.ti,ab. (73)
37	Remote Consultation/ (0)
38	((telephon$ or remote or phone) adj2 (follow$ or support or consult$ or advice or advis$ or intervention$ or train$ or instruction or assis$ or educate or education or information or monitor$)).ti,ab. (468)
39	Case Management/ (0)
40	case management.ti,ab. (205)
41	Action plan$.ti,ab. (204)
42	Management plan$.ti,ab. (213)
43	Management program$.ti,ab. (443)
44	care plan$.ti,ab. (275)
45	(nurse adj2 educator$).ti,ab. (73)
46	patient education.ti,ab. (410)
47	Patient Education as Topic/ (0)
48	(patient adj2 (education or advice or advis$ or instruct$ or educate or train$)).ti,ab. (585)
49	Consumer health information.ti,ab. (5)
50	patient informat$.ti,ab. (185)
51	((financial or monetary or money) adj2 (incentive$ or competition$ or contest$ or lotter$ or reward$ or prize$)).ti,ab. (193)
52	(contingent payment$ or deposit contract$).ti,ab. (0)
53	Decision Making/ (0)
54	(decision$ adj2 support$).ti,ab. (594)
55	(decision$ adj2 aid$).ti,ab. (151)
56	(shared adj2 decision$).ti,ab. (134)
57	or/3-56 (8452)
58	economics/ (0)
59	exp "Costs and Cost Analysis"/ (0)
60	Value of Life/ (0)
61	economics, dental/ (0)
62	exp economics, hospital/ (0)
63	economics, medical/ (0)
64	economics, nursing/ (0)
65	economics, pharmaceutical/ (0)
66	or/58-64 (0)
67	(econom$ or cost or costs or costly or costing or price or prices or pricing or pharmacoeconomic$).tw. (28822)
68	(expenditure$ not energy).tw. (724)
69	(value adj1 money).tw. (2)
70	budget$.tw. (1467)
71	or/67-70 (30285)
72	66 or 71 (30285)

ID	Search
73	(metabolic adj cost).ti,ab,sh. (42)
74	((energy or oxygen) adj cost).ti,ab,sh. (157)
75	72 not (73 or 74) (30087)
76	hospitalization/ or "length of stay"/ or patient admission/ or patient readmission/ (0)
77	Health Resources/ (0)
78	(length adj2 stay).ti,ab. (1158)
79	(duration adj2 stay).ti,ab. (90)
80	(hospital adj (visit$ or contact$ or attendance$ or admission$ or episode$)).ti,ab. (985)
81	hospital costs.ti,ab. (122)
82	(time adj2 discharge).ti,ab. (183)
83	hospital day$.ti,ab. (106)
84	((patient$ or inpatient$ or in-patient$) adj (cost$ or stay)).ti,ab. (142)
85	(number adj2 (nights or days)).ti,ab. (344)
86	(primary care adj (visit$ or contact$ or attendance$ or admission$ or episode$)).ti,ab. (31)
87	(surgery adj (visit$ or contact$ or attendance$ or admission$ or episode$)).ti,ab. (8)
88	((clinic or surgery or hospital or "accident and emergency") adj2 (work-flow or work flow)).ti,ab. (0)
89	(consultation$ adj2 (time or length)).ti,ab. (37)
90	(hospitalization$ or hospitalisation$ or rehospitalization$ or rehospitalisation$ or re-hospitalization$ or re-hospitalisation$).ti,ab. (3472)
91	or/76-90 (6050)
92	75 or 91 (35061)
93	randomized controlled trial.pt. (608)
94	controlled clinical trial.pt. (25)
95	randomized.ab. (11733)
96	placebo.ab. (4872)
97	clinical trials as topic.sh. (0)
98	randomly.ab. (11517)
99	trial.ti. (4683)
100	or/93-99 (27008)
101	(animals not (humans and animals)).sh. (1)
102	100 not 101 (27008)
103	57 and 92 and 102 (209)

NHS Economic Evaluation Database

Searched 20 June 2012 via The Cochrane Library.

ID	Search
1	(self NEXT administer*) in Economic Evaluations
2	MeSH descriptor Self Administration, this term only
3	MeSH descriptor Self Care, this term only
4	"self care" or (selfcare) or (self NEXT manage*) or (selfmonitor*) or (self NEXT monitor*) in Economic Evaluations
5	(selfhelp) or "self help" or (self NEXT diagnos*) or (selfdiagnos*) in Economic Evaluations
6	(self NEXT assess*) or (selfassess*) in Economic Evaluations
7	MeSH descriptor Blood Glucose Self-Monitoring, this term only
8	"self initiated intervention" in Economic Evaluations
9	(self NEXT initiated NEXT intervent*) in Economic Evaluations
10	MeSH descriptor Self Efficacy, this term only
11	MeSH descriptor Self Medication explode all trees
12	"self efficacy" or (pharmacist* or pharmacy or pharmacies) NEAR/2 support* in Economic Evaluations
13	(pharmacist* or pharmacy or pharmacies) NEAR/2 assist* or (pharmacist* or pharmacy or pharmacies) NEAR/2 (advice or advis* or inform*) or "pharmaceutical care" in Economic Evaluations
14	(self NEXT medicat*) or (selfmedicat*) or (self NEXT remed*) or (selfremed*) in Economic Evaluations
15	(self NEXT treat*) or (selftreat*) or "self cure" or (selfcure) in Economic Evaluations
16	MeSH descriptor Self-Help Groups, this term only
17	MeSH descriptor Social Support explode all trees
18	(social NEXT support*) in Economic Evaluations
19	(group NEAR/1 (support* or advice or advis* or monitor* or intervention* or train* or instruction or consult* or assist* or education or information)) in Economic Evaluations
20	(peer NEAR/1 (support* or advice or advis* or monitor* or intervention* or train* or instruction or consult* or assist* or education or information)) in Economic Evaluations
21	(expert NEXT patient*) or "psychosocial support" or (befriend*) or (health NEXT trainer*) in Economic Evaluations
22	MeSH descriptor Telemedicine, this term only
23	(telemedicine) or (telecare) or (telenursing) or (telemonitor*) or (telehealth) in Economic Evaluations
24	MeSH descriptor Remote Consultation, this term only
25	(telephon* or remote or phone) NEAR/2 (follow* or support or consult* or advice or advis* or intervention or train* or instruction or assist* or educate or education or information or monitor*) in Economic Evaluations
26	"case management" or (action NEXT plan*) or (management NEXT plan*) or (management NEXT program*) or (care NEXT plan*) in Economic Evaluations
27	(nurse NEAR/2 educator*) in Economic Evaluations
28	"patient education" in Economic Evaluations
29	MeSH descriptor Patient Education as Topic, this term only
30	MeSH descriptor Case Management, this term only
31	(patient NEAR/2 (education or advice or advis* or instruct* or educate or train*)) in Economic Evaluations
32	"consumer health information" or "patient information" in Economic Evaluations
33	(financial or monetary or money) NEAR/2 (incentive* or competition* or contest* or lotter* or reward* or prize*) in Economic Evaluations

ID	Search
34	(contingent NEXT payment*) or (deposit NEXT contract*) or (decision NEAR/2 support*) or (decision NEAR/2 aid*) or (shared NEAR/2 decision*) in Economic Evaluations
35	MeSH descriptor Decision Making, this term only
36	(#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 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 OR #33 OR #34 OR #35)
37	MeSH descriptor Hospitalization explode all trees
38	MeSH descriptor Health Resources, this term only
39	(length NEAR/2 stay) or (duration NEAR/2 stay) or (hospital NEAR/1 (visit* or contact* or attendance* or admission* or episode*)) or (time NEAR/2 discharge) or (hospital NEXT day*) in Economic Evaluations
40	(patient* or inpatient* or in-patient*) NEAR/1 (cost* or stay) or (number NEAR/2 (nights or days)) in Economic Evaluations
41	"primary care" NEAR/2 (visit* or contact* or attendance* or admission* or episode*) or (surgery NEAR/2 (visit* or contact* or attendance* or admission* or episode*)) in Economic Evaluations
42	(clinic or surgery or hospital or "accident and emergency") NEAR/2 (work-flow or "work flow") in Economic Evaluations
43	(consultation* NEAR/2 (time or length)) or (hospitalization* or hospitalisation* or rehospitalization* or rehospitalisation* or re-hospitalization* or re-hospitalisation*) or "hospital costs" in Economic Evaluations
44	(#37 OR #38 OR #39 OR #40 OR #41 OR #42 OR #43)
45	(#36 AND #44)

PsycINFO < 1806 to May week 3 2012 >

Searched 18 May 2012 via OvidSP.

ID	Search
1	((self administer$ adj2 questionnaire$) or (self administer$ adj2 survey$) or (selfadminister$ adj2 interview$)).ti, ab. (4088)
2	self administer$.ti,ab. (8158)
3	2 not 1 (4071)
4	Drug Self Administration/ (1142)
5	exp Self Help Techniques/ (7116)
6	Self Monitoring/ (2211)
7	(self care or selfcare).ti,ab. (4718)
8	(self manag$ or selfmanag$).ti,ab. (4597)
9	(self monitor$ or selfmonitor$).ti,ab. (4179)
10	(self help or selfhelp).ti,ab. (5924)
11	(self diagnos$ or selfdiagnos$ or self assess$ or selfassess$).ti,ab. (5035)
12	Self initiated intervention$.ti,ab. (0)
13	Self efficacy.ti,ab. (19044)
14	Self Efficacy/ (12331)
15	self medication/ (457)
16	((pharmacist$ or pharmacy or pharmacies) adj2 support$).ti,ab. (25)
17	((pharmacist$ or pharmacy or pharmacies) adj2 assist$).ti,ab. (28)
18	((pharmacist or pharmacy or pharmacies) adj2 (advice or advis$ or inform$)).ti,ab. (37)
19	pharmaceutical care.ti,ab. (79)
20	(self medicat$ or selfmedicat$ or self remed$ or selfremed$).ti,ab. (1004)
21	(self treat$ or selftreat$ or self cure or selfcure).ti,ab. (311)
22	exp Support Groups/ (4553)
23	Social Support/ (23928)
24	Social support$.ti,ab. (28222)
25	(group adj1 (support$ or advice or advis$ or monitor$ or intervention$ or train$ or instruction or consult$ or assist$ or education or educate or information)).ti,ab. (13907)
26	(peer adj1 (support$ or advice or advis$ or monitor$ or intervention$ or train$ or instruction or consult$ or assist$ or education or educate or information)).ti,ab. (2962)
27	expert patient$.ti,ab. (62)
28	Psychosocial support.ti,ab. (867)
29	Befriend$.ti,ab. (309)
30	Health trainer$.ti,ab. (8)
31	Telemedicine/ (1805)
32	telemedicine.ti,ab. (696)
33	telecare.ti,ab. (96)
34	telenursing.ti,ab. (13)
35	telemonitor$.ti,ab. (62)

ID	Search
36	telehealth.ti,ab. (429)
37	((telephon$ or remote or phone) adj2 (follow$ or support or consult$ or advice or advis$ or intervention$ or train$ or instruction or assis$ or educate or education or information or monitor$)).ti,ab. (2353)
38	exp Case Management/ (2565)
39	case management.ti,ab. (3412)
40	Action plan$.ti,ab. (1591)
41	Management plan$.ti,ab. (614)
42	Management program$.ti,ab. (2754)
43	care plan$.ti,ab. (1847)
44	(nurse adj2 educator$).ti,ab. (469)
45	patient education.ti,ab. (1727)
46	(patient adj2 (education or advice or advis$ or instruct$ or educate or train$)).ti,ab. (2517)
47	Consumer health information.ti,ab. (23)
48	patient informat$.ti,ab. (544)
49	((financial or monetary or money) adj2 (incentive$ or competition$ or contest$ or lotter$ or reward$ or prize$)).ti,ab. (2415)
50	(contingent payment$ or deposit contract$).ti,ab. (26)
51	Decision Making/ (38754)
52	(decision$ adj2 support$).ti,ab. (2711)
53	(decision$ adj2 aid$).ti,ab. (1006)
54	(shared adj2 decision$).ti,ab. (944)
55	5or/3-54 (161780)
56	Economics/ (12133)
57	Health Care Economics/ (291)
58	exp Costs/ and Cost Analysis/ (0)
59	Pharmacoeconomics/ (182)
60	or/56-59 (12545)
61	(econom$ or cost or costs or costly or costing or price or prices or pricing or pharmacoeconomic$).tw. (129318)
62	(expenditure$ not energy).tw. (4346)
63	(value adj1 money).tw. (26)
64	budget$.tw. (4840)
65	or/61-64 (134996)
66	60 or 65 (135864)
67	metabolic adj cost).ti,ab,sh. (47)
68	((energy or oxygen) adj cost).ti,ab,sh. (153)
69	66 not (67 or 68) (135669)
70	hospitalization/ (4209)
71	exp Hospital Admission/ (3535)
72	Treatment Duration/ (2959)
73	Health Care Utilization/ (10577)

ID	Search
74	(length adj2 stay).ti,ab. (2943)
75	(duration adj2 stay).ti,ab. (198)
76	(hospital adj (visit$ or contact$ or attendance$ or admission$ or episode$)).ti,ab. (3068)
77	hospital costs.ti,ab. (153)
78	(time adj2 discharge).ti,ab. (489)
79	hospital day$.ti,ab. (327)
80	((patient$ or inpatient$ or in-patient$) adj (cost$ or stay)).ti,ab. (542)
81	(number adj2 (nights or days)).ti,ab. (1513)
82	(primary care adj (visit$ or contact$ or attendance$ or admission$ or episode$)).ti,ab. (272)
83	(surgery adj (visit$ or contact$ or attendance$ or admission$ or episode$)).ti,ab. (8)
84	((clinic or surgery or hospital or "accident and emergency") adj2 (work-flow or work flow)).ti,ab. (0)
85	(consultation$ adj2 (time or length)).ti,ab. (215)
86	(hospitalization$ or hospitalisation$ or rehospitalization$ or rehospitalisation$ or re-hospitalization$ or re-hospitalisation$).ti,ab. (17964)
87	or/70-86 (40346)
88	69 or 87 (171172)
89	55 and 88 (15697)
90	clinical trials/ or "treatment outcome clinical trial".md. or ((randomi?ed adj7 trial*) or ((single or doubl* or tripl* or treb*) and (blind* or mask*)) or (controlled adj3 trial*) or (clinical adj2 trial*)).ti,ab,id. (60572)
91	89 and 90 (975)

Appendix 3 Economic checklists

Q1 Study clarity.

Q2 Comprehensive description of competing alternatives.

Q3 Perspective.

1 = Societal (26%).

2 = Health-care system and patient (8%).

3 = Health-care system (55%).

4 = Not clear (11%).

Q4 Study design.

5 = RCT (55%).

6 = Case–control trial (13%).

7 = Before and after (24%).

8 = Decision model (8%).

Q5 Economic study design.

9 = Cost-effectiveness analysis (32%).

10 = Cost–consequence analysis (63%).

11 = Cost–utility analysis (5%).

Q6 Design adequacy given study type.

Q7a Relevant costs identified.

Q7b Relevant consequences identified.

Q8a Costs measured accurately.

Q8b Consequences measured adequately.

Q9 Statistical analysis appropriateness given the design.

Q10a Subgroup analysis.

Q10b Subgroups prespecified.

Q11 Discounting.

Q12 Incremental analysis.

Q13 Allowance for uncertainty.

Q14 Missing data handled appropriately.

Q15a Economic model.

Q15b Appropriateness of economic model.

Q16 Funder stated (yes/no).

Q16a Type of funder.

12 = Public/voluntary sector (70%).

13 = Private sector (16%).

14 = Do not state (14%).

Q16b Generalisability.

Q16c Presentation and discussion of key results.

Study ID	Q1	Q2	Q3	Q4	Q5	Q6	Q7a	Q7b	Q8a	Q8b	Q9	Q10a	Q10b	Q11	Q12	Q13	Q14	Q15a	Q15b	Q16	Q16a	Q16b	Q16c
Barton *et al.*[156]	✓	✓	3	5	11	✓	✓	✓	✓	✓	✓	✗	N/A	N/A	✓	✓	✓	X	N/A	✓	12	✓	✓
Bosmans *et al.*[138]	✓	✓	1	5	9	✓	✓	✓	✓	✓	✓	✗	N/A	N/A	✓	✓	✗	✗	N/A	✓	12	✓	✓
Bosmans *et al.*[139]	✓	✓	3	5	11	✓	✓	✓	✓	✓	✓	✗	N/A	N/A	✓	?	✗	✗	N/A	✓	12	✓	✓
Bulthuis *et al.*[146]	✓	✓	1	5	11	✓	✓	✓	✓	✓	✓	✗	N/A	N/A	✓	✗	✗	✗	N/A	✓	12	✓	✓
Capomolla *et al.*[134]	✓	✓	4	5	11	✓	✗	✓	✗	✓	?	✗	N/A	✗	?	✗	✗	✗	N/A	✗	N/A	✗	✗
Cronan *et al.*[147] and Groessl *et al.*[148]	✓	✓	3	5	10	✓	✓	✓	✓	✓	✓	✗	N/A	✓	✓	✓	✗	✗	N/A	✓	12	✓	✓
Gallefoss and Bakke[123]	✓	✓	1	5	9	✓	✓	✓	✓	✓	✓	✗	N/A	N/A	✓	✓	✗	✗	N/A	✓	12	✓	✓
Gillet *et al.*[131]	✓	✓	3	5	11	✓	?	✓	✓	✓	✓	✗	N/A	✓	✓	✓	?	✓	✓	✓	12	✓	✓
Graves *et al.*[161]	✓	✓	3	8	9	✓	✓	✓	?	✓	✓	✗	N/A	✓	✓	✓	?	✓	✓	✓	15	✓	✓
Handley *et al.*[133]	✓	✓	3	5	11	✓	✗	✓	✗	✓	✓	✗	N/A	N/A	✓	✓	?	✗	N/A	✓	12	✗	✓
Henderson *et al.*[163]	✓	✓	3	5	11	✓	✓	✓	✓	✓	✓	✗	N/A	N/A	✓	✓	✓	✗	N/A	✓	12	✓	✓
Hurley *et al.*[149]	✓	✓	1	5	11	✓	✓	✓	✓	✓	✓	✗	N/A	N/A	✓	✓	✗	✗	N/A	✓	12	✓	✓
Irvine *et al.*[132]	✓	✓	3	5	11	✓	?	✓	✓	✓	✓	✓	✓	N/A	✓	✓	✓	✗	N/A	✓	12	✓	✓
Jessep *et al.*[157]	✓	✓	3	5	9	✓	✓	✓	✓	✓	✓	✗	N/A	N/A	✓	✗	?	✗	N/A	✓	12	✗	✓
Jolly *et al.*[135]	✓	✓	1	5	11	✓	✓	✓	✓	✓	✓	✓	✓	N/A	✓	✓	?	✗	N/A	✓	12	✓	✓
Katon *et al.*[270]	✓	✓	3	5	9	✓	✓	✓	✓	✓	✓	✗	N/A	N/A	✓	✗	✗	✗	N/A	✓	12/13	✗	✓
Katon *et al.*[140,165]	✓	✓	3	5	11	✓	✓	✓	✓	✓	✓	✗	N/A	N/A	✓	✓	✗	✗	N/A	✓	12	✓	✓
Kaupinnen *et al.*[124]	✓	✓	2	5	9	✓	✓	✓	✓	✓	✗	✗	N/A	N/A	✓	✓	✗	✗	N/A	✓	12	✓	✓
Kennedy *et al.*[162] and Richardson *et al.*[164]	✓	✓	2	5	11	✓	✓	✓	✓	✓	✓	✗	N/A	N/A	✓	✓	✓	✗	N/A	✓	12	✓	✓
Khdour *et al.*[125]	✓	✓	3	5	11	✓	✓	✓	✓	✓	✓	✗	N/A	N/A	✓	✓	✓	✗	N/A	✓	12	✓	✓
Koff *et al.*[126]	✓	✓	3	5	10	✓	✗	✓	✓	✓	✗	✗	N/A	N/A	✓	✓	?	✗	N/A	✓	?	✓	✓
Lewin *et al.*[136]	✓	✓	3	5	11	✓	?	✓	✓	✓	✓	✗	N/A	N/A	✓	✗	?	✗	N/A	✓	13	✗	?

Study ID	Q1	Q2	Q3	Q4	Q5	Q6	Q7a	Q7b	Q8a	Q8b	Q9	Q10a	Q10b	Q11	Q12	Q13	Q14	Q15a	Q15b	Q16	Q16a	Q16b	Q16c
Meijer *et al.*[150]	✓	✓	?	5	10	✗	✓	✓	✓	✓	✓	✗	N/A	N/A	✓	✗	?	✗	N/A	✓	12	✓	✓
Monninkhof *et al.*[127]	✓	✓	1	5	11	✓	✓	✓	✓	✓	✓	✗	N/A	N/A	✓	✓	?	✓	✓	✓	13	✗	✓
Niemisto *et al.*[158]	✓	✓	1	5	9	✓	✓	✓	✓	✓	✓	✗	N/A	✗	✓	✓	✗	✗	N/A	✓	12	✓	✓
Patel *et al.*[151]	✓	✓	1	5	11	✓	?	✓	✓	✓	✓	✗	N/A	N/A	✓	✓	✓	✗	N/A	✓	12	✓	✓
Pyne *et al.*[142]	✓	✓	3	5	11	✓	✓	✓	✓	✓	✓	✗	N/A	N/A	✓	✓	✗	✗	N/A	✓	12	✓	✓
Roelofs *et al.*[159]	✓	✓	1	5	9	✓	✓	✓	✓	✓	✓	✗	N/A	N/A	✓	✓	✓	✗	N/A	✓	15	✓	✓
Schermer *et al.*[128]	✓	✓	1	5	11	✓	✓	✓	✓	✓	✓	✗	N/A	✗	✓	✓	✗	✗	N/A	✓	12	✓	✓
Sevick *et al.*[152]	✓	✓	3	5	9	✓	✓	✓	✓	✓	✓	✗	N/A	✗	✓	✗	✗	✗	N/A	✓	12	✓	✓
Simon *et al.*[278]	✓	✓	3	5	9	✓	✓	✓	✓	✓	✓	✗	N/A	N/A	✓	✓	✗	✗	N/A	✓	12	✓	✓
Simon *et al.*[145]	✓	✓	3	5	9	✓	✓	✓	✓	✓	✓	✗	N/A	N/A	✓	✓	✗	✗	N/A	✓	12	✓	✓
Simon *et al.*[130] low intensity	✓	✓	3	5	11	✓	?	✓	✓	✓	✓	✗	N/A	✓	✓	✓	✓	✓	✓	✓	12	✓	✓
Simon *et al.*[130] high intensity	✓	✓	3	5	9	✓	✓	✓	✓	✓	✓	✗	N/A	N/A	✓	✓	✗	✗	N/A	✓	12	✓	✓
Strong *et al.*[160] LI	✗	✓	3	5?	9	?	✓	✓	✓	✓	?	✗	N/A	N/A	✓	✓	✗	✗	N/A	✓	15	✗	✗
Strong *et al.*[160] PI	✗	✓	3	5?	9	?	✓	✓	✓	✓	?	✗	N/A	N/A	✓	✓	✗	✗	N/A	✓	15	✗	✗
Taylor *et al.*[137]	✓	✓	3	5	11	✓	?	✓	✓	✓	✓	✗	N/A	N/A	✓	✓	✗	✗	N/A	✓	12	✗	✓
Thomas *et al.*[153]	✓	✓	3	5	9	✓	✓	✓	✓	✓	✓	✓	?	✓	✓	✓	✗	✗	N/A	✓	12	✗	✓
Van der Meer *et al.*[129]	✓	✓	1	5	11	✓	✓	✓	✓	✓	✓	✗	N/A	N/A	✓	✓	✓	✗	N/A	✓	12	✗	✓
Weinburger *et al.*[154]	✓	✓	3	5	9	✓	✓	✓	✓	✓	✓	✗	N/A	N/A	✓	✗	✗	✗	N/A	✓	12	✓	✓
Whitehurst *et al.*[155]	✓	✓	2	5	11	✓	✓	✓	✓	✓	✓	✗	N/A	N/A	✓	✓	✓	✗	N/A	✓	12	✓	✓

✗, no; ✓, yes; ?, unclear; LI, a lay-led self-care intervention; N/A, not applicable; PI, a psychologist-led self-care intervention.
'Low intensity' is use of blood glucose meter and advice to contact GP for interpretation; 'high intensity' is use of blood glucose meter and training to interpret results.

Appendix 4 Details of individual studies: context

Study ID (first author and reference number)	Country	*n*	Other LTCs excluded	Measures of effectiveness	Health utilisation outcomes	Costs measures/types
Angermann[201]	Germany	715	No	SF-36	Hospitalisations, inpatient admissions, physician contacts, medication, outpatient visits	
Barnason[202]	USA	280	No	SF-36	Hospitalisations, emergency department visits, health-care provider visits for cardiac problems	
Barton[156]	UK	389	Yes	WOMAC, EQ-5D, QALYs	Hospitalisations, GP visits, outpatient visits, inpatient admissions, nurse visits, other health professional visits	Total costs, health-care visits costs, medication costs, use of other resources related to knee pain (GP, nurse, other health-care professional or hospital, inpatient and outpatient visits) at 1-year follow-up
Barton[156]	UK	389	Yes	WOMAC, EQ-5D, SF-36	Hospitalisations, GP visits, outpatient visits, nurse visits, other health professional visits	Total costs, health-care visits costs, medication costs
Barton[156]	UK	389	Yes	WOMAC, EQ-5D, SF-36	Hospitalisations, GP visits, outpatient visits, nurse visits, other health professional visits	Total costs, health-care visits costs, medication costs
Bauer[263]	USA	330	No	SF-36, Mental Health Collaborative Study instrument	Hospitalisations, medication	Total, hospitalisation, inpatient, outpatient
Bauml[264]	Germany	236	No	Lancashire QoL Profile (*z*-value), BPRS, Global Assessment of Functioning	Hospital days, hospitalisations, medication	
Beck[282]	USA	221	No	SF-36	CHCC visits, emergency department visits, other visits, calls to nurse and doctor, exams/tests, hospitalisations	Script costs, total costs, hospitalisation costs, intervention costs, CHCC group visits
Beckerman[166]	Israel	42	No	SGRQ, modified Borg scale	Hospital days, hospitalisations, primary care consultations	
Behnke[167]	Germany	26	No	CRQ, modified Borg scale; BDIndex/ Transition Dyspnoea Index	Hospitalisations, medication	
Bocchi[203]	Brazil	350	Yes	MLHFQ	Hospitalisations, hospital days, emergency care, medical treatment	

Study ID (first author and reference number)	Country	*n*	Other LTCs excluded	Measures of effectiveness	Health utilisation outcomes	Costs measures/types
Bosmans[139]	Netherlands	145	Yes	PRIME-MD, EQ-5D, MADRS, QALYs	Hospitalisations, outpatient, inpatient, primary care, medication, supportive care, direct non-health care	Total, hospitalisation, primary care, secondary care, supportive care, direct non-health care, psychotropic medication, intervention
Bosmans[138]	Netherlands	151	No	Hopkins SCL	GP visits, specialist visits, out of work, tests, medication	Total costs, primary care costs, secondary care costs, medication, intervention, patient costs
Bouvy[204]	Netherlands	152	No	Dartmouth Primary Care Cooperative Information Project/World Organisation of National Colleges, Academies, and Academic Associations of General Practice/ Family Physicians, MLHFQ	Total number of hospitalisations, planned readmissions, other hospital admission, medication	
Boxall[168]	Australia	60	No	CRQ, SGRQ, modified Borg scale, Bartel Activities of Daily Living Index, SPMSQ	Hospitalisations, average length of stay at readmission	
Brotons[205]	Spain	283	No	MLHFQ	Hospitalisations, medication	
Brun[257]	France	74	No	French translation of NHP, French translation of DQoL	Hospital admissions, number of outpatient consultations with GP + specialists, medication	Total costs
Bulthuis[146]	Netherlands	85	Yes	SF-36, HAQ, McMaster Toronto Arthritis Patient Preference Disability Questionnaire, QALYs	Hospitalisation, primary care, outpatient, specialist visits, medication, professional domestic care, other paramedical help	Total, hospitalisation, primary care, inpatient, outpatient, specialist, paramedical, alternative, aids used, medication, patient costs, absenteeism, domestic help, formal care, informal care, intervention
Capomolla[134]	USA	235	No	QALYs	Hospitalisations, medication	Total costs, pharmacological costs, case management costs
Castro[169]	USA	96	No	AQLQ	Hospital readmissions, hospital days, emergency room visits, health-care provider visits, medications	Total costs, hospitalisations, emergency department visits, health-care provider visits, nurse/paid caregiver, tests, asthma medication, loss of productivity/time, intervention costs, non-professional/ other paid help, unpaid caregiver costs

Study ID (first author and reference number)	Country	*n*	Other LTCs excluded	Measures of effectiveness	Health utilisation outcomes	Costs measures/types
Clark[170]	USA	808	No	Mini asthma QoL	Hospitalisations, emergency department visits, unscheduled and scheduled visits to clinic, medication	
Clarke[265]	USA	255	No	PCS and MCS SF-12, CES-D	Mental health outpatients visits, medication, general health services outpatient visits	
Clarke[265]	USA	255	No	SF-36, CES-D	Outpatients visits, medication	
Cline[206]	Sweden	206	Yes	QoL in heart failure questionnaire, Nottingham health profile, patients' global self-assessment	Hospitalisations, hospital days, days to readmission, outpatient visits, medication	Doctor visits, hospitalisations, intervention, total costs
Coull[208]	UK	320	No	SF-36, HADS-depression, HADS-anxiety	Medication, use of secondary care health services	
Coultas[171]	USA	151	No	SF-36, SGRQ, CES-D questionnaire, BSI-18	Hospitalisations (lung disease), emergency department visits, GP visits, medication, hospitalisations (other diseases), emergency department visits, GP visits	
Coultas[171]	USA	151	No	SF-36, SGRQ, CES-D questionnaire	Hospitalisations, emergency department visits, GP visits	
Davidson[209]	Australia	105	No	Heart Failure Needs Assessment Questionnaire, MLHFQ, NYHA	Hospitalisations, medication	
Davies[262]	UK	300	No	Audit of Diabetes Dependent QoL	GP contacts, other contacts, readmissions, referrals to community diabetes specialist nurse service, time away from normal activities, time in days to readmission, frequency of readmission, hospital length of stay	Hospital length of stay costs
de la Porte[210]	Netherlands	240	Yes	SF-36, MLHFQ, NYHA	Hospitalisations, days in hospital, medication, outpatient visits	Total costs, hospitalisations, days in hospital, outpatient clinic costs, intervention, total patient costs
den Boer[266]	UK	151	Yes	World Health Organization QoL Assessment, SCL-90 (depression, anxiety), BDI, STAI	Contacts with specialists (psychiatrist, other mental health caregivers, including and excluding) cognitive self-help therapist	

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de Oliveira[172]	Brazil	52	No	Modified QoL questionnaire	Hospital admissions, emergency department visits, medication	
Dekker[211]	USA	41	No	BDI-II, Crandell Cognitions Inventory, MLHFQ	Hospitalisations, emergency department visits	
DeWalt[212]	USA	605	No	Improving Chronic Illness Care Evaluation Heart Failure Symptom Scale, Short-test of Functional Health Literacy in Adults, NYHA	Hospitalisations, emergency department visits	
DeWalt[213]	USA	127	No	MLHFQ	Hospitalisations, reason for admissions (cardiac), medication	
Doughty[214]	New Zealand	197	No	MLHFQ	Hospital days, hospitalisations, readmissions for worsening heart failure	
Dougherty[215]	USA	168	No	SF-12, CES-D, STAI	Hospital visits, emergency department visits, clinic visits	
Druss[267]	USA	80	No	MCS SF-36	Primary care visits	
Dunagan[216]	USA	151	Yes	SF-12 not 36, MLHFQ, BDI, NYHA	Hospitalisations, hospital admissions for heart failure, hospital encounters, hospital days, emergency department visits	Hospital costs
Dunn[268]	USA	101	Yes	Self-Control Questionnaire for Depression, CAPS Davidson Traumatic Stress Scale, Hamilton Depression Scale, BDI-II, Global Severity Index of BSI, the ASI	Hospitalisations, outpatient visits, clinic visits, medication	Discharges, visits, inpatient, outpatient, pharmacy
Dunbar[217]	USA	246	Yes	BDI-II, STAI-anxiety, Duke Activity Status Inventory	Hospitalisations, emergency department visits, calls to providers, missed work for any reason	
Dunbar[217]	USA	246	Yes	BDI-II, STAI-anxiety	Hospitalisations, emergency department visits, calls to providers, missed work for any reason	

Study ID (first author and reference number)	Country	*n*	Other LTCs excluded	Measures of effectiveness	Health utilisation outcomes	Costs measures/types
Eaton[173]	New Zealand	97	Yes	BMI, airflow obstruction, dyspnoea and exercise capacity index, Chronic Respiratory Questionnaire Self-Administered, SF-36, HADS	Hospitalisations, time to first COPD-related readmission, hospital days, emergency department visits (emergency departments or primary care), number of inpatient admissions	
Gallefoss[123]	Norway	78	No	HRQoL, SGRQ	Monthly GP visits, medication, specialist doctor visits, hospitalisations	Total costs, hospitalisation costs, physician costs, travel costs, patient costs, intervention costs, time cost for those employed/not employed, medication
Gesica[218]	UK	1518	No	MLHFQ, NYHA	Hospitalisations, medication	
Gillett[131]	UK	824	No	EQ-5D, QALYs	Medication, health-care resources (in terms of GP, nurse, physiotherapist, podiatrist, dietitian, optician)	Total costs, primary care visits costs, other health-care resource visits costs, intervention costs, medication costs, remaining lifetime discounted costs, patient costs
Goldberg[219]	USA	180	No	SF-36 [error, should be SF-12], Medical Outcomes Health Distress Scale, MLHFQ	Hospitalisations, emergency department visits	
Graves[161]	Australia	432	No	SF-36	N/A	Total costs
Griffiths[283]	UK	476	No	EQ-5D, HADS-anxiety, HADS-depression	Visits to GP/practice nurse	Total costs, intervention administration costs
Groessl[148]	USA	363	No	QWB	Hospitalisations, primary care visits, outpatient, home visit, hospital visits, emergency department visits, total health-care contacts	Total cost savings
Groessl[148]	USA	363	No	QWB	Hospitalisations, primary care visits, outpatient, home visit, hospital visits, emergency department visits, total health-care contacts	Total cost savings
Groessl[148]	USA	363	No	QWB	Hospitalisations, primary care visits, outpatient, home visit, hospital visits, emergency department visits, total health-care contacts	Total cost savings

Study ID (first author and reference number)	Country	*n*	Other LTCs excluded	Measures of effectiveness	Health utilisation outcomes	Costs measures/types
Gruffydd-Jones[174]	UK	174	No	ACQ, mini-AQLQ	Routine and non-routine contacts, length of inpatients stays, respiratory secondary care contacts, medication	Total costs, inpatient stays, routine consultations, medication, non-routine care
Guell[175]	Spain	30	No	Modified dyspnoea in daily activities scale, Spanish CRQ, modified Borg Scale	Hospitalisations, medication	
Haas[250]	UK	109	Yes	SF-36, Modified Von Korff scales	Doctor visits, other professionals, medication	
Hamann[269]	Germany	107	No	Global Assessment of Functional Skills, Clinical Global Impressions Scale	Hospitalisations, medication	
Handley[133]	USA	226	No	SF-12, QALYs	Hospital days	Total costs, intervention costs, patient costs
Hanssen[220]	Norway	288	No	PCS SF-36	Hospitalisations, days off work	
Henderson[163]	UK	965	No	EQ-5D, QALYs, ICECAP-O, SF-36, short form CES-D, Brief STAI	Hospital use, community health services/primary care use, mental health services use, community care services, care home respite, day services, medication	Total costs, hospital costs, primary care costs, mental health services costs, home care costs, community care costs, day care services costs, medication costs, intervention costs
Hermiz[176]	Australia	177	No	SGRQ	Hospitalisations, emergency department visits, primary care visits, GP prescribed drugs, contact with community nurse	
Hernandez[177]	Spain	222	Yes	SGRQ, SF-12	Hospitalisations, emergency department visits, inpatient stays – change to inpatient readmissions, hospital days	Emergency department visits, outpatient visits, primary care visits, social support visits, nurse home visits, medication, telephone support call costs, health transport costs, patient costs
Holland[221]	UK	293	No	EQ-5D, MLHFQ, Health VAS	Hospitalisations, GP visits, GP home visits, nurse visits, nurse home visits, GP telephone calls, nurse/other telephone calls, medication	

Study ID (first author and reference number)	Country	*n*	Other LTCs excluded	Measures of effectiveness	Health utilisation outcomes	Costs measures/types
Hurley[149]	UK	418	Yes	EQ-5D, QALYs, WOMAC-functioning	Hospitalisations, inpatient, outpatient, GP visits, emergency department, specialist, social services, medication, informal care inputs	Total, primary care, secondary care, medication, informal care expenses, time off work, intervention costs, knee rehabilitation, outcome costs
Hurley[149]	UK	418	Yes	Hospitalisations	Hospitalisations, inpatient, outpatient, GP, emergency department, specialist, social services, medication informal care inputs	Total costs, intervention costs
Hurley[149]	UK	418	Yes	Hospitalisations	Hospitalisations, inpatient, outpatient, GP, emergency department, specialist, social services, medication informal care inputs	Total costs, intervention costs
Jansa[258]	Spain	40	Yes	SF-12, Spanish DQoL		Intervention costs, patient costs, health-care provider costs
Jayadevappa[222]	USA	23	No	SF-36, QWB-SA, MLHFQ, CES-D, Perceived Stress Scale	Hospitalisations, hospital days	
Jerant[284]	USA	415	No	EQ-5D, SF-36, HAQ, CES-D	Hospitalisations	Total costs
Jerant[284]	USA	415	No	EQ-5D, SF-36, HAQ, CES-D	Hospitalisations	Total costs
Jessep[157]	UK	64	Yes	WOMAC, EQ-5D, HADS-Depression, HADS-anxiety		Total costs, secondary care (outpatient, emergency department other), primary (GP, nurse, other), medication, intervention
Johnson[251]	UK	234	No	EQ-5D, QALYs, Roland and Morris Disability Questionnaire, GHQ, VAS		Total costs
Jolly[223]	UK	597	No	EQ-5D VAS, HADS-depression, HADS-anxiety	GP visits, nurse visits, rehabilitation, medication	
Jolly[135]	UK	525	No	EQ-5D, QALYs, SF-36 (should be SF-12), Global Mood Score, HADS-anxiety, HADS-depression	Hospitalisations, hospital days, GP consultations, practice nurse consultations, time off work, medication	Total costs, health-care costs and societal perspective costs, hospital staff costs, home staff costs, home equipment, patient costs, rehabilitation costs
Irvine[132]	UK	177	No	EQ-5D, QALYs	Hospitalisations, medication, all health-care professional contacts	Total costs, intervention costs, trainer costs

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Karjalainen[252]	Finland	170	Yes	Generic HRQoL (15D), ODI	Visits to physicians, visits to physiotherapist, inpatient rehabilitation, hospital days, sick leave days, medication	Total costs, sick leave costs, health-care consumption costs
Karjalainen[252]	Finland	170	Yes	EQ-5D, Oswestry disability index	Visits to physicians, physiotherapist, inpatient rehabilitation, hospital days, sick leave days	Total, sick leave
Kasper[224]	USA	200	Yes	MLHFQ, Duke Activity Status Index, NYHA	Hospitalisations, medication	Inpatient stay costs, outpatient pharmacy costs, intervention costs
Katon[270]	USA	228	No	SCL depression scale, Sheehan Disability Score, NEO neuroticism scale		Total costs, intervention costs (antidepressant medication, specialties mental health visits, primary care mental health visits, intervention visits). Outpatient depression treatment costs (primary care visits without mental health diagnosis, medication, specialties visits, emergency visits, pharmacy, other outpatient costs), total outpatient non-depression costs, total outpatient costs, inpatient care (medical and mental health)
Katon[271]	USA	115	No	Anxiety-free days base on ASI, Panic Disorder Severity Scale	Intervention visits, other mental health visits, total mental health visits, primary care visits, total primary care and mental health visits, outpatient visits	Total outpatient costs, total mental health costs, total 1-year health service costs, non-mental health primary care, total outpatient non-mental health, total outpatient, inpatient, psychiatric medication, intervention visits, mental health visits
Katon[272]	USA	1801	Yes	Depression-free days, QALYs based on HSCL-20		Grand total health-care costs, total outpatient costs, primary care, outpatient mental health, other outpatient services, inpatient mental health services, inpatient services, antidepressant medications, other medication, intervention costs

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Katon[141]	USA	232	No	ASI, QALYs, CES-D		Total, primary care, specialties, emergency department, psychiatric medication, non-psychiatric medications, laboratory tests, medical procedures, intervention, mental health visits, total ambulatory psychiatric visits, inpatient costs, total ambulatory and inpatient costs
Katon[140]	USA	214	No	QoL SCIRE QoL (using not validated, 0 to 10, measure) Patient Global Rating of Improvement for depression scale, SCL-20, PHQ-9	Hospitalisations, medications	
Kauppinen[124]	Finland	167	No	15D, SGRQ	Use of additional health-care services including health centre care, specialist care, emergency care, inpatient care, medication	Total costs, direct costs (health centre care, specialists care, emergency care, inpatient care, medication), indirect costs owing to sickness days
Kennedy[162]	UK	629	No	EQ-5D	Inpatient days, outpatient appointments, GP visits, day care appointments, counsellor visits	Total, inpatient days, outpatient appointments, GP visits, day care appointments, counsellor visits, medication costs, intervention costs, patient costs
Khdour[125]	Northern Ireland	173	Yes	EQ-5D, QALYs, SGRQ, Self-reported adherence, COPD knowledge questionnaire	Hospitalisations, emergency department, outpatient, GP scheduled and unscheduled visits, hospital admissions, medication use, hospital pharmacist input	Total specific health-care resources costs, hospital bed-days, GP consultations (scheduled and unscheduled), emergency department visits, medication, intervention costs, total intervention costs, overall total costs
Ko[178]	China	60	No	SF-36, SGRQ, Borg score	Hospital readmission, emergency department attendance	
Koff[126]	USA	40	No	SGRQ	Hospitalisations, emergency department visits, radiology services, diagnostic and blood tests	Total costs
Koehler[225]	Germany	710	No	SF-36, PHQ-9, NYHA	Hospitalisations (any, heart failure), days off work	

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Kroenke[285]	USA	250	Yes	PRIME-MD, HSCL-20, SF-36, Brief Pain Inventory, Roland Disability Scale, Graded Chronic Pain scale, GAD-7 anxiety	Outpatient visits, primary care visits, medical specialty visits, surgical specialties visits, mental health, other visits, emergency department visits, hospital days, medication	
Kwok[226]	China	105	No	GHQ, London Handicap Scale	Hospitalisations	Total costs, hospitalisation and emergency care, outpatient clinic, community nursing, private doctor, community nurse, travel to clinics/ hospital, social services, hospital days
Lahdensuo[179]	Finland	122	No	SGRQ	Hospitalisations, emergency department visits, unscheduled visits to clinic, medication, days off work	
Lee[180]	China	112	No	GHQ, Barthel Index	Hospitalisations, hospital days, emergency department visits	
Levitt[273]	USA	99	No	Heinrichs Abbreviated QoL Scale, BPRS, Modified Colorado Symptom Index	Hospitalisations	
Levy[181]	UK	211	No	SGRQ	Health-care utilisation, emergency department visits, routine GP visits, emergency GP visits, routine nurse visits, hospital consultations, medication	
Lewin[227]	UK	176	Yes	GHQ, HADS-depression, HADS-anxiety	Hospitalisations, GP visits	
Lewin[136]	UK	192	No	SF-12, Seattle Angina Questionnaire, HADS-depression, HADS-anxiety	Hospital admissions, emergency department admissions, primary care appointments, outpatient appointments, telephone contacts	Hospital admissions, emergency department admissions, primary care appointments, outpatient appointments, telephone contacts
Linton[253]	Sweden	243	No	Outcome Evaluation Questionnaire, Pain Catastrophizing Scale, HADS-depression, HADS-anxiety, Activities of Daily Living Scale	Physician visits, physiotherapist visits, doctor visits, medication, sick leave days	Total, health-care visits, intervention, sick leave
Linton[253]	Sweden	243	Yes	EQ-5D, SF-36, HADS-depression, HADS-anxiety	Physician visits, physiotherapist visits, doctor visits, medication, sick leave days	

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Lopez Cabezas[228]	Spain	134	No	EQ-5D, NYHA	Hospitalisations, inpatient readmissions, medication	Total costs, hospitalisation costs, intervention costs, patient costs
Man[182]	UK	42	Yes	SGRQ, CRQ, SF-36	Hospitalisations, hospital days, emergency department visits	
Mancuso[183]	USA	296	Yes	AQLQ, Geriatric Depression Scale	Repeated emergency department visits, access to outpatient care	
Markle-Reid[229]	Canada	101	No	SF-36, CES-depression, Stroke Impact Scale-16, Kessler-10, cognitive function (SPMSQ), Reintegration to Normal Living Index		Total health services costs, direct costs, indirect costs
McBeth[254]	UK	442	Yes	Chronic Pain Grade questionnaire, Vanderbilt Pain Management Inventory, GHQ, 7-point, self-rated, clinical global impression change score (validated, untitled scale), SF-36		Incremental total costs
McBeth[254]	UK	442	Yes	7-point, self-rated, clinical global impression change score, SF-36		Incremental total costs
McBeth[254]	UK	442	Yes	7-point, self-rated, clinical global impression change score, SF-36		Incremental total costs
McDonald[230]	Ireland	98	No	QoL Questionnaire (not validated), NYHA	Hospitalisations, medication	
McLean[185]	Canada	225	No	Juniper questionnaire	Emergency department visits, hospital admissions, medication, visits to primary care, days off school/work	Total costs, hospitalisations, emergency department visits, medical visits, medication, pharmacy fees, days off work
McGeoch[184]	New Zealand	159	Yes	SGRQ, HADS, COPD-SMI	Hospitalisations, emergency department visits, medication, primary care visits	
McGowan[259]	Canada	321	No	Self-rated health (SF-36)	Emergency department visits, hospital admissions, total number of nights spent in hospital, number of primary care visits	

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McWilliam[286]	Canada	298	No	SF-36, QoL Index	Hospitalisations, hospital days, emergency department visits, home care utilisation, utilisation of professional services	
Community Pharmacy Medicines Management Project Evaluation Team[207]	UK	1614	No	SF-36, EQ-5D		Total costs, usual treatment costs (medicines and NHS visits), intervention costs, NHS costs (GP and hospital visits), all medication, CHD medication, non-CHD medication
Mejhert[231]	Sweden	208	Yes	Nottingham health profile	Hospitalisations, time to first readmission, length of stay, medication	
Meijer[150]	Netherlands	23	No	Dutch version of SF-36, VAS	Return to work	Total costs, direct medical costs (treatment, medication), direct non-medical costs (expedients), indirect non-medical costs (production losses, loss of time, other costs)
Moffett[255]	UK	187	Yes	Roland disability questionnaire, Aberdeen back pain scale, EQ-5D	Exercise classes, GP visits, physiotherapist visits, chiropractor visits, orthopaedic visits, tests/exams, hospital nights, days off work, equipment	Total costs, exercise classes, GP visits, physiotherapist visits, chiropractor visits, orthopaedic visits, tests/exams, hospital nights, days off work, equipment
Monninkhof[127]	Netherlands	248	No	Dutch version SGRQ, EQ-5D QALYs	Physiotherapy visits, hospitalisations, scheduled emergency department visits, unscheduled emergency department visits, inpatient stays, outpatient visits, GP visits, medication, pharmacist use	Total costs, hospitalisation costs, intervention costs, health-care contact for exacerbation, limited activity days
Morcillo[232]	Spain	70	No	SF-36, Charlson Index, Spanish version of Pfeiffer's Short Portable Mental Status Questionnaire, NYHA	Hospitalisations, emergency department visits	Total costs
Moudgil[186]	UK	689	No	AQLQ	Emergency department visits, emergency admissions, primary and secondary health-care visits, medication, deputising services	
Murphy[233]	Ireland	903	Yes	SF-12	Hospitalisations, GP visits, nurse visits	

Study ID (first author and reference number)	Country	*n*	Other LTCs excluded	Measures of effectiveness	Health utilisation outcomes	Costs measures/types
Murray[234]	USA	314	No	CHFQ, NYHA	Hospitalisations, emergency department visits, medication	Total, hospitalisation, outpatient costs, inpatient costs, intervention costs, medication costs
Naylor[235]	USA	239	No	MLHFQ, Enforced Social Dependency Scale	Hospitalisations, hospital days, physician visits, emergency department visits, home visits	Total costs, hospitalisations, physician visits, emergency department visits, home visits
Niemstro[158]	Finland	204	Yes	Oswestry Low Back Pain Disability Questionnaire (ODI), VAS, 15D, Depression Questionnaire Score	Physician visits, physiotherapist visits, absence from work	Total costs, physician visits, physiotherapist, absence from work, productivity loss
Ninot[187]	France	38	Yes	French version SGRQ, NHP	Number of hospitalisations and length of hospital admissions, medication	Total costs, hospitalisation costs, COPD medication costs
Nucifora[236]	Italy	200	Yes	Minnesota Heart Failure Questionnaire MLHFQ, NYHA	Hospitalisations, length of hospital stay, unplanned outpatient visits, medication	
Nunez[248]	Spain	100	Yes	SF-36, WOMAC	GP visits, medication	Costs for GP visits
Ojeda[237]	Spain	153	No	MLHFQ, NYHA	Hospitalisations, hospital days inpatient readmissions, medication	
Patel[151]	UK	812	No	SF-36, WOMAC, HADS-depression, HADS-anxiety EQ-5D utility, EQ-5D VAS, QALYs	Hospitalisations, outpatients, physiotherapy, emergency department, occupational therapy, community-based services, GP, GP home/surgery visits/calls, social worker, practice nurse visits/calls, home help, informal care, medication	Total costs health and social care, total costs societal, health and social costs (excluding intervention), patient/family/friends costs, indirect costs, social security benefits, intervention costs
Penn[274]	USA	65	No	Social Functioning Scale, BDI-II, Beck Cognitive Insight Scale	Hospitalisations, hospital days	
Penn[275]	USA	46	Yes	QoL Scale, Role Functioning Scale, Multnomah Community Ability Scale, Calgary Depression Scale for Schizophrenia	Hospitalisations, hospital days	
Peters[256]	New Zealand	68	No	Sickness Impact Profile, McGill Pain Questionnaire, Pain Behaviour Checklist, GHQ, BDI, VAS	Medications, physiotherapist treatment	

Study ID (first author and reference number)	Country	*n*	Other LTCs excluded	Measures of effectiveness	Health utilisation outcomes	Costs measures/types
Peters[256]	New Zealand	68	No	Sickness Impact Profile, Pain Behaviour Checklist, GHQ, BDI	Medications	
Pinnock[189]	UK	278	Yes	Juniper mini asthma QoL questionnaire, Short Q asthma morbidity score	Hospital admissions, emergency department consultations, GP consultations, nurse consultations, outpatient consultations, medication	
Pilotto[188]	Australia	170	No	SGRQ	Hospital admissions, emergency department attendances, attended outpatient department, GP consultations, additional visits to GP, consulted other GP practice, days off work	
Price[190]	UK	1553	No	Mini-AQLQ	Number/type of health-care contacts including diagnostic investigations, hospitalisations, medications	Expected total annual cost
Pyne[142]	USA	395	Yes	SF-12, QALYs, SCL-20, Depression Health Beliefs Inventory, QWB		Total health-care costs, inpatient total, depression-related inpatient, outpatient, total outpatient medication, patient costs (travel/time), incremental costs
Ramachandran[238]	India	50	Yes	Kansas City Cardiomyopathy Questionnaire, NYHA class	Hospitalisations, emergency department visits, medication	
Rea[191]	New Zealand	135	Yes	SF-36, CRQ	Hospitalisations, hospital days, medication, emergency department visits	
Reynolds[276]	Australia	25	No	QOLI-Brief Version, Colorado Client Assessment Record	Hospitalisations	
Rich[239]	USA	282	No	Chronic Heart Failure Questionnaire CHFQ, NYHA class	Hospitalisations, hospital days, readmissions, medication	Total costs, hospitalisations, intervention costs, other health-care costs, caregiver's time costs
Richardson[287]	Canada	303	No	SF-36, LLFDI, CES-D	Hospital days, emergency department visits	

Study ID (first author and reference number)	Country	*n*	Other LTCs excluded	Measures of effectiveness	Health utilisation outcomes	Costs measures/types
Riegel[240]	USA	134	No	EQ-5D, MLHFQ, PHQ-9-depression, NYHA class, Specific Activity Scale	Hospitalisations, hospital days, readmissions	Hospitalisation costs
Ries[118]	USA	172	No	QWB, Rand 36-Item Health Survey, CRQ, UCSD Shortness of Breath Questionnaire; Dyspnoea Indices, Centres for Epidemiologic Studies-Depression Scale	Hospitalisations, outpatient visits, number of outpatient telephone calls, emergency department visits	
Rivera[277]	USA	203	No	Lehman QoL Inventory, Brief Symptom Inventory	Hospitalisations, individual therapy, group therapy, activity with intervention provider, activity with health-care professional, outpatient clinic visits, contacts with case management, number of days that patients received day treatment, primary care, patients/time costs	
Rivera[277]	USA	203	No	Lehman QoL Inventory	Hospitalisations, outpatient, primary care, patients/time costs	
Roberts[288]	Canada	293	No	PAIS		Total costs, hospital costs, other health services costs, medication, travel cost, loss of wages costs, total patient costs, total direct costs, total indirect costs
Roberts[288]	Canada	293	No	PAIS		Total health services costs, health services costs, medication, travel cost, loss of wages costs, total direct costs, total patient/family costs, total indirect costs, total annual costs
Roelfs[159]	Netherlands	360	Yes	Quebec Back Pain Disability Scale, EQ-5D	GP visits, physiotherapist, manual therapist, medication, medical specialist (outpatient), alternative therapist, thermal pillow, help from friend, absence from work	Total, direct, indirect

Study ID (first author and reference number)	Country	*n*	Other LTCs excluded	Measures of effectiveness	Health utilisation outcomes	Costs measures/types
Ryan[192]	UK	288	Yes	ACQ, mini-AQLQ	Hospital admissions, medication, unscheduled practice nurse consultations, consultations with GP, out-of-hours attendances, emergency department attendances, acute exacerbations	Total costs, total cost of intervention, nursing costs, telemonitoring service costs, total costs of health-care provision, GP consultations; practice nurse respiratory consultations, secondary care costs, emergency services, medication costs
Schermer[128]	Netherlands	193	No	AQLQ	Direct health care such as emergency department visits, hospitalisations, medication; primary care asthma consultations, chest physician consultations	Total costs, hospitalisation, emergency department visits, physician consultations, medication, productivity loss, intervention costs
Schwarz[241]	USA	102	No	MLHFQ, CES-D	Hospital readmission, emergency department visits	Total costs of care
Seto[242]	Canada	100	No	MLHFQ, NYHA class	Hospitalisations, hospital nights, emergency department visits, clinic visits, medication	
Sevick[152]	USA	439	No	WOMAC	N/A	Total costs, in-centre activities, home visits, adverse events, medical referrals, telephone follow-up costs
Sevick[152]	USA	439	No	WOMAC	N/A	Total costs, in-centre activities, home visits, adverse events, medical referrals, telephone follow-up costs
Seymour[193]	UK	60	Yes	EQ-5D VAS, CRDQ, SGRQ, Borg scale	Hospitalisations, emergency department visits	
Shelledy[194]	USA	166	Yes	SF-36, SRGQ, Borg score	Hospitalisations, clinic visits, emergency department visits, inpatient days	Hospitalisation costs, emergency department costs
Simon[130]	UK	453	No	EQ-5D, QALYs	Medication, primary care visits, emergency department visits, outpatients care, day hospital care, inpatient care, auxiliary health care, private health care	Total costs, primary care, hospital costs, emergency department visits costs, auxiliary health care, intervention costs, medication costs

Study ID (first author and reference number)	Country	*n*	Other LTCs excluded	Measures of effectiveness	Health utilisation outcomes	Costs measures/types
Simon[130]	UK	453	No	EQ-5D	Medication, primary care visits, emergency department visits, outpatients care, day hospital care, inpatient care, auxiliary health care, private health care	Total costs, primary care, hospital costs, emergency department visits costs, auxiliary health care
Simon[145]	USA	407	No	HDRS	Hospitalisations, outpatient visits, specialties mental health visits, other admissions	Total health services costs, hospitalisations, outpatient, medication, intervention costs, time in treatment costs
Simon[278]	USA	386	No	SCL-20	Primary care visits, specialty visits, intervention visits	Total health services costs, total outpatient depression costs, outpatient, specialist care, medication, intervention, primary care, hospitalisations
Simon[279]	USA	785	Yes	Psychiatric Status Rating scale	Hospitalisation, primary care, outpatient, medication, psychotherapy	Total, hospitalisation, outpatient, medication, intervention
Simon[143]	USA	600	No	SCL-90	Specialty mental health-care visits, medication, primary care visits	Total depression treatment costs, total outpatient costs, total health-care plan costs, specialist, primary care, medication, intervention, incremental costs
Simon[143]	USA	600	No	SCL-90	Specialty mental health-care visits, medication, primary care visits	Total, specialist, primary care, medication, intervention
Sinclair[243]	UK	324	No	QoL after Myocardial Infarction Questionnaire, Extended Activities of Daily Living Scale	Hospitalisations, outpatient visits	
Sisk[244]	USA	406	No	SF-12 physical component score only, MLHFQ	Hospitalisations, nurse management components, medication, emergency department visits	
Soler[195]	Spain	26	Yes	Spanish SGRQ, modified MRC scale (dyspnoea)	Hospitalisations, primary care visits, visits to research clinic, emergency department visits, admissions to intensive care, length of stay in hospital	

Study ID (first author and reference number)	Country	*n*	Other LTCs excluded	Measures of effectiveness	Health utilisation outcomes	Costs measures/types
Solomon[249]	USA	178	No	SF-36, Modified Health Assessment Questionnaire	Hospitalisations, emergency department visits, GP visits, medication	
Strong[160]	USA	255	No	Roland Disability Questionnaire		Total, primary care visits, specialist visits, emergency department visits, alternative therapist visits, physical therapy visits, tests/exams, medication, intervention, incremental costs
Strong[160]	USA	226	No	Roland Disability Questionnaire, SF-36		Total, primary care visits, specialist visits, emergency department visits, alternative therapist visits, tests/exams, medication
Sundberg[196]	Sweden	97	No	Swedish Living with Asthma Questionnaire	Hospital admissions, unscheduled visits, medication	
Swerissen[289]	Australia	320	Yes	Self-rated health, health distress, disability, depression	Hospital department, GP, specialist medical practitioner, allied health professional, mental health professional, emergency department visits	
Taylor[137]	UK	230	Yes	MacNew, HADS-depression, HADS-anxiety, EQ-5D QALYs	Hospitalisations, hospital nights, primary care consultations, tests, medication, home-based rehabilitation visits	Total costs, hospitalisations, primary care, secondary, medication, tests, hospital equipment, hospital rehabilitation costs, patient costs, hospital staff costs, staff travel costs, home costs
Thomas[153]	USA	786	No	SF-36, WOMAC, HADS-depression, HADS-anxiety		Total, primary care, secondary care and primary care, intervention costs
Trento[260]	Italy	112	No	Modified, Italian, DQoL	Medication, hypoglycaemic treatment, retinopathy	Total costs, transportation costs, opportunity costs, staff costs, pharmaceutical costs, patient costs, total direct costs, other costs
Turkington[280]	UK	422	No	MADRS, Comprehensive Psychopathology Rating Scale, Psychotic Symptom Rating Scales	Hospital days, readmissions, medication	

Study ID (first author and reference number)	Country	*n*	Other LTCs excluded	Measures of effectiveness	Health utilisation outcomes	Costs measures/types
van der Meer[129]	Netherlands	200	Yes	EQ-5D, EQ-5D VAS QALYs, Asthma Control Questionnaire	All contact with health-care professionals, emergency department visits, hospital admissions, medication	Total health-care costs, productivity costs, total societal costs, hospitalisation costs, intervention costs, medication, other health-care costs
Varma[245]	Ireland	83	Yes	SF-36, Minnesota Heart Failure Questionnaire	Hospitalisations, emergency department visits	
Wakabayashi[197]	Japan	102	Yes	SGRQ, Mini-Mental State Examination, Instrumental Activities of Daily Living Questionnaire, LINQ score, Modified MRC Dyspnoea Scale, Bode Index	Hospitalisations, emergency department visits	
Wakefield[246]	USA	148	No	MLHFQ, NYHA class, Mini-Mental Status Examination; GDS	Hospitalisations, hospital days, urgent care visits, intervention contacts	
Wakefield[246]	USA	148	No	MLHFQ	Hospitalisations	
Watson[198]	New Zealand	56	Yes	SGRQ	Hospitalisations, medication, hospital specialist visits, pharmacist visits, primary care visits (GP/PN)	
Weinberger[154]	USA	191	Yes	Arthritis Impact Measurement Scales, self-rated health status (validated measure)	Intervention contacts	Inpatient, outpatient costs, emergency department costs, total costs
Whitehurst[155]	UK	402	Yes	EQ-5D, QALYs	Treatment sessions, primary care contacts, inpatient episodes, outpatient attendances, other health-care professionals, medication	Total costs, treatment sessions, primary care contacts, inpatient episodes, outpatient attendances, other health-care professionals, medication
Whooley[281]	USA	331	No	15-item GDS	Hospitalisations, clinic visits	
Willmott[247]	UK	179	Yes	SF-36, return to work	Combined GP and hospital visits, medication, attendance at cardiac rehabilitation	

Study ID (first author and reference number)	Country	*n*	Other LTCs excluded	Measures of effectiveness	Health utilisation outcomes	Costs measures/types
Wolf[261]	USA	147	No	SF-36	Medication, intervention sessions	
Wootton[290]	Australia	525	No	SF-36, EQ-5D	Hospital treatment, pharmacy, other treatment services, medical treatment community nursing treatment, allied health treatment	Total, hospital treatment, pharmacy, other treatment services, medical treatment community nursing treatment, allied health treatment
Yilmaz[199]	Turkey	80	No	AQLQ	Emergency department visits, hospital admissions, medication	
Yoon[200]	Australia	76	Yes	Psychosocial disturbance questionnaire	Hospitalisations, emergency department visits, missed work/school	

15D, 15 dimensional; ACQ, Asthma Control Questionnaire; AQLQ, Asthma Quality Of Life Questionnaire; ASI, Anxiety Sensitivity Index; BDI, Beck Depression Inventory; BDIndex, Baseline Dyspnoea Index; BMI, body mass index; BPRS, Brief Psychiatric Rating Scale; BSI, brief symptom inventory; CAPS, Clinician Administered PTSD Scale; CES-D, Centre for Epidemiological Studies Depression Scale; CHCC, Collaborative Health Care Clinic; CHFQ, Chronic Heart Failure Questionnaire; COPD, chronic obstructive pulmonary disease; COPD-SMI, chronic obstructive pulmonary disease – severe mental illness; CRQ, Chronic Respiratory Questionnaire; DQoL, diabetes quality of life; EQ-5D, European Quality of Life-5 Dimensions; GAD, generalised anxiety disorder; GDS, Geriatric Depression Scale; GHQ, General Health Questionnaire; GP, general practitioner; HADS, Hospital Anxiety and Depression Scale; HAQ, Health Assessment Questionnaire; HDRS, Hamilton Depression Rating Scale; HSCL-20, 20-item Hopkins Symptom Checklist; ICECAP-O, ICEpop CAPability measure for older people; LINQ, Lung Information Needs Questionnaire; LLFDI, Late-Life Function and Disability Instrument; LTC, long-term condition; MacNew, Quality of Life after Myocardial Infarction Questionnaire; MADRS, Montgomery Asberg Depression Rating Scale; MCS, mental component summary; MLHFQ, The Minnesota Living with Heart Failure Questionnaire; MRC, Medical Research Council; N/A, not applicable; NEO, Neuroticism, Extraversion, Openness; NHP, Nottingham Health Profile; NYHA, New York Heart Association Classification; ODI, Oswestry Disability Index; PAIS, Psychosocial Adjustment to Illness Scale; PCS, physical component summary; PHQ-9, Patient Health Questionnaire-9; PN, practice nurse; PRIME-MD, PRIMary care Evaluation of Mental Disorders; QALY, quality-adjusted life-year; QOLI, Quality of Life Inventory; QWB, Quality of Well-being Scale; SA, self-administered; SCIRE, Spinal Cord Injury Rehabilitation Evidence; SCL, symptom checklist; SF-12, Short Form questionnaire-12 items; SF-36, Short Form questionnaire-36 items; SGRQ, St. George's Respiratory Questionnaire; SPMSQ, Short Portable Mental Health Status Questionnaire; STAI, State-Trait Anxiety Inventory; UCSD, University of California, San Diego; VAS, visual analogue scale; WOMAC, Western Ontario and McMaster Universities Osteoarthritis Index.

Note: when studies have been repeated in rows, it is because more than one comparison was included.

Appendix 5 Details of individual studies: patients

Study ID (first author and reference number)	Long-term conditions	Males (%)	Mean age (years)	Eligible patients who did not take part
Angermann[201]	Heart failure	31	69.4	21
Barnason[202]	Chronic heart failure	83	71	17
Barton[156]	Knee pain	35	61.5	32
Barton[156]	Knee pain	35	61.5	32
Barton[156]	Knee pain	35	61.5	32
Bauer[263]	Bipolar disorder	91	46.6	33
Bauml[264]	Psychosis	43	34	15
Beck[282]	Heart disease, lung disease, joint disease, diabetes	36	75	50
Beckerman[166]	Chronic obstructive pulmonary disease	71.4	66.9	N/A
Behnke[167]	Chronic obstructive pulmonary disease	75	69	N/A
Bocchi[203]	Chronic heart failure	64	52	N/A
Bosmans[139]	Depression	46	64.7	46
Bosmans[138]	Depression	31	43	29
Bouvy[204]	Heart failure	60	70.2	N/A
Boxall[168]	Chronic obstructive pulmonary disease	65	76	N/A
Brotons[205]	Chronic heart failure	44	76	37
Brun[257]	Type 2 diabetes	100	60.6	N/A
Bulthuis[146]	Arthritis	20	69	25
Capomolla[134]	Chronic heart failure	84	56	N/A
Castro[169]	Asthma	15	38	N/A
Clark[170]	Asthma	0	49	32
Clarke[265]	Depression	24	45	12
Clarke[265]	Depression	24	45	12
Cline[206]	Chronic heart failure	52	76	N/A
Coull[208]	Ischaemic heart disease	60	67.4	19
Coultas[171]	Chronic obstructive pulmonary disease	54	69	23
Coultas[171]	Chronic obstructive pulmonary disease	54	69	23
Davidson[209]	Chronic heart failure	60	74	33
Davies[262]	Type 1 or 2 diabetes	55.3	63.4 median	41
de la Porte[210]	Chronic heart failure	79	71	49
den Boer[266]	Depression or anxiety disorder	47	41.9	17
de Oliveira[172]	Asthma	15	38	N/A
Dekker[211]	Chronic heart failure	43	64	37
DeWalt[212]	Chronic heart failure	52	60	30
DeWalt[213]	Chronic heart failure	41	62	3

Study ID (first author and reference number)	Long-term conditions	Males (%)	Mean age (years)	Eligible patients who did not take part
Dougherty[215]	Chronic heart failure	73.8	65	N/A
Doughty[214]	Heart failure	60	73.5	N/A
Druss[267]	Mental illness	26	48.4	29
Dunagan[216]	Heart failure	47	69.4	45
Dunn[268]	Post-traumatic stress disorder and depression	100	55	40
Dunbar[217]	Patients with implantable cardioverter defibrillator	70.1	58.4	48
Dunbar[217]	Patients with implantable cardioverter defibrillator	70.1	58.4	48
Eaton[173]	Chronic obstructive pulmonary disease	42	70	58
Gallefoss[123]	Asthma	21	44	N/A
Gesica[218]	Chronic heart failure	68.9	65.2	72
Gillett[131]	Type 2 diabetes	26	61	N/A
Goldberg[219]	Heart failure	65.5	60.2	N/A
Graves[161]	Diabetes, hypertension	40.3	57.8	36.6
Griffiths[283]	Diabetes, cardiovascular disease, respiratory, arthritis	42	48	76
Groessl[148]	Arthritis	35.8	69	75
Groessl[148]	Arthritis	35.8	69	75
Groessl[148]	Arthritis	35.8	69	N/A
Gruffydd-Jones[174]	Asthma	40	50	N/A
Guell[175]	Chronic obstructive pulmonary disease	100	66	8
Haas[250]	Low back pain	22.2	75.5	N/A
Hamann[269]	Psychosis	52	38	N/A
Handley[133]	Type 2 diabetes	55.8	45.2	14
Hanssen[220]	Acute myocardial infraction	76.5	60.9	28
Henderson[163]	Heart failure, chronic obstructive pulmonary disease, diabetes	60	70.6	N/A
Hermiz[176]	Chronic obstructive pulmonary disease	46	67	N/A
Hernandez[177]	Chronic obstructive pulmonary disease	97	71	4
Holland[221]	Heart failure	63.2	76.4	23
Hurley[149]	Chronic knee pain	29.7	66	62
Hurley[149]	Chronic knee pain	29.7	66	62
Hurley[149]	Chronic knee pain	29.7	66	62
Jansa[258]	Type 1 diabetes	68.8	23	20
Jayadevappa[222]	Heart failure	20	63.8	88
Jerant[284]	Arthritis, asthma, chronic obstructive pulmonary disease, congestive heart failure, depression, and/or diabetes mellitus	25	60.1	32
Jerant[284]	Arthritis, asthma, chronic obstructive pulmonary disease, congestive heart failure, depression, and/or diabetes mellitus	25	60.1	2
Jessep[157]	Knee pain	37.1	67	2

Study ID (first author and reference number)	Long-term conditions	Males (%)	Mean age (years)	Eligible patients who did not take part
Johnson[251]	Low back pain	42	48.5	39
Jolly[223]	Myocardial infraction or angina	74	64	N/A
Jolly[135]	Myocardial infarction or coronary revascularisation	76	61.8	57
Irvine[132]	Type 2 diabetes	50.8	58.7	15
Karjalainen[252]	Low back pain	40	43	4
Karjalainen[252]	Low back pain	40	43	4
Kasper[224]	Chronic heart failure	56.1	63.7	12
Katon[270]	Depression	17	46.7	32
Katon[271]	Panic disorder	36	41.9	76
Katon[272]	Depressive disorders	34	71.4	16 (screened), 12 (referred)
Katon[141]	Panic disorder	34	41.9	76
Katon[140]	Depression + diabetes or coronary heart disease	44	56.3	9
Kauppinen[124]	Asthma	42.70	44	N/A
Kennedy[162]	Mixed	30.4	55.3	23
Khdour[125]	Chronic obstructive pulmonary disease	45	67	N/A
Ko[178]	Chronic obstructive pulmonary disease	96.7	73.8	26
Koff[126]	Chronic obstructive pulmonary disease	50	65	N/A
Koehler[225]	Chronic heart failure	82	66.9	N/A
Kroenke[285]	Depression and pain	50	55.8	25
Kwok[226]	Heart failure	45	76.8	N/A
Lahdensuo[179]	Asthma	47.5	43	N/A
Lee[182]	Chronic obstructive pulmonary disease	49	80	N/A
Levitt[273]	Serious mental health	64	55	N/A
Levy[181]	Asthma	43	40	33
Lewin[227]	Acute myocardial infarction	72.7	56.3	11
Lewin[136]	First implantable cardioverter defibrillator implantation	74	58.7	12
Linton[253]	Spinal pain	29	45	37
Linton[253]	Spinal pain	26	44	37
Lopez Cabezas[228]	Heart failure	46.9	76.1	N/A
Man[182]	Chronic obstructive pulmonary disease	38	71	15
Mancuso[183]	Asthma	23	43	36
Markle-Reid[229]	Stroke	62	70.6	66
McBeth[254]	Chronic widespread pain	30.3	56.3	50
McBeth[254]	Chronic widespread pain	30.3	56.3	50
McBeth[254]	Chronic widespread pain	30.3	56.3	50
McDonald[230]	Heart failure	70.2	70.8	54
McLean[185]	Asthma	37	48	10

Study ID (first author and reference number)	Long-term conditions	Males (%)	Mean age (years)	Eligible patients who did not take part
McGeoch[184]	Chronic obstructive pulmonary disease	67	72	7
McGowan[259]	Type 2 diabetes	45	59	N/A
McWilliam[286]	Mixed	36		N/A
Community Pharmacy Medicines Management Project Evaluation Team[207]	Coronary heart disease	70.6	68.8	58
Mejhert[231]	Heart failure	59	75.7	27
Meijer[150]	Non-specific upper extremity musculoskeletal disorders	60.9	37.9	11
Moffett[255]	Low back pain	44	42.6	N/A
Monninkhof[127]	Chronic obstructive pulmonary disease	84	65	N/A
Morcillo[232]	Heart failure	56	76.3	N/A
Moudgil[186]	Asthma	47	35	43
Murphy[233]	Coronary heart disease	70	66.5	30
Murray[234]	Heart failure	33.9	62.6	3
Naylor[235]	Heart failure	44	75.6	63
Niemstro[158]	Low back pain	47	36.7	3
Ninot[187]	Chronic obstructive pulmonary disease	78	61	16
Nucifora[236]	Heart failure	62	73	N/A
Nunez[248]	Osteoarthritis	35	69.5	4
Ojeda[237]	Heart failure	62	65	22
Patel[151]	Arthritis	31	68.7	63
Penn[274]	Schizophrenia	49	39.6	21
Penn[275]	First-episode psychosis	61	20.9	39
Peters[256]	Chronic pain	43.7	43.9	38
Peters[256]	Chronic pain	43.7	43.9	38
Pinnock[189]	Asthma	41	56.4	53
Pilotto[188]	Asthma	47.8	49.7	53
Price[190]	Asthma	41	48	10
Pyne[142]	Depression	89	60	40
Ramachandran[238]	Heart failure	76	45.8	6
Rea[191]	Chronic obstructive pulmonary disease	41	68	23
Reynolds[276]	Mental illness (bipolar, schizophrenia, depression)			5
Rich[239]	Congestive heart failure	41	78.4	18
Richardson[287]	Mixed	62.3		49
Riegel[240]	Heart failure	50.8	72.7	40
Ries[118]	Chronic obstructive pulmonary disease	54	67	N/A
Rivera[277]	Mental illness	53	36.7	37
Rivera[277]	Mental illness	53	36.7	37

Study ID (first author and reference number)	Long-term conditions	Males (%)	Mean age (years)	Eligible patients who did not take part
Roberts[288]	Mixed	31	43.7	40
Roberts[288]	Mixed	31	43.7	40
Roelfs[159]	Low back pain	3	41.5	27
Ryan[192]	Asthma	41	52	27
Schermer[128]	Asthma	42	39	55
Schwarz[241]	Heart failure	61	79.1	11
Seto[242]	Heart failure	76	52.3	46
Sevick[152]	Arthritis	31	69	N/A
Sevick[152]	Arthritis	31	69	N/A
Seymour[193]	Chronic obstructive pulmonary disease	47	65	N/A
Shelledy[194]	Asthma	22	44	21
Simon[130]	Type 2 diabetes	55.9	66.3	44
Simon[130]	Type 2 diabetes	55.9	66.3	44
Simon[145]	Depression	22	45.4	31
Simon[278]	Depression	28	45.6	N/A
Simon[279]	Bipolar disorder	31	44.3	2
Simon[143]	Depression	22	44	5
Simon[143]	Depression	22	44	5
Sinclair[243]	Myocardial infarction	53	73.8	28
Sisk[244]	Heart failure	52.2	59.3	74
Soler[195]	Chronic obstructive pulmonary disease		73	N/A
Solomon[249]	Osteoarthritis, rheumatoid arthritis, or fibromyalgia	26	61	12
Strong[160]	Back pain			N/A
Strong[160]	Back pain	50.4	49.1	12
Sundberg[196]	Asthma	55	19	N/A
Swerissen[289]	Mixed	21	65.4	35
Taylor[137]	Acute myocardial infarction	80	64.3	18
Thomas[153]	Knee pain	44.9	61.9	7
Trento[260]	Type 2 diabetes	34	61	N/A
Turkington[280]	Schizophrenia	N/A	N/A	37
van der Meer[129]	Asthma	29	37	21
Varma[245]	Heart failure	36.6	76.4	N/A
Wakabayashi[197]	Chronic obstructive pulmonary disease	84	70	N/A
Wakefield[246]	Heart failure	98	67.2	38
Wakefield[246]	Heart failure	98	67.2	38
Watson[198]	Chronic obstructive pulmonary disease	67	67	N/A
Weinberger[154]	Osteoarthritis	11.4	61.1	25
Whitehurst[155]	Low back pain	45	40.9	11

Study ID (first author and reference number)	Long-term conditions	Males (%)	Mean age (years)	Eligible patients who did not take part
Whooley[281]	Depression	38	75.9	16
Willmott[247]	Myocardial infarction	83	63	20
Wolf[261]	Type 2 diabetes	42	53.4	N/A
Wootton[290]	Mixed	54	78.1	N/A
Yilmaz[199]	Asthma	30	29	N/A
Yoon[200]	Asthma	28	N/A	59

N/A, not applicable.

Appendix 6 Details of individual studies: interventions

Study ID (first author and reference number)	Content of intervention	Content of control	Intensity of intervention	Follow-up (months)
Angermann[201]	Nurse-led post-discharge disease management intervention addressing individual problems raised by patients, pursuing networking of health-care providers and training for caregivers	Usual care	Initial meeting prior to discharge, telephone contacts (weekly for first month and at least one per month for 5 months) = 2.5 hours the lowest duration	6
Barnason[202]	Self-management telehealth device + programme based on behavioural theory	Usual outpatient care	Daily use × 6 weeks	6
Barton[156]	Dietary intervention plus group-based quadriceps strengthening exercises + individualised reinforcement visits	Leaflet provision	Visits monthly for 6 months and then every other month for 18 months = 15 visits = 7.5 hours	6, 12, 24
Barton[156]	Dietary intervention only	Leaflet provision	Visits monthly for 6 months and then every other month for 18 months = 15 visits = 7.5 hours	6, 12, 24
Barton[156]	Quadriceps strengthening exercises only	Leaflet provision	Six telephone calls (visits were the same with control) = 30 minutes	6, 12, 24
Bauer[263]	Nurse-led collaborative intervention enhancing patient self-management skills with group psychoeducation; providing clinician decision support with simplified practice guidelines; and improving access to care, continuity of care + information	Usual care	Intense but unclear	36
Bauml[264]	Patient + relatives separate psychoeducational group therapy	Usual care	Four 1-hour weekly sessions + four 1-hour monthly sessions + eight 1.5-hour sessions every 2 weeks with relatives = 16 sessions	84
Beck[282]	Group outpatient visits	Usual care	Monthly 2 hours and 15 minutes outpatient meetings	12
Beckerman[166]	Long-term inspiratory muscle training in a rehabilitation programme	Low-load training	Two sessions of 15 minutes each, six times a week for 12 months	12
Behnke[167]	Combined hospital, supervised, exercise training group and home-based exercise training at individual intensity	Usual hospital care	1 × treadmill plus 105 minutes' (5 ×) walking training at hospital, plus 45 minutes' (3 ×) walking training plus 15 minutes' diary entry per day	18

Study ID (first author and reference number)	Content of intervention	Content of control	Intensity of intervention	Follow-up (months)
Bocchi[203]	Hospital outpatient disease management programme including education, monitoring, plus telephone monitoring	Usual outpatient care	Seven sessions	30
Bosmans[139]	General practitioner training on how to implement the disease management programme consisting of late-life depression screening (Dutch guidelines), patient education, drug therapy with paroxetine, and supportive contacts	Usual care	Eight GP sessions = 4 hours the lowest duration	12
Bosmans[138]	Pharmacist-coaching intervention consisted of three contacts with the pharmacist; a take-home video reviewing important facts on depression and antidepressant treatment	Usual care	One pharmacist session (20 minutes) at baseline + one session (14 minutes) 2 weeks later + one session (13 minutes) at 3 months = three sessions (47 minutes)	6
Bouvy[204]	Pharmacist-led intervention on medication compliance in hospitalised/outpatients with heart failure	Usual care	One interview session + six monthly contacts	6
Boxall[168]	Home-based individualised programme including graduated walking and arm exercises, individual multidisciplinary education sessions and weekly physiotherapist clinic visits	Delayed self-management	Home-based, daily walking/arm exercises (progressive 10 minutes to 30 minutes), plus diary recording (15 minutes) and 270 minutes of weekly visits to physiotherapist (9 × 30 minutes)	3
Brotons[205]	Home-based intensive educational programme, including co-ordination with physician and cardiologist, post hospitalisation	Usual care	× 12 monthly visits to home plus telephone contacts (15 minutes) every 15 days	12
Brun[257]	Structured exercise programme, including education + training at home	Usual care	Eight × 2-hour sessions = 16 hours	12
Bulthuis[146]	3-week intensive exercise programme, individualised + group-based, post hospitalisation, for patients with rheumatic diseases at the European Care Residence and Resort 'Groot Stokkert', which offers hotel facilities and professional care for disabled persons	Usual care	Two 75-minute daily physician sessions for 3 weeks + group education programme two per week = 36 sessions	12
Capomolla[134]	Day hospital care programme including co-ordination from multidisciplinary staff + care plan for chronic heart failure patients	Usual care		12

Study ID (first author and reference number)	Content of intervention	Content of control	Intensity of intervention	Follow-up (months)
Castro[169]	Multifaceted intervention, including education, psychosocial support, self-management plan and co-ordination of care for 'high-risk' inpatients with asthma	Usual care		12
Clark[170]	Individualised, nurse delivered, telephone counselling, multicomponent intervention based on self-regulation theory for women with asthma	Usual care	225 minutes	12
Clarke[265]	Pure self-help Internet site, (Overcoming Depression on the InterNet) offering training in cognitive restructuring using postcard reminders or telephone reminders	Usual care	Pure self-management; only three reminder postcards were sent	4, 12
Clarke[265]	Pure self-help Internet site, (Overcoming Depression on the InterNet) using telephone reminders	Usual care	Pure self-management; only three reminder telephone calls were made	4, 12
Cline[206]	Patients and families educational programme on heart failure during hospitalisation + discharge and follow-up nurse-led outpatient clinic	Usual care	2 hours, 30 minutes	12
Coull[208]	Patient participation in a volunteer mentor-led group with input from cardiac rehabilitation specialists, programme relating to cardiovascular disease, management and self-help based on a person-centred approach	Usual care	2 hours monthly for a year = 12 2-hour sessions	12
Coultas[171]	Nurse-assisted collaborative care or medical management rehabilitation training programme concerning case scenarios	Usual care	8 hours of standardised medical management GOLD training plus initial contact at home and once a month telephone call to patient (30 minutes)	6
Coultas[171]	Nurse-assisted collaborative management training	Usual care	16 hours of standardised medical management GOLD training, plus collaborative care training, plus initial contact at home and once a month telephone call to patient (30 minutes)	6
Davidson[209]	Multidisciplinary, monitored, cardiac rehabilitation exercise programme, outpatient clinic and home-based, without pharmacological therapy	Usual care	30 minutes plus 10 minutes' exercise × 12, plus 45 minutes' telephone support	12

Study ID (first author and reference number)	Content of intervention	Content of control	Intensity of intervention	Follow-up (months)
Davies[262]	Hospital diabetes specialist nursing service consisting of individual structured patient education appropriate to need, and practical management advice including verbal and written case-note feedback to ward-based medical and nursing staff	Usual care	Appropriate to need (no more information is provided)	12
de la Porte[210]	Intensive combined nurse/physician clinic following hospital discharge, consisting of education components plus counselling, diet advice (via dietitian) and physical examination for patients with heart failure	Usual care	4 hours, 30 minutes	12
den Boer[266]	Cognitive self-therapy group sessions led by therapists in outpatient clinics for patients with depression and anxiety which aims for patients to become 'paraprofessionals' and to conduct sessions with peers	Usual care	One to three 45-minute preparatory sessions + three orientation sessions + five weekly day-long sessions + weekly self-therapy sessions	18
de Oliveira[172]	Outpatient asthma education programme, including a treatment plan, for patients with moderate–severe asthma	Usual care	Six monthly visits + two 1-hour information sessions about asthma sessions	6
Dekker[211]	Brief individualised cognitive therapy programme including single session in the hospital plus single telephone support call post discharge for patients with heart failure and depressive symptoms	Usual care	35 minutes	3
DeWalt[212]	Multisession, literacy sensitive, behavioural self-management programme (ongoing telephone-based support) for patients with heart failure	Single session group, usual outpatient care	1 hour, 10 minutes of calls, plus follow-up calls every 2 weeks until necessary	12
DeWalt[213]	Literacy sensitive, self-management programme including educational session, picture-based self-care materials, and telephone support calls for patients with heart failure	Education pamphlet plus usual care	1 hour plus 15 minutes × eight calls = 3 hours	12
Dougherty[215]	Combined education and telephone intervention delivered by trained cardiovascular nurses compared with the usual care	Usual care	Eight sessions × 20 minutes = 160 minutes = 2 hours and 40 minutes	6, 12

Study ID (first author and reference number)	Content of intervention	Content of control	Intensity of intervention	Follow-up (months)
Doughty[214]	Integrated heart failure management programme, including individualised pharmacological treatment, which took place in hospital-based clinic post discharge and co-ordination of follow-up care between GP and clinic and patient and family	Usual care	One initial clinic visit with nurse + six weekly visits + three (1.5 hours) group education sessions = 10 visits = 11 hours	6
Druss[267]	Self-care disease management, a manualised, six-session intervention, delivered by mental health peer leaders	Usual care	Peer specialist-led three sessions	6
Dunagan[216]	Nurse-led telephone disease management involving scheduled telephone calls post discharge by specially trained nurses promoting self-management and guideline-based therapy as prescribed by primary physicians for patients with heart failure	Usual care	Three initial telephone nurse contacts + further telephone support based on participant's needs	6, 12
Dunn[268]	Self-management therapy for veterans with chronic posttraumatic stress disorder and depression, didactic presentations on depression components, group discussion, in-session exercises for understanding concepts, and weekly homework assignments	Psychoeducation	14 1.5-hour weekly sessions (same in control) = 20 hours	3–6, 12
Dunbar[217]	Nurse-led telephone counselling intervention that included education, symptom management, and coping skills training for patients after insertion of an implantable cardioverter defibrillator to reduce symptoms of depression and anxiety	Usual care	30 minutes initial session + four 1-hour telephone sessions + booster session = 5 hours and 30 minutes	6, 12
Dunbar[217]	Group counselling intervention that included education, symptom management, and coping skill training	Usual care	30 minutes initial session + four 1-hour telephone sessions + booster session = 5 hours and 30 minutes	6, 12
Eaton[173]	Inpatient supervised structured exercise programme and outpatient rehabilitation programme	Usual care, American Thoracic Society/European Respiratory Society COPD guidelines	Daily 30 minutes of exercise plus 16 hours of supervised exercise training (1-hour sessions of exercise training twice weekly × 8 weeks)	3

Study ID (first author and reference number)	Content of intervention	Content of control	Intensity of intervention	Follow-up (months)
Gallefoss[123]	Group-based and individual education and counselling programme, including the provision of a written self-management plan in patients with asthma	Usual care	180 minutes	12
Gesica[218]	Nurse-led telephone intervention to educate and monitor worsening heart failure in outpatients	Usual care	Four telephone calls every 14 days + telephone calls every 30 days (14 days or 7 days depending on severity) = 1 hour and 20 minutes	16
Gillett[131]	Structured group education programme for ongoing and newly diagnosed type 2 diabetes	Usual care	6 hours	12
Goldberg[219]	Technology-based heart failure monitoring system for patients with advanced heart failure	Usual care	Only instructions were given during the nurse visit	6
Graves[161]	Telephone counselling intervention to improve physical activity and diet	Usual care	Seven 2–2.5-hour sessions scheduled on consecutive weeks led by two volunteers (at least one of them was lay leader) = seven sessions (14 hours)	3
Griffiths[283]	Lay-led, culturally adapted, self-management programme (CDSMP Expert Patient Programme) in a South Asian chronic disease group	Usual care	Six weekly, 3-hour sessions and took place in general practices or community centres. The programmes were led by pairs of trained and accredited Bangladeshi lay tutors, who themselves had chronic diseases (mainly diabetes), who acted as facilitators	4
Groessl[148]	Social support intervention led by staff members, involved unstructured group discussions prompted by weekly task assignments aimed at promoting empathy and sharing of coping techniques between group members with chronic illness	Non-volunteers to study with diagnosis confirmed	10 weekly 2-hour meetings followed by 10 monthly 2-hour meetings = 20 sessions = 40 hours	12, 24, 36
Groessl[148]	The education intervention involved 2-hour presentations by health educators who were paid to participate in the project	Non-volunteers to study with diagnosis confirmed	10 weekly 2-hour meetings followed by 10 monthly 2-hour meetings = 20 sessions = 40 hours	12, 24, 36
Groessl[148]	The combination intervention included both educational classes and social support, with the first hour dedicated to education and the second to social support. During the second hour no staff members were present	Non-volunteers to study with diagnosis confirmed	10 weekly 2-hour meetings followed by 10 monthly 2-hour meetings = 20 sessions = 40 hours	12, 24, 36

Study ID (first author and reference number)	Content of intervention	Content of control	Intensity of intervention	Follow-up (months)
Gruffydd[174]	Targeted routine asthma care by nurse-led, telephone delivered, using the Royal College of Physicians three questions, to formulate individualised written asthma action plan	Usual care	36 minutes	12
Guell[175]	Long-term outpatient, pulmonary multicomponent rehabilitation programme for patients, including drug regime, breathing re-training, chest physiotherapy, supervised exercise	Usual care	1 hour session × 12 weeks (12 hours), plus 2 hours, 30 minutes session × 12 weeks (27.6 hours), plus 30 minutes session × 24 weeks (12 hours) = 51.6 hours	12
Haas[250]	Community-based, lay-led, Chronic Disease Self-Management Program for patients with chronic low back pain in older Americans	Wait list control	Community-based, 6-week workshop taught by trained lay people. Each weekly class was 2.5 hours = six sessions = 15 hours	6
Hamann[269]	Shared decision-making programme on antipsychotic drug use consisting of decision aid and a 'planning talk' between patient with schizophrenia and hospital physician	Usual care	One session for booklet/ psychoeducation + one physician visit	6, 18
Handley[133]	Automated telephone self-management support, that is, interactive telephone technology to provide surveillance and patient education combined with nurse care management for patients with diabetes	Usual care	Weekly, rotating automated (prerecorded) telephone calls in their native language for 9 months (39 weeks)	12
Hanssen[220]	A structured, nurse-led intervention encompassing reactive and proactive telephone follow-up after discharge for patients with acute myocardial infarction	Usual care	Eight telephone calls	18
Henderson[163]	Community-based telehealth (Whole Systems Demonstrator telehealth questionnaire study) intervention for patients with long-term conditions	Usual care	Telehealth – no further support	12
Hermiz[176]	Home visits post discharge, involving detailed assessment plus verbal and written care plan, plus preventative GP care for patients	Usual care		3

Study ID (first author and reference number)	Content of intervention	Content of control	Intensity of intervention	Follow-up (months)
Hernandez[177]	Specialist team discharge assessment, pharmacological therapy plus education, and home hospitalisation visits, including reinforcement of action plan by physician	Conventional inpatient/ discharge care	4.5 hours	8
Holland[221]	Drug review and symptom self-management and lifestyle advice intervention by community pharmacists for patients with heart failure, post discharge	Usual care	Two pharmacist home visits at 2 weeks after discharge and 6–8 weeks after discharge = 2 hours	6
Hurley[149]	Combined (group + individual) rehabilitation involving 12 supervised sessions (twice weekly for 6 weeks) by physiotherapist for patients with chronic knee pain	Usual care	12 sessions twice weekly for 6 weeks = 12 hours	6
Hurley[149]	Group rehabilitation involving 12 supervised sessions (twice weekly for 6 weeks) by physiotherapist	Usual care	12 sessions twice weekly for 6 weeks = 12 hours	18.3
Hurley[149]	Individual rehabilitation involving 12 supervised sessions (twice weekly for 6 weeks) by physiotherapist	Usual care	12 sessions twice weekly for 6 weeks = 12 hours	18.3
Jansa[258]	Trained in the management of a telecare system – the GlucoBeep system (Medimatica, software medico, Italy) (device, patient software, unit and professional software) – in replacement of face-to-face outpatient appointments for patients with type 1 diabetes and poor metabolic control	Usual care	One teaching-training session in using the telecare system	6.12
Jayadevappa[222]	Transcendental meditation, a behavioural intervention for stress reduction, plus educational group-based sessions, for African Americans with congestive heart failure	Health education	Seven initial 1.5 hour-sessions + nine further meetings = 8 hours the least	6
Jerant[284]	Homing in on Health, a Chronic Disease Self-Management Program variant, peer-led, face to face	Usual care	Six home-based one-to-one weekly sessions lasting approximately 2 hours each delivered by trained peers with chronic conditions = six sessions = 12 hours	12

Study ID (first author and reference number)	Content of intervention	Content of control	Intensity of intervention	Follow-up (months)
Jerant[284]	Telephone-based interview on Health, a Chronic Disease Self-Management Program variant	Usual care	Six home-based one-to-one weekly sessions lasting approximately 2 hours each delivered by trained peers with chronic conditions = six sessions = 12 hours	12
Jessep[157]	Integrated rehabilitation programme (Enabling Self-Management and Coping with Arthritic Knee Pain though Exercise – knee pain) that combined exercise, patient education, self-management and coping strategies	Usual care	10 1-hour physiotherapist led sessions within 5 weeks + one review session at 4 months	4.12
Johnson[251]	Group programme led by physiotherapists involving exercise and education using a CBT approach for patients with persistent disabling low back pain	Usual care	Eight 2-hour group sessions over a 6-week period	3, 9, 15
Jolly[223]	Programme to co-ordinate preventative care led by specialist liaison cardiac nurses which sought to improve communication between hospital and general practice and to encourage general practice nurses to provide structured follow-up for patients with myocardial infarction and angina	Usual care	At least three telephone call specialist cardiac liaison nurses to practices	12
Jolly[135]	Post-discharge, home-based, cardiac rehabilitation programme (the Birmingham Rehabilitation Maximisation Study) including exercise, relaxation, education and lifestyle counselling, home visits and telephone contact	Centre-based rehabilitation	Visit at home	3, 6, 12, 24
Irvine[132]	University of East Anglia Impaired Fasting Glucose programme, including both diet and group-based physiotherapist-led exercise components; peer support group and telephone support to prevent type 2 diabetes in patients with impaired fasting glucose	Usual care	17.5 hours to deliver training seminars; 21 minutes of calls per participant (no other info)	8

Study ID (first author and reference number)	Content of intervention	Content of control	Intensity of intervention	Follow-up (months)
Karjalainen[252]	Mini-intervention, based on features of a light mobilisation programme and graded activity programme, with physiotherapist and physician support for patients with subacute low back pain	Usual care	1.5 hours' consultation with physician and physiotherapist	3, 6, 12, 24
Karjalainen[252]	Identical to mini-intervention group; visit to patients worksite by a nurse, physiotherapist and physician, work supervisor to assess work conditions and provide support and feedback sent to GP	Usual care	1.5 hours' consultation with physician and physiotherapist + worksite visit	3, 6, 12, 24
Kasper[224]	Multidisciplinary outpatient management programme consisting of telephone calls, a therapeutic plan, and one nurse visit in patients with heart failure at high risk of hospital readmission	Usual care	11 calls + six monthly visits	6
Katon[270]	Multifaceted, stepped collaborative care intervention, targeting the patient and the physician and the process of care using collaborative management by a psychiatrist and a primary care physician for persistently depressed primary care patients	Usual care	Two sessions with psychiatrist (first 50 minutes and second 25 minutes) = 1 hour and 15 minutes	18
Katon[271]	Multifaceted intervention targeting the patient and the physician and the process of care using collaborative management by a psychiatrist and a primary care physician for patients with panic disorder	Usual care	Two sessions with psychiatrist (first 1 hour and second 30 minutes) + at least four telephone calls = 1 hour and 50 minutes	12
Katon[272]	Provided access to a depression care manager supervised by a psychiatrist and primary care physician offered education support for antidepressant medication and problem solving therapy for late-life depression	Usual care	One initial session + six sessions for problem-solving therapy + 18 meetings/calls = 5 hours	24
Katon[141]	CBT and pharmacotherapy collaborative care intervention for panic disorder delivered in primary care by a mental health therapist	Usual care	Six sessions within 3 months, six telephone sessions between 3 and 12 months	12

Study ID (first author and reference number)	Content of intervention	Content of control	Intensity of intervention	Follow-up (months)
Katon[140]	Medically supervised nurse, working with each patient's primary care physician, provided guideline-based, collaborative care management of multiple diseases	Advanced usual care	18 sessions in primary care in 12 months	12
Kauppinen[124]	Intensive education programme, including use of inhaled drugs, peak expiratory flow monitoring and including self-management plan for newly diagnosed patients with asthma	Conventional education	150 minutes	36
Kennedy[162]	Lay-led, generic, self-care support programme, the Expert Patients Programme was developed by researchers at Stanford University in the USA for patients with long-term conditions	Usual care	Six weekly 2.5-hour sessions with 8–10 participants	6
Khdour[125]	Hospital pharmacy-led, structured, disease medicine management programme, including action plan and motivational interviewing (cost-effectiveness)	Usual care	1 hour, plus 40 minutes of telephone calls, plus 30 minutes of outpatient visit = 2 hours, 10 minutes	12
Ko[178]	Early outpatient pulmonary rehabilitation exercise programme after hospitalisation for acute exacerbations	Usual care	Three times per week for 8 weeks and spent 2 hours in each session	3, 6, 9, 12
Koff[126]	Proactive integrated care, multicomponent intervention for patients with four components: (1) disease-specific education, (2) teaching of SM, (3) enhanced communication with co-ordinators and (4) remote home monitoring ('Health Buddy')	Usual care	30 minutes' introductory session; 20 minutes per day Health Buddy System session; 9 hours' daily monitoring of patients	3
Koehler[225]	Physician-led remote telemedical management that used portable devices for electrocardiography, blood pressure, and body weight measurements connected to a personal digital assistant that sent automated encrypted transmission via cell phones to the telemedical care for patients with chronic heart failure	Usual care	Four follow-up visits	26

Study ID (first author and reference number)	Content of intervention	Content of control	Intensity of intervention	Follow-up (months)
Kroenke[285]	Combined pharmacological therapy and pain self-management programme, consisting of a nurse care manager (depression care management team, developed for primary care patients with depression and musculoskeletal pain)	Usual care	Optimised pharmacotherapy, six sessions of a pain self-management programme over 12 weeks and a continuation phase of therapy for 6 months which included two telephone calls = six sessions + two calls = 3 hours and 10 minutes the minimum	6, 12
Kwok[226]	Community nurse-supported hospital discharge programme involving community nurse visits pre and post discharge for older patients with chronic heart failure	Usual care	One pre-discharge nurse meeting + nine home visits = 4 hours and 30 minutes the least	6
Lahdensuo[179]	Guided self-management group, including personal education, physiotherapeutic counselling and diary recordings for patients with asthma	Traditional treatment	150 minutes + daily diary recordings	12
Lee[180]	Nursing home care protocol of individualised care following hospitalisation in older nursing home patients with chronic obstructive pulmonary disease	Usual care	1 hour plus weekly CM nurse visits (30 minutes) for first month (2 hours); CM nurse visits (30 minutes) at monthly intervals (6 months = 3 hours) plus telephone support calls (15 minutes) in between visits (6 months = 1 hour, 15 minutes). Total 7 hours and 15 minutes	6
Levitt[273]	Illness management and recovery group-based programme, including case management, psychiatric treatment and medication, for patients with serious mental illness who were receiving supportive housing services	Waiting list	41 supporting sessions	12
Levy[181]	Structured education sessions by emergency room-based specialist nurses, using self-management plan, for emergency room attendance for asthma	Usual care	2 hours	6
Lewin[227]	Home-based self-help rehabilitation programme ('the Heart Manual') for post-infarct patients who included education, a home-based exercise programme and a tape-based relaxation and stress management programme	Usual care	Four contacts (either telephone or face to face) with the facilitator (physician)	12

Study ID (first author and reference number)	Content of intervention	Content of control	Intensity of intervention	Follow-up (months)
Lewin[136]	Brief home-based cognitive–behavioural rehabilitation programme for patients receiving an implantable cardioverter-defibrillator introduced before implantation, with brief telephone contacts with nurse	Usual care	Four contacts (either telephone or face to face) with the facilitator nurse	6
Linton[253]	Primary care, group CBT intervention, focusing on preventing long-term disability by changing patients with spinal pain behaviours and beliefs so they can cope better with their problems	Information pamphlet	Six 2-hour group sessions over 6 weeks	12, 60
Linton[253]	A packet of information once a week for 6 weeks	Information enhanced	Six 2-hour group sessions over 6 weeks	12, 60
Lopez Cabezas[228]	Multifactorial educational intervention carried out by a pharmacist involved receiving information about the disease, drug therapy, diet education, and active telephone follow-up in patients with heart failure	Usual care	Initial meeting with physician + six monthly telephone calls and three calls once in two months = nine contacts (per 10 minutes) + one meeting (30 minutes) = 2 hours	12
Man[182]	Outpatient pulmonary rehabilitation programme, multidisciplinary team-led with exercise and educational components	Usual care	2 hours per class = 32 hours	3
Mancuso[183]	Multicomponent, behavioural-based, emergency department education programme (workbook, behavioural contract, telephone calls, physiological feedback) for patients with asthma	Instruction/ PF training	2 hours and 10 minutes (15 minutes of calls × 8 weeks + 10 minutes to make contract)	12
Markle-Reid[229]	Specialised, evidence-based, interprofessional team approach to community-based stroke rehabilitation	Usual care	Individualised plan with three initial appointments and home visits (unclear the intensity)	12
McBeth[254]	Telephone-delivered CBT, involving patient-centred assessment, by developing a shared understanding and formulation of problem, and identified patient-defined goals for patients with chronic widespread pain	Usual care	One initial assessment (45–60 minutes), seven weekly sessions (each 30–45 minutes long), and one session 3 months and one session 6 months after randomisation = 5 hours 15 minutes = 11 sessions	6, 9

Study ID (first author and reference number)	Content of intervention	Content of control	Intensity of intervention	Follow-up (months)
McBeth[254]	A leisure facility- and gym-based exercise programme consistent with American College of Sport Medicine guidelines for improving cardiorespiratory fitness	Usual care	Following one induction session, patients were offered six fitness instructor-led monthly appointments for programme reassessment = seven sessions = 3.5 hours	6, 9
McBeth[254]	The above two combined	Usual care	18 sessions = 18 hours and 45 minutes	6, 9
McDonald[230]	Multidisciplinary care involving inpatient and outpatient medical care, education and close telephone and clinic follow-up for patients with heart failure	Usual care	At least three inpatient education visits from specialist nurse, 12 weekly telephone calls and two visits to heart failure clinic	3
McLean[185]	Enhanced pharmaceutical care, including teaching of asthma self-management, medication usage and provision of asthma action plan, delivered by local community, experienced pharmacists	Usual care	Seven 1-hour appointments with a pharmacist	7
McGeoch[184]	Provision of written self-management plan (action plan) and patient initiated medication administered in primary care	Usual care	1 hour	12
McGowan[259]	Community peer-led group-based self-management programme with a focus on action planning, follow-up and problem solving for patients with type 2 diabetes	Usual care	2.5 hours × 6 weeks	0
McWilliam[286]	Health promotion education therapy, individualised, led by nurses post discharge, for chronically ill older patients	Usual care	10 weekly home visits by nurse = 10 hours (mean 10.55 hours)	5, 12
Community Pharmacy Medicines Management Project Evaluation Team[207]	12-month intervention comprised an initial consultation with a community pharmacist to review appropriateness of therapy, compliance, lifestyle, social and support issues	Usual care	At least one pharmacist consultation and further consultations based on the need	12
Mejhert[231]	Nurse-based outpatient management programme and pharmacotherapy intervention for elderly patients with heart failure	Usual care	Regular visits of patients to outpatient clinic	18

Study ID (first author and reference number)	Content of intervention	Content of control	Intensity of intervention	Follow-up (months)
Meijer[150]	Return to work, outpatient multidisciplinary treatment programme with psychological and physical sessions for patients with upper extremity musculoskeletal disorders	Usual care	13 full days (from 9 to 17 hours), five return-to-work sessions and one feedback session = 62 sessions, 82 hours	2, 6, 12
Moffett[255]	Exercise classes led by a physiotherapist that included strengthening exercises for all main muscle groups, stretching exercises, relaxation session, and brief education on back care, utilising elements of CBT, for patients with lower back pain in primary care	Usual care	Eight sessions over 4 weeks = 4 hours	6.12
Monninkhof[127]	Educational self-management outpatient programme including a fitness programme, guidelines for self-treatment of exacerbations, and a self-management education course	Usual care	10 hours (education component), plus 1.5 hours (× 104 physiotherapist sessions) = 156 hours	12
Morcillo[232]	Single home-based educational intervention nurse-led, after hospital discharge, which included education and self-management advice for heart failure patients	Usual care	2 hours' nurse visit at home	6
Moudgil[186]	Individually-based, asthma education and optimisation of drug therapy programme	Usual care	120 minutes	4
Murphy[233]	Complex intervention involving tailored care plans for practices (practice-based training in prescribing and behaviour change, administrative support, quarterly newsletter) and tailored care plans for patients (motivational interviewing, goal identification, and target setting for lifestyle change) with reviews every 4 months at the practices for secondary prevention of heart disease in primary care	Usual care	One initial meeting with GP, one telephone call from GP, consultations every 4 months = seven meetings + one telephone call = 4 hours	24

Study ID (first author and reference number)	Content of intervention	Content of control	Intensity of intervention	Follow-up (months)
Murray[234]	Pharmacist-led intervention on medication compliance, involving multidisciplinary team, for patients with heart failure, with low health literacy and limited resources	Usual care	Unclear	12
Naylor[235]	Transitional care intervention, involving discharge planning and home follow-up protocol, delivered by advanced practice nurses for older adults hospitalised with heart failure	Usual care	Daily visits during hospitalisation, eight home visits	3
Niemstro[158]	Combined manipulative treatment, stabilising exercises, and physician consultation for patients with chronic low back pain	Physician consultation	Four 1-hour sessions over 4 weeks = 4 hours	5, 12, 24
Ninot[187]	Supervised hospital-based exercise programme, plus self-management education sessions	Usual care	16.5 hours (plus 45 minutes = × 3 telephone follow-ups, 2 × per week post intervention)	12
Nucifora[236]	Nurse-led education programme, included predischarge patient education, post-discharge facilitated telephone communication and follow-up outpatient visits with an internist for patients with heart failure	Usual care	One half-hour visit during hospital, one telephone call after discharge, three doctor home visits = 2 hour and 15 minutes	6
Nunez[248]	Therapeutic education and functional readaptation programme for patients with musculoskeletal diseases involving the lower limbs, designed to improve pain and functional disability and to increase patient disease self-management (based on social learning theory)	Usual care	Two individual visits lasting about 30 minutes at first week and at 3 months and two group sessions of about 90 minutes in weeks 3 and 4, for a maximum of 10–12 patients = four sessions, 4 hours	3.9
Ojeda[237]	Post-discharge intervention programme for patients with heart failure involving patient education, consultation with the cardiologist and monitoring in the Heart Failure Unit	Usual care	One education session prior to discharge + six clinic visits = seven sessions = 3.5 hours at least	12
Patel[151]	Arthritis SM programme plus education booklet in primary care patients with osteoarthritis of the hips or knees, or both, and pain, or disability	Education booklet	Six weekly group sessions of 2.5 hours each = 9 hours	12

Study ID (first author and reference number)	Content of intervention	Content of control	Intensity of intervention	Follow-up (months)
Penn[274]	Community-based, therapist-led, group CBT, including emotional support and counselling components for patients with schizophrenia auditory hallucinations severity	Enhanced supportive therapy	12 weekly sessions = 6 hours	6
Penn[275]	The Graduated Recovery Intervention Program for patients with first episode psychosis; involved four phases delivered by a therapist (1) engagement and wellness management, (2) substance use; (3) persistent symptoms and (4) functional recovery	Treatment as usual	12 sessions up to 36	12
Peters[256]	Multidisciplinary inpatient pain management programme, CBT based	Usual care	4 days per week for 4 weeks	9–12
Peters[256]	Multidisciplinary outpatient pain management programme, education based	Usual care	Nine weekly, 2-hour sessions at the hospital = 18 hours	9–12
Pinnock[189]	Nurse-delivered, routine review by telephone of patients with asthma in primary care	Usual care	Telephone call by nurse	3
Pilotto[188]	Nurse-run asthma clinics, including the provision of an action plan, in primary care	Usual care	Three nurse follow-up visits to review the inhaler technique and encourage patients to develop action plans	6, 9
Price[190]	Use of personal action plans through implementation of adjustable dosing in asthma patients	Fixed dosing normal management		3
Pyne[142]	Rural-based, collaborative care depression intervention; stepped-care model for treatment involving an off-site depression care team (nurse depression care manager, clinical pharmacist, psychiatrist) to make treatment recommendations via electronic medical record, and communication via telephone and computerised decision support software	Usual care	Unclear	12
Ramachandran[238]	Telephone-based disease management programme involving interactive sessions with the patient with heart failure and spouse, and a telephonic helpline and regular telephone calls	Usual care	Two initial face-to-face sessions (1 hour) and 25 telephone calls (25 × 5 = 125 minutes) = 3 hours and 5 minutes	6

Study ID (first author and reference number)	Content of intervention	Content of control	Intensity of intervention	Follow-up (months)
Rea[191]	Disease management programme, including a care plan and co-ordination of care	Usual care	12 visits to PN (6 hours) plus four visits to GP (2 hours) plus two home visits (1 hour) = 9 hours	12
Reynolds[276]	Transitional discharge model to support patients with mental health conditions discharged from admission wards to community living; two components included peer support, and overlap of inpatient and community staff relationship and co-ordination of care	Usual care	At least four home visits by inpatient nurses + peer support	5
Rich[239]	Nurse-directed, multidisciplinary intervention consisted of comprehensive education for the patient with congestive heart failure and family, a prescribed diet, social-service consultation and planning for an early discharge, a review of medications, and intensive follow-up	Usual care		1
Richardson[287]	A rehabilitation multicomponent intervention for patients with chronic conditions was delivered by a physiotherapist and occupational therapist in primary care setting and included collaborative goal setting for rehabilitation needs, chronic disease self-management workshop, referral to community programmes and a web-based education program	Usual care	Collaborative goal setting for rehabilitation needs, individual treatment as needed, a 6-week group SM workshop	6, 9
Riegel[240]	Nurse-led telephone case management, using a decision-support software program ('At Home with Heart Failure') for Hispanic patients with heart failure, post discharge	Usual care	13.5 telephone contacts + 8.6 family contacts + 4.6 nurse consultations with other professionals = 26.6 contacts = approximately 3 hours	6
Ries[118]	Telephone maintenance programme following rehabilitation programme in patients with chronic lung disease	Usual care	Weekly telephone calls (15 minutes × 52 weeks = 13 hours). Monthly reinforcement sessions = 1.5 hours supervised exercise, 1 hour topic review, 0.5 hours social time (3 hours). Total = 16 hours	24

Study ID (first author and reference number)	Content of intervention	Content of control	Intensity of intervention	Follow-up (months)
Rivera[277]	Consumer-assisted providers of case management which involved provision of social support through matching peer staff with consumers with severe mental impairment	Usual care	Standard care plus + peer support	12
Rivera[277]	Clinic-based case management which mainly included provision of support via professional	Usual care	Standard care plus + peer support	12
Roberts[288]	Individualised 1-hour counselling meetings (1–10 meetings) conducted by nurses over a 6-month period for patients with chronic conditions	Usual care	1–10 meetings lasting 1 hour	6, 12
Roberts[288]	Individualised telephone counselling by nurses	Usual care	Calls (5–10 minutes) every 2 weeks for the first 2 months and then every month for 4 months = 80 minutes at the minimum	6, 12
Roelfs[159]	Short intervention involving wearing a lumbar support for home care workers when/anticipated to experience chronic back pain	Usual care	No session	12
Ryan[192]	Mobile phone supported self-monitoring, including transmission of symptoms, drug use and PF with feedback according to a plan for patients with asthma	Usual care	Twice daily recordings per week	6
Schermer[128]	Guided, individual, SM from primary care physicians, including educational tools for patient and physician, and PF monitor in patients with asthma	Usual care		24
Schwarz[241]	Telemonitoring by an advanced practice nurse	Usual care	Telemonitoring + advance nurse contacts	6
Seto[242]	Mobile phone-based telemonitoring system to record daily weight, blood pressure readings and assess symptoms, plus telephone technical support, for heart failure management	Usual care	One instruction session	6

Study ID (first author and reference number)	Content of intervention	Content of control	Intensity of intervention	Follow-up (months)
Sevick[152]	Aerobic exercise training intervention consisted of a 3-month facility-based programme and a 15-month home-based programme	Health education	Three 60-minute sessions per week for 3 months ($n = 36$ sessions) + four home visits + six telephone calls + three telephone calls + eight telephone calls = 57 contacts = (36 hours + 2 hours + 2.5 hours) = 40 hours	3
Sevick[152]	Resistance exercise training intervention consisted of a 3-month facility-based programme and a 15-month home-based programme	Health education	Three 60-minute sessions per week for 3 months ($n = 36$ sessions) + four home visits + six telephone calls + three telephone calls + eight telephone calls = 57 contacts = (36 hours + 2 hours + 2.5 hours) = 40 hours	3
Seymour[193]	Outpatient, post-exacerbation pulmonary rehabilitation programme following hospitalisation	Usual care	2 hours, twice weekly, exercise and education sessions	3
Shelledy[194]	In-home asthma disease management programme, respiratory therapist-led, involving asthma education for patient and family, educational tools and care plan	Usual care	5 hours	6
Simon[130]	Diabetes glycaemic education and monitoring trial for patients with type 2 diabetes; less intensive group = use of blood glucose metre + advice to contact GP for interpretation	Usual care	15 minutes (assessment visit) + 5 minutes (record three values, 2 days per week) + 5 minutes (diary entry) over 9 months; 6 days of nurse training × 5 weeks	12
Simon[130]	Diabetes glycaemic education and monitoring trial; more intensive group = use of blood glucose meter + training to interpret results	Usual care	15 minutes (assessment visit) + 5 minutes (record three values, 2 days per week) + 5 minutes (diary entry) over 9 months; 6 days of nurse training × 5 weeks	12
Simon[145]	Depression management programme which included patient education, antidepressant pharmacotherapy in primary care, telephone monitoring and psychiatric consultation if needed	Usual care	Eight primary physician visits = 4 hours + possible psychiatric consultations	12

Study ID (first author and reference number)	Content of intervention	Content of control	Intensity of intervention	Follow-up (months)
Simon[278]	Depression relapse prevention programme involving: systematic patient education, psychoeducational visits with a depression prevention specialist, shared decision-making regarding maintenance pharmacotherapy, and telephone and mail monitoring of medication adherence and depressive symptoms	Usual care	Two visits with depression specialist + four telephone monitoring contacts + four personalised e-mails	12
Simon[279]	Nurse care manager provided 2-year systematic intervention programme, including: structured group psychoeducational programme, telephone monitoring of mood symptoms and medication adherence, feedback to treating mental health providers, facilitation of appropriate follow-up care, and as-needed outreach and crisis intervention	Usual care	24 telephone calls + 48 weekly groups sessions	24
Simon[143]	Telephone care management intervention included outreach calls for monitoring and support, feedback to treating physicians, and care co-ordination for patients with depression	Usual care	Up to five brief telephone calls	12
Simon[143]	The care management plus telephone psychotherapy intervention added an eight-session structured CBT programme with up to four additional calls for reinforcement	Usual care	12 telephone calls + eight sessions = 5 hours	12
Sinclair[243]	Home-based intervention for older cardiac patients consisted of home visits after hospital discharge by nurse who encouraged compliance with and knowledge of treatment regimen, offered support and guidance about resuming daily activities	Usual postdischarge care	Two nurse home visits (no duration is reported) = 1 hour	3
Sisk[244]	Nurse-led intervention focused on specific self-management problems plus scheduled follow-up calls for minority communities with heart failure	Usual care	One appointment with nurse, additional calls (no information on the number, co-ordination with patient's clinician)	12

Study ID (first author and reference number)	Content of intervention	Content of control	Intensity of intervention	Follow-up (months)
Soler[195]	Short educational programme included visits to specialised nurse-led clinic and short educational programme (but no SM plan)	Usual care	Monthly visits to clinic (1 hour) plus educational session (30 minutes) total = 12 hours, 30 minutes	12
Solomon[249]	Arthritis Self-Management Program course, incorporating educational materials such as SM plan, in primary care	Arthritis handbook only	Six weekly sessions, each about 2 hours in duration, led by a trained facilitator = 12 hours	4
Strong[160]	Lay-led, self-care, group-based intervention in reducing impairment and activity limitations in patients with moderate back pain in primary care	Usual care	Four weekly group sessions	3, 6, 12
Strong[160]	Psychologist-led self-care interventions in reducing impairment and activity limitations in patients with moderate back pain	Usual care	Two 2-hour group sessions, one 45-minute mini individual session and a brief (3-minute) follow-up telephone call = four sessions = 4 hours and 47 minutes	3, 6, 12
Sundberg[196]	Computerised, educational, interactive programme involving questions and graphics for young adults with asthma, followed by discussion with asthma nurse at outpatient clinic	Usual care	1 hour	12
Swerissen[289]	Chronic disease management programme for patients with chronic illness from Vietnamese, Chinese, Italian and Greek backgrounds	Usual care	Six weekly sessions of 2.5 hours in duration using the Chronic Disease Self-Management Workshop – Leaders Manual	6
Taylor[137]	Home-based cardiac rehabilitation, nurse facilitated, self-help programme ('the Heart Manual')	Hospital rehabilitation	Two face-to-face sessions and four telephone calls (5–10 minutes) = 100 minutes	9
Thomas[153]	Home-based exercise programme consisted of quadriceps strengthening plus telephone contact and aerobic exercise taught in a graded programme for patients with knee pain	No intervention	Four 30-minute visits during the initial 2 months and one visit every 6 months = eight visits = 4 hours	24
Trento[260]	Physician-led lifestyle intervention by group care, including education sessions plus optional individual care for patients with type 2 diabetes	Usual care	34 minutes + 45 minutes = 1 hour, 19 minutes (plus 24 minutes for elective individual visits)	51

Study ID (first author and reference number)	Content of intervention	Content of control	Intensity of intervention	Follow-up (months)
Turkington[280]	Mental health nurse-led brief CBT designed to improve patients' understanding, to develop their coping skills and help them to take more control over their schizophrenia	Usual care	Six sessions within 2–3 months	12
van der Meer[129]	Internet-based self-management program, including electronic personal action plan, group and online education for patients with asthma	Usual primary care, face to face		12
Varma[245]	Structured pharmaceutical education programme on disease and its treatment and lifestyle changes	Usual care	One education session	12
Wakabayashi[197]	Integrated care programme including educational sessions and treatment and management plan, according to patient score on LINQ for older patients with COPD	Education based on LINQ	3 hours	12
Wakefield[246]	Nurse-delivered telehealth-facilitated post-discharge support programme with self-efficacy components, for patients with heart failure	Usual care	14 telephone calls = 60 minutes	3
Wakefield[246]	Video health-facilitated post-discharge support programme	Usual care	14 telephone calls = 60 minutes	3
Watson[198]	SM plan plus SM booklet	Usual care	1 hour	6
Weinberger[154]	Interventions consisted of providing information and differed in mode of delivery. Telephone only group was telephoned monthly and/or scheduled visits in clinic	Clinic visits or no intervention	Monthly telephone calls + clinic visits for 1 year	12
Whitehurst[155]	Brief pain management programme physiotherapy-led targeting psychosocial risk factors for patients with low back pain in primary care	Physical therapy programme	40-minute assessment/treatment session, plus up to six subsequent 20-minute treatment sessions = seven sessions = 2 hours and 40 minutes	3, 12
Whooley[281]	Case-finding for depression intervention. Primary care physicians notified of depression score (Geriatric Depression Scale) and offered psychoeducational sessions led by nurse	Usual care	Six weekly sessions + one booster session = 3.5 hours the lower	24

Study ID (first author and reference number)	Content of intervention	Content of control	Intensity of intervention	Follow-up (months)
Willmott[247]	Intervention included expressive writing about patients' thoughts and feelings in relation to having had an infarct	Attention control	Only instructions were given during the nurse visit	5
Wolf[261]	Dietitian-led lifestyle case management individual and group support sessions, for obese patients with type 2 diabetes in primary care	Usual care	4 hours of group sessions + 6 hours of small group sessions + 15 minutes brief telephone calls	12
Wootton[290]	Multidisciplinary intervention to improve the co-ordination of primary acute and residential care services	Usual care	Unclear	12
Yilmaz[199]	Outpatient clinic, special education programme for patients with asthma	Usual care		36
Yoon[200]	Brief, group-based, single session, education programme for adults with asthma, including inhaler use, adjust medication dosage using a treatment plan	Delayed intervention	3 hours	10

CBT, cognitive–behavioural therapy; CM, case managing; COPD, chronic obstructive pulmonary disease; GOLD, Global Initiative for Chronic Obstructive Lung Disease; GP, general practitioner; LINQ, Lung Information Needs Questionnaire; PF, peak flowmeter; SM, self-management.

Appendix 7 Details of individual studies: quality

Study ID (first author and reference number)	*n*	Unit of allocation	Allocation concealment
Angermann[201]	715	Patients	Not clear
Barnason[202]	280	Patients	Not clear
Barton[156]	389	Patients	Not clear
Barton[156]	389	Patients	Not clear
Barton[156]	389	Patients	Not clear
Bauer[263]	330	Patients	Adequate
Bauml[264]	236	Patients	Adequate
Beck[282]	221	Patients	Not clear
Beckerman[166]	42	Patients	Not clear
Behnke[167]	26	Patients	Not clear
Bocchi[203]	350	Patients	Adequate
Bosmans[139]	145	Practices	Not clear
Bosmans[138]	151	Patients	Not clear
Bouvy[204]	152	Patients	Not clear
Boxall[168]	60	Patients	Adequate
Brotons[205]	283	Patients	Adequate
Brun[257]	74	Patients	Not clear
Bulthuis[146]	85	Patients	Not clear
Capomolla[134]	235	Patients	Not clear
Castro[169]	96	Patients	Not clear
Clark[170]	808	Patients	Not clear
Clarke[265]	255	Patients	Adequate
Clarke[265]	255	Patients	Adequate
Cline[206]	206	Patients	Not clear
Coull[208]	320	Patients	Not clear
Coultas[171]	151	Patients	Not clear
Coultas[171]	151	Patients	Not clear
Davidson[209]	105	Patients	Not clear
Davies[262]	300	Patients	Not clear
de la Porte[210]	240	Patients	Not clear
den Boer[266]	151	Patients	Adequate
de Oliveira[172]	52	Patients	Not clear
Dekker[211]	41	Patients	Not clear
DeWalt[212]	605	Patients	Adequate
DeWalt[213]	127	Patients	Not clear
Dougherty[215]	168	Patients	Not clear

Study ID (first author and reference number)	*n*	Unit of allocation	Allocation concealment
Doughty[214]	197	GPs	Not clear
Druss[267]	80	Patients	Not clear
Dunagan[216]	151	Patients	Not clear
Dunn[268]	101	Patients	Not clear
Dunbar[217]	246	Patients	Not clear
Dunbar[217]	246	Patients	Not clear
Eaton[173]	97	Patients	Not clear
Gallefoss[123]	78	Patients	Not clear
Gesica[218]	1518	Patients	Not clear
Gillett[131]	824	Practices	Not clear
Goldberg[219]	180	Patients	Not clear
Graves[161]	434	Practices	Not clear
Griffiths[283]	476	Patients	Not clear
Groessl[148]	363	Patients	Not clear
Groessl[148]	363	Patients	Not clear
Groessl[148]	363	Patients	Not clear
Gruffydd[174]	174	Patients	Not clear
Guell[175]	30	Patients	Not clear
Haas[250]	109	Patients	Not clear
Hamann[269]	107	Patients	Not clear
Handley[133]	226	Patients	Not clear
Hanssen[220]	288	Patients	Not clear
Henderson[163]	3230	Practices	Adequate
Hermiz[176]	177	Patients	Not clear
Hernandez[177]	222	Patients	Not clear
Holland [221]	293	Patients	Adequate
Hurley[149]	418	Practices	Adequate
Hurley[149]	418	Practices	Adequate
Hurley[149]	418	Practices	Adequate
Jansa[258]	40	Patients	Not clear
Jayadevappa[222]	23	Patients	Not clear
Jerant[284]	415	Patients	Not clear
Jerant[284]	415	Patients	Not clear
Jessep[157]	64	Patients	Adequate
Johnson[251]	234	Patients	Adequate
Jolly[223]	597	Practices	Adequate
Jolly[135]	525	Practices	Adequate
Irvine[132]	177	Patients	Adequate
Karjalainen[252]	170	Patients	Adequate

Study ID (first author and reference number)	*n*	Unit of allocation	Allocation concealment
Karjalainen[252]	170	Patients	Adequate
Kasper[224]	200	Patients	Adequate
Katon[270]	228	Patients	Not clear
Katon[271]	115	Patients	Not clear
Katon[272]	1801	Patients	Not clear
Katon[141]	232	Patients	Not clear
Katon[140]	214	Patients	Not clear
Kauppinen[124]	167	Patients	Not clear
Kennedy[162]	629	Patients	Adequate
Khdour[125]	173	Patients	Not clear
Ko[178]	60	Patients	Not clear
Koff[126]	40	Patients	Not clear
Koehler[225]	710	Patients	Not clear
Kroenke[285]	250	Patients	Not clear
Kwok[226]	105	Patients	Adequate
Lahdensuo[179]	122	Centres	Not clear
Lee[180]	112	Nursing homes	Not clear
Levitt[273]	99	Patients	Not clear
Levy[181]	211	Patients	Not clear
Lewin[227]	176	Patients	Adequate
Lewin[136]	192	Centres	Not clear
Linton[253]	243	Patients	Adequate
Linton[253]	243	Patients	Adequate
Lopez Cabezas[228]	134	Patients	Adequate
Man[182]	42	Patients	Not clear
Mancuso[183]	296	Patients	Not clear
Markle-Reid[229]	101	Patients	Adequate
McBeth[254]	442	Patients	Adequate
McBeth[254]	442	Patients	Adequate
McBeth[254]	442	Patients	Adequate
McDonald[230]	98	Patients	Not clear
McLean[186]	225	Patients	Adequate
McGeoch[184]	159	Patients	Not clear
McGowan[259]	321	Patients	Not clear
McWilliam[286]	298	Patients	Not clear
CPMMPT[207]	1614	Patients	Adequate
Mejhert[231]	208	Patients	Not clear
Meijer[150]	23	Patients	Adequate
Moffett[255]	187	Patients	Not clear

Study ID (first author and reference number)	*n*	Unit of allocation	Allocation concealment
Monninkhof[127]	248	Patients	Not clear
Morcillo[232]	70	Patients	Not clear
Moudgil[186]	689	Patients	Not clear
Murphy[233]	903	Practices	Adequate
Murray[234]	314	Patients	Adequate
Naylor[235]	239	Patients	Adequate
Niemstro[158]	204	Patients	Not clear
Ninot[187]	38	Patients	Adequate
Nucifora[236]	200	Patients	Not clear
Nunez[248]	100	Patients	Not clear
Ojeda[237]	153	Patients	Not clear
Patel[151]	812	Patients	Adequate
Penn[274]	65	Patients	Not clear
Penn[275]	46	Patients	Not clear
Peters[256]	68	Patients	Not clear
Peters[256]	68	Patients	Not clear
Pinnock[189]	278	Patients	Adequate
Pilotto[188]	170	Practices	Not clear
Price[190]	1553	Patients	Adequate
Pyne[142]	395	Practices	Adequate
Ramachandran[238]	50	Patients	Not clear
Rea[191]	135	Patients	Not clear
Reynolds[276]	25	Patients	Not clear
Rich[239]	282	Patients	Not clear
Richardson[287]	303	Patients	Adequate
Riegel[240]	134	Patients	Not clear
Ries[192]	172	Patients	Adequate
Rivera[277]	203	Patients	Not clear
Rivera[277]	203	Patients	Not clear
Roberts[288]	293	Patients	Not clear
Roberts[288]	293	Patients	Not clear
Roelfs[159]	360	Patients	Adequate
Ryan[192]	288	Patients	Adequate
Schermer[128]	193	Family practices	Not clear
Schwarz[241]	102	Patients	Not clear
Seto[242]	100	Patients	Adequate
Sevick[152]	439	Patients	Not clear
Sevick[152]	439	Patients	Not clear
Seymour[193]	60	Patients	Not clear

Study ID (first author and reference number)	*n*	Unit of allocation	Allocation concealment
Shelledy[194]	166	Patients	Not clear
Simon[130]	453	Patients	Adequate
Simon[130]	453	Patients	Adequate
Simon[145]	407	Patients	Not clear
Simon[278]	386	Patients	Not clear
Simon[279]	785	Patients	Not clear
Simon[143]	600	Patients	Not clear
Simon[143]	600	Patients	Not clear
Sinclair[243]	324	Patients	Not clear
Sisk[244]	406	Patients	Adequate
Soler[195]	26	Patients	Not clear
Solomon[249]	178	Practices	Not clear
Strong[160]	255	Patients	Not clear
Strong[160]	226	Patients	Not clear
Sundberg[196]	97	Patients	Not clear
Swerissen[289]	320	Patients	Not clear
Taylor[137]	230	Patients	Adequate
Thomas[153]	786	Patients	Not clear
Trento[260]	112	Patients	Not clear
Turkington[280]	422	Patients	Not clear
van der Meer[129]	200	Patients	Not clear
Varma[245]	83	Patients	Not clear
Wakabayashi[197]	102	Patients	Adequate
Wakefield[246]	148	Patients	Not clear
Wakefield[246]	148	Patients	Not clear
Watson[198]	56	Patients	Not clear
Weinberger[154]	191	Patients	Not clear
Whitehurst[155]	402	Patients	Not clear
Whooley[281]	331	Clinics	Not clear
Willmott[247]	179	Patients	Not clear
Wolf[261]	147	Patients	Not clear
Wootton[290]	525	Patients	Not clear
Yilmaz[199]	80	Patients	Not clear
Yoon[200]	76	Patients	Not clear

Appendix 8 Details of individual studies: economic analyses

Study and date and type	Population setting	Intervention and comparison	Perspective and time horizon	Outcomes and costs	Outcomes reported (including ICERs and uncertainty)	Author conclusion and additional comments
Respiratory						
Gallefoss[123] CEA	Norway. Asthma in outpatient setting	Patient education and physiotherapy vs. usual care	Societal	SGRQ	Incremental SGRQ gain 16.3 units (HRQoL = better)	Based on including all cost difference, intervention is dominant
				FEV		
				Cost of intervention	Health costs difference 1900 NOK	Excluding productivity losses means the intervention adds costs
			Health Service	Health care		
				Costs	All cost difference –5500 NOK	Whether or not it is worth paying 3400 NOK for 10 point gain on SGRQ is unknown
				Productivity		
Kaupinnen[124] CEA	Finland. Asthma in outpatient setting	Intensive education vs. usual care	Societal	15D	Intensive education associated incremental gain of 0.02 units 15D	As the cost difference is statistically significant and the effect on QoL is not, the authors conclude that the intervention IS NOT cost-effective
			Health Service	SGRQ	Incremental difference in health costs of £51	The conclusion, essentially reducing the analysis to a cost minimisation study, would not accord with current guidance. The authors should have calculated an ICER to inform whether or not intervention was cost-effective
				Cost of intervention	Intervention dominant when indirect costs included	
				Health-care costs		
				Productivity		
Khdour[125] CUA	UK. COPD in pharmacy	Pharmacy led self-management programme vs. usual care	NHS/PSS	QALY generated from EQ-5D	Incremental QALY gain 0.065 QALYs	Intervention is cost-effective and conclusion was robust to sensitivity analysis
					Incremental total cost –£672	
				NHS/PSS costs	Dominant	Base case analysis was on complete cases though multiple imputation was conducted and results did not alter
					95% probability of being cost-effective at £20,000/QALY	

Study and date and type	Population setting	Intervention and comparison	Perspective and time horizon	Outcomes and costs	Outcomes reported (including ICERs and uncertainty)	Author conclusion and additional comments
Koff[126] CEA	USA. COPD in outpatient	Education, self-management, telemonitoring vs. usual care	Health system?	SGRQ	3-month incremental SGRQ gain 9.7	Intervention improves outcomes at reduced costs
				Health-care costs	Health costs reduced by intervention. Authors used an unusual method, calculating the change in cost from previous period. Costs in treatment group fell by 1401 US dollars while TAU increased by 1709 US dollars. As TAU were more expensive in the pre-trial period, it can be estimated that the difference in costs between the groups in the follow-up period was US$5085 in favour of intervention	Small sample ($n = 40$). Cost of intervention omitted generating overly positive conclusion. Pre study costs were considerably higher in usual care arm suggesting groups were not well balanced
				Not intervention costs	Dominant	
Monninkhof[127] CUA	Holland. COPD in outpatient setting	Comprehensive self-management vs. usual care	Societal	QALY generated from EQ-5D	QALY differences of 0.018 in favour of intervention (not significant). SGRQ also improved in treatment group compared with control but was very small (and non-significant)	No significant difference in QALYs coupled with a significant increase in costs generated a non-efficient result for the intervention based on a cost minimisation analysis
				SGRQ Health-care costs Travel costs Productivity	Intervention cost more than usual care (€1643 vs. €805, incremental cost difference = €838), though difference was reduced when productivity losses were excluded (incremental cost difference = €593)	Small but positive impact on QoL would generate an ICER of €33,000/QALY, which is borderline cost-effective (i.e. dependent on threshold chosen)
Schermer[128] CEA/CUA	Holland. Asthma in primary care	Self-management vs. usual care	Societal	Preference-based QALY	Incremental QALY gain 0.015 QALYs	Intervention is dominant in societal analysis
				Cost of intervention	Incremental total cost –£13	£13,000/QALY from health service perspective
			Health service	Health-care costs Productivity	Incremental health cost £11 Incremental health ICER 733/QALY	Did not discount and not clear how missing data were handled

Study and date and type	Population setting	Intervention and comparison	Perspective and time horizon	Outcomes and costs	Outcomes reported (including ICERs and uncertainty)	Author conclusion and additional comments
Van der Meer[129] CEA/CUA	Holland. Asthma in primary care	Internet-based self-management vs. usual care	Societal	QALY generated from EQ-5D	Incremental QALY gain 0.024 QALYs	Self-management cost-effective as below threshold willingness to pay for a QALY
				Cost of intervention	Incremental total cost £641	
			Health service	Health-care costs	Incremental health cost £37	Unclear whether or not authors controlled for baseline EQ-5D and given such a small change in QALYs this might have impacted on result and conclusion
				Productivity	Incremental health ICER 1541/QALY	
Diabetes						
Simon high intensity. Simon low intensity[130] CEA	UK. Diabetes	Blood glucose self-monitoring	Health system	QALY generated from EQ-5D	Two forms of self-monitoring of blood glucose (self-monitoring of blood glucose, high intensity and low intensity) compared with usual care	Interventions are dominated by usual care
				NHS costs	Both added to costs and both reduced outcomes. This was the case in both the within trial analysis and the extrapolated analysis	Did not include patient costs, though could be argued that these would be minimal
Gillet[131] CUA	UK (newly diagnosed) diabetes	Group education	NHS/PSS	QALY generated from EQ-5D within a trial and then event modelling from reduced risk equations	The DESMOND trial. Analysis based on within trial costs (but benefits extrapolated) is £5387/QALY or £2092/QALY using real-world costs	DESMOND intervention likely to be cost-effective
						Almost all the benefit of the intervention was achieved in the longer term (i.e. was not observed in the trial and is based on the model)
				NHS/PSS costs	66% probability of intervention being cost-effective at £20,000/QALY, 68% at £30,000	Did not include patient costs, though could be argued that these would be minimal
						It would seem that a complete case analysis was conducted which casts doubt on the conclusion

Study and date and type	Population setting	Intervention and comparison	Perspective and time horizon	Outcomes and costs	Outcomes reported (including ICERs and uncertainty)	Author conclusion and additional comments
Irvine[132] CUA	UK. Diabetes	Group-based education and physiotherapy, peer support compared with usual care	NHS/PSS	QALY generated from EQ-5D	Both groups had lower EQ-5D scores at follow-up than at baseline. The drop was less in the treatment group and, therefore, treatment was associated with a QALY improvement of 0.003 QALYs	Patient costs not included
				NHS/PSS costs	Additional cost of intervention was £226 generated an ICER of £68,000/QALY and is unlikely to be cost-effective (16% at £20,000)	
Handley[133] CEA	USA. Diabetes	Automated telephone support	Health system	QALY generated from SF-12	ATSM generated an increase in QALYs (0.012) at an increased cost of US$782 or US$277 (if ongoing costs only were considered) ICER was either US$65,000 per QALY or US$32,000 depending on cost assumptions. Authors conclude that they are similar to other accepted intervention in diabetes	No health service resource use captured, assumption that the only cost of importance was the cost of the system No patient costs, productivity losses Missing data not described nor the method for dealing with it
Cardiovascular						
Capomolla[134] CUA	Italy. Heart failure	Day hospital vs. usual care	'Societal'. In reality closer to a limited health system perspective	QALY generated through time trade off	Authors state that intervention 'costs US$19,462 per QALY saved'. Actually, intervention saves that amount and generates more QALYs so should be considered dominant	
Jolly[135] CEA	UK. Previous myocardial infarction patients	Home-based programme using Heart Manual compared with centre-based programme	Societal	QALY generated from EQ-5D NHS/PSS costs	From a NHS perspective, home-based was significantly more expensive. Also more expensive when societal used, but not significant. QALYS were not reported, though EQ-5D scores at each follow-up would have allowed their calculation. The EQ-5D scores show very little change in either group over time and any difference in QALYs would be very small	Lack of reporting of results and a query over the imputation technique, neither of which are likely to impact on conclusions

Study and date and type	Population setting	Intervention and comparison	Perspective and time horizon	Outcomes and costs	Outcomes reported (including ICERs and uncertainty)	Author conclusion and additional comments
Lewin[136] CEA	UK. Patients having an implantable cardiac defibrillator	Implantable cardioverter-defibrillator plan vs. usual care	NHS	QALY generated from SF-12	Intervention reduces costs and improves QALYs, and would, therefore, be considered dominant. Authors (inappropriately) calculate ICER. 67% probability of being cost-effective at 30,000/QALY	It is difficult to see how the cost differential has been calculated Similarly, QALY changes are only reported in text and it is unclear how they were derived Unclear how missing data were handled
Taylor[137] CEA	UK. Patient with uncomplicated myocardial infarction	Home vs. hospital cardiac rehabilitation	NHS	QALY generated from EQ-5D	No significant differences in costs or QALYs. Thus there is little difference between the two and more research is required	Home-based programme associated with small increase in costs and substantial reduction on QALYs (0.06) Study was very small ($n = 80$) with those that did not provide data excluded
Mental health						
Bosmans[138] CUA	Holland. Patients with depression	Pharmacy-based coaching vs. usual care	Societal	% increase in adherence. Change in SCL score	Intervention increases costs (health-care and productivity losses) though not significantly Outcomes improved but again not significantly	Base case is complete case analysis. Sensitivity is based on mean imputation. Short-term nature of follow up. In depression, longest term modelling from SCL to relapse/remission might be more appropriate
Bosmans[139] CUA	Holland. Elderly patients with depression	Disease management programme by GPs compared with usual care by GPs	Health system	QALY generated from EQ-5D % remission	Intervention reduced health-care costs by a small amount (US$136) but reduced HRQoL and % recovering. Unlikely to be cost-effective	Primary analysis based on complete case Did not consider indirect costs or patient expenses, though given the other results, unlikely to alter conclusions
Katon[140,165] CUA	USA. Comorbid depression	Collaborative care	Payer perspective	Depression-free days QALY generated from published estimates	Intervention reduced costs and improved both depression free days and QALYs. Dominant	QALY values taken from literature, other values could have been used but unlikely to change results/conclusion Analysis is based on complete cases

Study and date and type	Population setting	Intervention and comparison	Perspective and time horizon	Outcomes and costs	Outcomes reported (including ICERs and uncertainty)	Author conclusion and additional comments
Katon[141] CEA	USA. Panic disorder	Collaborative care	Payer perspective	Anxiety-free days	Small reduced cost of intervention but large significant improvement in anxiety free days renders intervention likely to be cost-effective. Dominant	Based on complete cases
Pyne[142] CUA	USA. Depression	Collaborative care	Health system	QALYs generated from SF-12	Intervention improved outcomes at increased cost generating cost/QALY of 486,000 in base case	Based on complete cases
Simon[143] CEA	USA. Depression	Telephone care management (TCM) vs. telephone psychotherapy (TP) vs. TAU	Health system	Depression-free days	TP reduced costs compared with TAU and improved outcomes. TCM increased costs more and achieved fewer DFDs than TP	Primary analysis based on complete cases
Simon[145] CEA	USA. Depression	Relapse prevention programme vs. usual care	Health system	Depression-free days	Intervention increased costs by US$13 and increased depression free days by 13 generating a cost per day free of depression of US$1	Primary analysis based on complete cases Narrow range of costs Outcome measure commonly used in trials by this group but has no commonly expressed value
Simon[145] CEA	USA. Depression	Depression management programme vs. usual care	Health system	Depression-free days	Intervention increased costs but generated more depression free days. Incremental cost per DFD was US$52	Primary analysis based on complete cases

Study and date and type	Population setting	Intervention and comparison	Perspective and time horizon	Outcomes and costs	Outcomes reported (including ICERs and uncertainty)	Author conclusion and additional comments
Arthritis						
Bulthuis[146] CUA	Holland. Arthritis	IET vs. usual care	Societal	QALYs generated from SF-6D	IET generates cost savings and small improvements in HRQoL Dominant	Small sample ($n = 85$) completed cost questionnaires and primary analysis based on these completers. It appears that HRQoL was not adjusted for baseline score. Given the small difference (0.01), direction/magnitude of result might be affected
Cronan[147] and Groessl[148] CEA	USA. Arthritis	Social support/ education package	Health system	QWB	The combined analysis shows a reduction in costs and an improvement in outcomes Dominant	No significant differences between intervention groups so these were pooled However, they did vary in their costs (and maybe in their underlying demographics) Complete case analysis presented, no imputation Used change from baseline costs
Hurley[149] CUA	UK. Knee pain	Exercise rehabilitation programme delivered as group or to individual compared to usual care	Societal	QALYs generated from EQ-5D	Group rehab associated with a tiny improvement in QALY compared with TAU (0.009), individual rehab associated with reduction of 0.003. Individual cost more than group (455 vs. 253). Thus group-based intervention likely to be cost-effective (ICER of £17,000/QALY)	Complete case analysis on those with full cost and outcome data Calculation of QALYs unclear as EQ-5D scores at each point not given; not clear if baseline adjustment made
Meijer[150] CCA	Holland. Musculoskeletal disorders	Outpatient multidisciplinary treatment	Societal	SF-36 Return to work Pain	Intervention associated with higher costs and greater rates of return to work Authors conclude not cost-effective as the rate of return to work is not significantly different from zero	Small sample ($n = 38$) further reduced by four patients being excluded from analysis

Study and date and type	Population setting	Intervention and comparison	Perspective and time horizon	Outcomes and costs	Outcomes reported (including ICERs and uncertainty)	Author conclusion and additional comments
Patel[151] CUA	UK. Arthritis	Self-management plan	Societal NHS/PSS	QALYs generated from EQ-5D	Intervention increased costs from an NHS perspective but lowered costs from a societal perspective. QALYs were lower in intervention group (0.01) and intervention unlikely to be cost-effective at 20,000 per QALY (around 25% probability)	The inclusion of transfer payments in the societal costs renders this perspective less informative as these should be excluded
Sevick[152] CEA	USA. OA	Aerobic vs. resistance exercise vs. education (control)	Health system	Self-reported disability Walking distance	Both interventions were associated with a reduction in costs compared with education control (US$20 for aerobic, US$19 for resistance). Both groups also performed better than control. Authors use the saving per effect size to conclude that resistance is more efficient than aerobic	Complete case analysis Conclusion that resistance more efficient than aerobic may be erroneous Outcomes measured at 18 months, but not discounted
Thomas[153] CEA	UK. Arthritis	Exercise therapy Usual care	NHS	WOMAC % improvement in knee pain	Incremental cost associated with exercise was £41 27% in treatment group and 20% in control showed > 50% improvement in knee pain	Complete case analysis, though only 3% of patients missing mean that results unlikely to be affected
Weinburger[154] CEA	USA. OA	Telephone support	Health system	Arthritis Impact Measurement Scale	Intervention increases costs between either US$15 (if other health-care costs excluded) and US$29 if these are included. Improvement on AIMS of 0.21 (physical) and 0.48 psychological) generates ICERs of 871 and 381 per AIMS point gained, respectively	Study is now rather dated based on 1980s data Unfortunately we have no way of knowing whether the improvements in AIMS are worth paying for, though the authors contend that the intervention is cost-effective Complete data only used
Whitehurst[155] CUA	UK. Low back pain	BPM vs. PT	NHS and patient	QALYs generated by EQ-5D	PT was more effective and more costly than BPM (difference in costs + £53, QALYs + 0.022) ICER of 2362/QALY and a probability of 74% at 10,000 and 90% at 20,000 per QALY threshold	

Study and date and type	Population setting	Intervention and comparison	Perspective and time horizon	Outcomes and costs	Outcomes reported (including ICERs and uncertainty)	Author conclusion and additional comments
Pain						
Barton[156] CUA	UK. Knee pain	Four lifestyle interventions DI DIQ Quadriceps strength Leaflet provision	NHS	QALYs generated by EQ-5D	DI and DIQ were both dominated/ extended dominated DIQ generated additional 0.06 QALYs at additional cost of £647 generating ICER of £10,649/QALY High levels of uncertainty, as at threshold QALY values over 5000, all four interventions had a probability of being cost-effective of under 30%	2-year follow-up longer than most trials but a lifetime model would have favoured DIQ more
Jessep[157] CEA (rather than CUA as EQ-5D not translated into QALYs)	UK. Knee pain	Hospital vs. community-based physiotherapy	NHS	EQ-5D	Costs in community-based group lower (320 vs. 583), though most of this appears to be owing to other secondary care in hospital based-group EQ-5D scores improve also in community group (difference of 0.08 compared with baseline and hospital setting)	Small sample ($n = 64$) Not entirely clear but appears to be based on complete case analysis
Niemisto[158] CEA	Finland. Low back pain	Combination therapy (manipulation, exercise, information) vs. usual care	Societal	VAS ODI	Costs were US$1662 higher in combination group. VAS improved by 4.97 and ODI by 1.24. The ICERs generated from these estimates do not tally with conventional calculation which is likely owing to the treatment of missing data	Missing data imputed using last value carried forward which is not recommended Costs/effects not discounted even though 2-year follow-up HRQoL not used in CEA owing to the high amount of missing baseline HRQoL

Study and date and type	Population setting	Intervention and comparison	Perspective and time horizon	Outcomes and costs	Outcomes reported (including ICERs and uncertainty)	Author conclusion and additional comments
Roelofs[159] CEA	Holland. Low back pain	Lumbar support vs. usual care	Societal	Low back pain sick leave	Lumbar support associated with a reduction in health-care costs and productivity losses (235 reduction in direct health-care costs, 371 in total costs)	Imputation via expectation maximisation and sensitivity via complete case analysis
				EQ-5D	Authors state that changes in EQ-5D not significant so ignored them, but intervention was associated with an improvement in EQ-5D too (as well as other outcomes)	
Strong[160] CEA	USA. Back pain	Lay-led self-management vs. psychologist-led self-management vs. usual care	Health system	Roland disability score	Authors conclude that both lay-led and psychologist-led self-management reduce disability days at increased cost, with psychologist being more cost-effective in terms of reduced cost per low impact back pain day	Based on two separate RCTs conducted at different times and comparison of the cost-effectiveness of treatment to TAU. Based on complete cases. Choice of outcome measure makes comparison with other studies difficult
Mixed						
Graves[161] CUA	Australia. Chronic illness	Telephone counselling vs. enhanced usual care vs. usual care	Health system	QALYs generate from SF-36 (via SF-6D)	10 year model based on results of an RCT. Authors conclude that enhanced usual care and telephone counselling are both more expensive and more effective than usual care ICERs Telephone counselling vs. enhanced usual care US$78,000 per QALY Telephone counselling vs. usual care US$29,000 Enhanced usual care vs. usual care US$12,000	Unclear how missing data were treated in the trial-based analysis. Therefore, the model (which uses estimates of trial-based effectiveness) is not transparent Costs of intervention were assumed to stay the same over 10 years

Study and date and type	Population setting	Intervention and comparison	Perspective and time horizon	Outcomes and costs	Outcomes reported (including ICERs and uncertainty)	Author conclusion and additional comments
Kennedy[162] and Richardson[164] CUA	UK. Chronic illness	Expert Patients Programme vs. usual care	Societal	QALYs from EQ-5D	Intervention has better outcomes (0.02 QALY) and lower costs (£27) and would be dominant 94% probability of being cost-effective at £20,000/QALY	Long-term extrapolation could have been conducted
Henderson[163] CUA	UK. Long-term conditions	Telehealth vs. usual care	NHS/PSS	QALYs from EQ-5D	Additional cost of £1110 and QALY of 0.012 generating ICER of 92,000 per QALY and 11% probability of being cost-effective at 30,000	

15D, 15 dimensional; AIMS, Arthritis Impact Measurement Scales; BPM, brief pain management; CCA, cost consequence analysis; CEA, cost-effectiveness analysis; COPD, chronic obstructive pulmonary disease; CUA, cost–utility analysis; DFD, depression-free day; DI, dietary intervention; DIQ, dietary intervention plus quad strength; EQ-5D, European Quality of Life-5 Dimensions; IET, intensive exercise therapy; NOK, Norwegian krone; OA, osteoarthritis; ODI, Oswestry Disability Index; PSS, Perceived Stress Scale; PT, physical therapy; QALY, quality-adjusted life-year; QWB, quality of well-being; RCT, randomised controlled trial; SCL, symptoms checklist; SF-6D, Short Form questionnaire-6 Dimensions; SF-12, Short Form questionnaire-12 items; SF-36, Short Form questionnaire-36 items; SGRQ, St. George's Respiratory Questionnaire; TAU, treatment as usual; TCM, telephone care management; TP, telephone psychotherapy; VAS, visual analogue scale; WOMAC, Western Ontario and McMaster Universities Osteoarthritis Index.
'Low intensity' is use of blood glucose meter and advice to contact GP for interpretation; 'high intensity' is use of blood glucose meter and training to interpret results.

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