JARID
Journal of Applied Research in Intellectual Disabilities

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Journal:	*Journal of Applied Research in Intellectual Disabilities*
Manuscript ID	JARID-12-2018-R-0297.R2
Wiley - Manuscript type:	Review
Keywords:	intellectual disability, learning disability, social care, managing demand, systematic review

Abstract:	BACKGROUND: Demand for formal social services support for adults with intellectual disabilities (ID) is increasing internationally. Initiatives which empower individuals with ID to improve their health, develop living skills or manage chronic illnesses, may promote independence and reduce unnecessary dependency on social services. METHODS: A 'preventative framework' to managing demand comprising several domains was developed from existing literature to guide the search strategy. RESULTS: Fourteen papers related to three domains in the predetermined preventative framework were selected for inclusion in the review, including twelve economic studies. Outcomes included measurement of care needs, and cost-comparison between social care models or cost-effectiveness of interventions. Due to the heterogeneity, we were not able to quantitatively synthesise findings. CONCLUSIONS: We conclude that evidence linking initiatives across sectors to demand for adult social care is lacking. We identify several gaps in the literature and make recommendations for future research and data recording in practice.

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Introduction

Intellectual disability (ID), or 'learning disability' in the UK, is defined as a developmental condition characterised by significantly reduced ability to understand new or complex information, learn new skills, and to cope independently, which starts before adulthood and has a lasting effect on development (Department of Health, 2001). In 2015 there were an estimated 1,087,100 people with ID living in England including 930,400 adults (aged 18-64 years) (Hatton, 2016). Most adults with ID do not receive formal social services support, for example, living independently or being cared for

informally. Although people with ID comprise only a small proportion of all adults receiving social services support (12%), this corresponds to a much larger proportion of overall adult social care spending (39%) (National Audit Office, 2017). However, it may be expected that the cost of social services varies depending on the severity of the ID (Mansell, 2011). Demand for social services and care support for adults and older adults with ID is increasing internationally (Woittiez, 2018), with concomitant increases in social care spending (Emerson, Hatton, & Robertson, 2011). This is partly a function of demographic trends - life expectancy in this group is increasing – leading to a rise in the proportion of older adults with ID. This has implications for additional care needs and more costly support (such as residential care) related to ageing and loss of caregivers (Hatton, 2016). Further, rising demand for formal support among people with ID may be intensified due to reduced informal care capacity (e.g., increased number of lone parent families, maternal employment, ageing caregivers), as well as growing expectations for independence among people with ID (Emerson & Hatton, 2008; Emerson et al., 2011).

Minimising the impact of the rises in demand on social services described above necessitates system and individual level strategies that can help prevent or delay the development of individual and carer social care support needs. In the UK, a number of organisations around the NHS and local authorities collaborate to deliver social care services, which are needs-based rather than condition-based. In this context, key UK government strategies for supporting people with ID to have the greatest potential to live valued and fulfilled lives have emphasised the importance of preventative interventions or strategies to reduce formal social care support needs (Emerson et al., 2011; Department of Health, 2001, 2009, 2010; Parkin, 2016). The English 2014 Care Act enshrined in law the duty on local authorities to: ‘provide or arrange for the provision of services, facilities or resources, or take other steps, which it considers will (a) contribute towards preventing or delaying the development by adults in its area of needs for care and support; (b) contribute towards preventing or delaying the development by carers in its area of needs for support; (c) reduce the

needs for care and support of adults in its area; (d) reduce the needs for support of carers in its area' (Her Majesty's Government, 2014).

In practice, people with ID commonly access support through personal budgets – a form of cash-for-care scheme – whereby money is allocated to individuals eligible for publically funded social care for them to use to plan and purchase their own care and support from a range of providers. These are intended to promote self-directed support, often with assistance, and access to interventions, programmes or activities which, for example, empower individuals with ID to improve their wellbeing, develop living skills (i.e. activities of daily living, managing finances), or manage chronic illnesses to promote independence and reduce unnecessary dependency on services (Beresford, 2015; Emerson et al., 2011; Greig, 2013). However, due to economic and demographic pressures, outcomes related to 'prevention' and reduced dependency on formal services have become synonymous with the potential for financial savings (Greig, 2013). Of those adults with ID receiving formal social care, 22% live in residential or nursing homes (National Audit Office, 2017). Such high cost care packages are associated with having support needs additional to those linked to having ID (e.g., mental health conditions, behaviour that challenges, physical health problems), as well as limited informal support networks and lack of local service availability (Emerson et al., 2011). High cost packages may also be more likely among older adults (aged 60+) with ID – as 74% of costs for this group are for accommodation (Strydom et al., 2010). While economic concerns may dominate short-term decisions about where to target resources, efforts to minimise demand for formal adult social care should demonstrate improvements for individuals and, at minimum, avoid harm. Initiatives which demonstrate financial savings (e.g., assistive technology) may potentially have adverse consequences for individuals (e.g., social isolation) (Beyer & Perry, 2013). Yet, few research studies or local evaluations collect data to assess evidence for any impact on subsequent use of public services. This limits capacity to make evidence-based decisions about how to allocate resources, and undermines public policy strategy aiming to promote independence and prevention (Greig, 2013).

Managing demand for social care among adults with ID

There is a need to review the published and grey literature for evidence about which interventions or approaches are effective in promoting independence and preventing demand for formal specialised or non-specialised social care support among adults (or older adults) with ID. Four categories of approaches to preventing demand for (non-specialised) formal social care support have been proposed. First, providing the right care at a time of crisis (e.g., when unpaid informal caregivers are no longer able to provide support such as due to death or frailty); second, supporting progression towards greater - or maintaining - independence (e.g., improved/maintained functional living skills); third, supporting people's ability to self-manage long term physical conditions (e.g., medications management); and, fourth, promoting healthy lifestyles to reduce impact or delay onset of comorbid chronic conditions (e.g., smoking cessation) (Beresford, 2015; Bolton, 2016). In addition, Emerson et al. (2011) suggest that use of (specialised) ID social care services could be prevented by reducing additional needs associated with use of services among people with ID (e.g., mental/physical health problems, behaviour that challenges) and by supporting families and/or caregivers who already provide most care for people with ID informally.

The system for funding and provision of public social services differs internationally influencing the context and generalisability of findings to the UK setting. However, we include international studies where these relate to interventions which align with the national policy agenda (e.g., promoting independence), in line with reviews in other disciplines (Masters, Anwar, Collins, Cookson, & Capewell, 2017). Further, while it is acknowledged that interventions focussing on children or young adults transitioning into adult services may have the greatest impact on future demand, the current review focusses on interventions targeted at adults and older adults, as they comprise the majority of those requiring formal social care services and account for the majority of the predicted growth in demand (Emerson & Hatton, 2008; Emerson et al., 2011; National Audit Office, 2017).

We used the above domains to develop a 'preventative framework' to guide a systematic scoping review of the literature (Table 1).

[TABLE 1 HERE]

Specifically, the review aimed to:

1) Identify studies of specific interventions or strategies aimed at people with ID within each domain of the 'preventative framework'.

2) Identify whether any studies of these interventions included reduced (or delayed) use of formal social care as outcomes, or reduced costs of formal social care at individual or system level (bearing in mind the potential for reduced costs to be associated with adverse consequences for individuals).

3) Synthesise quantitative evidence within each preventative domain for impact on use of formal social care services and cost of services at individual and system levels.

Methods

We devised a comprehensive search strategy for interventions within the framework outlined in Box 1; the full search strategy is available (see supporting material). This included a broad range of (current and no longer used) terms and their derivatives to identify the population of interest. It also included terms relating to social care; each of the preventative domains and interventions within them; and, terms relating to cost and service use outcomes. Given that we used this approach to retrieve literature on interventions related to the preventative framework, we decided that a scoping systematic review would be the most appropriate method to answer the research question (Arksey, & O'Malley, 2006; Colquhoun, et al., 2010; Levac, Colquhoun, & O'Brien, 2010) . The initial search strategy was devised as part of a wider search for evidence relating to interventions, treatments, programmes or activities that might prevent or delay need for formal social care, including studies of interventions linked to the preventative framework that reported a range of outcomes. However, this paper includes only those which reported costs and reduced or delayed

service use as outcomes. We included quantitative and economic studies to optimise available information about efficacy, effectiveness and cost-effectiveness. This review follows the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) statement (Moher, Liberati, Tetzlaff, & Altman, 2009). See supporting material for Prisma checklist.

Searches

The main biomedical and sociological databases were searched in November 2017. Specific search strategies were designed for Medline (Web of Science), Embase, CINAHL, PsycInfo, Social Care and Policy, AMED and Cochrane Library. The initial search was designed for Medline (via Web of Science) which combined MeSH terms and keywords (i.e. intellectual/learning disabilities, social care, social services, costs, activities of daily living), and was later adapted to other databases (see supplementary material). In addition, we searched several online sources for relevant grey literature: Social Care Institute for Excellence (SCIE), Association of Directors of Adult Social Services (ADASS), Local Government Association (LGA), National Institute for Health Research (NIHR), NIHR School of Social Care Research (SSCR), and the Health Management Information Consortium (HMIC). Last, the references and citations of included articles were hand checked for any missing studies. The search was limited to articles published between January 2001 and October 2017. This reflected the date of publication of the first English government 'Valuing People' White Paper, which aimed to improve services for people with ID. To constrain the scope of the paper, articles focussed on offenders with ID in the forensic environment and those focussing on adults with high functioning autism were excluded (studies were eligible for the review if the paper included a sample with at least 70% of people with ID). A bibliographic database was created to store and manage the references using EndNote version X7.0.2 and Microsoft Excel.

Screening

Two reviewers carried out the screening (ARG and CW). Initial screening of titles and abstracts of articles identified from the search strategy was carried out. The full text of selected articles were then screened against the inclusion and exclusion criteria outlined in Box 1. Any disagreement was solved through discussion, and arbitrated by a third researcher (FA).

Data extraction

Data were extracted by two independent assessors on: study design, setting, number of participants, year of publication, country, target population (including severity and description of ID, sociodemographic characteristics, intervention (or approach), quantitative/cost outcomes, type of costs included, and any additional notes.

Assessment of study quality

For critical appraisal of the economic studies we used the Consensus on Health Economic Criteria (CHEC) checklist (Evers, Goossens, De Vet, Van Tulder, & Ament, 2005). The tool covers a range of methodological fields, including objectives, sample, design, cost analysis, and generalisability. In order to conduct the quality assessment of the two studies not reporting on cost, we utilised a tool which drew on relevant items from three existing tools: i) the Newcastle-Ottawa Scale for assessing the quality of non-randomised studies (Wells et al., 2012); ii) the STROBE checklist for the reporting of cohort, case-control, and cross-sectional studies (Von Elm et al., 2007); and, iii) an additional check-list specifically for the appraisal of cross-sectional studies (Trust, 2002). This composite tool has been successfully used in other reviews that assessed studies with similar epidemiological designs (Barratt et al., 2016; Poulton et al., 2018).

Data synthesis

Information was summarised qualitatively and quantitatively. Where possible quantitative data were extracted in order to estimate the pooled effect sizes for each outcome. If this was not possible with

available data, information was narratively described according to the methodological quality, type of preventative framework, and intervention.

Results

Search and extraction results

The search and screening process is outlined in Figure 1. Across the academic and grey literature searches 9,577 records were identified. Two reviewers simultaneously screened half of the records each by reading every title and abstract (or executive summary) to identify articles relevant to the review, of which 768 were retained. These 768 studies included several literature reviews, the references of which were also checked to identify any relevant studies that had not been identified. This resulted in an additional 221 records, such that the full texts of 989 records were checked against inclusion and exclusion criteria. 975 records were removed at this stage, leaving 14 papers selected for inclusion in the review.

[FIGURE 1 HERE]

Study characteristics

The study characteristics are summarised in Table 2. Most studies presented cost-comparison findings (n=8) with a smaller number presenting data on cost-effectiveness (n=4). The majority of studies were UK based (n=10), and the included studies varied in terms of level of severity of ID covered. Studies were relevant to three of the preventative framework domains, including: promoting independence (n=5); promoting self-management of long term conditions/improved health support (n=2); and, supporting people with ID and additional needs (n=7).

[TABLE 2 HERE]

Quality of studies

All 12 economic studies were assessed against CHEC checklist, with a total possible score of 19 (see supporting material for full checklist results). Scores ranged from 11 to 18 with a median score of 14. Criteria that were commonly not met across economic studies were: incremental analysis of costs and outcomes of alternatives; discounting of future costs and outcomes; and, sensitivity analysis of important variables whose values are uncertain. In addition, it was often not possible to identify any potential conflict of interest or if ethical and distributional issues had been considered. Appraisal of the two quantitative studies indicated an overall quality assessment of 'fair' (Endermann, 2015) and 'good' (Koritsas, Iacono, Hamilton, & Leighton, 2008).

[TABLE 3 HERE]

Promoting independence

As illustrated in Table 3, five studies were included within the promoting independence domain, of which four compared costs and outcomes associated with different residential settings and one examined the cost-effectiveness of individual budgets. The residential settings studies (4) were all cross-sectional comparisons including three using a matched pairs design. Studies compared costs of a range of health and social care services provision, including both accommodation and non-accommodation costs. None of the studies carried out full cost-effectiveness analyses. In general, matched group residential settings studies reported that more independent living was cheaper than less independent living. Two studies did not break down support costs by type to assess whether this held for social care costs (Bigby, Bould, & Beadle-Brown, 2018; Spreat, Conroy, & Fullerton, 2005), while one provided more detailed breakdowns by group without explicitly disaggregating health from social care costs (Felce et al., 2008). The latter study estimated that mean weekly daytime activity costs and total accommodation costs were higher for fully staffed compared to a matched semi-independent living group (£265 vs £145 and £1278 vs £381 respectively). There were no differences in hospital costs or costs of community-based professional input.

Studies of matched samples comparing community vs residential, or supported living vs fully staffed group homes indicated that those living in more independence-focused arrangements (i.e. community living, supported living) experienced: greater opportunities for choice and independence, independent community activity participation, household activities, more diverse social networks, greater choice-making, (Felce et al., 2008), and greater exposure to community activities and more hours of habilitative instruction (Spreat et al., 2005). However, there was some evidence that such living arrangements may also be associated with greater money problems, fewer number of community activities, reduced access to certain health care activities, (Felce et al., 2008) and work or pre-work vocational activities (Spreat et al., 2005). Further, high levels of choice-making and greater number of community activities did not necessarily translate into improved quality of life (QoL) or broader social connections with community members when comparing supported living with fully staffed group homes (Bigby et al., 2018). In a non-matched sample, Hallam et al. (2002) identified that village community clustered housing was cheaper overall than both residential campus style-housing and dispersed housing (e.g., group homes or supported living). Total mean weekly accommodation costs were £637 for village communities, £931 for residential campus, and £902 for dispersed housing). Day activity costs were £125, £69 and £107 respectively), and hospital and community service (health) costs were £22, £17 and £31 respectively. Both village communities and dispersed housing offered benefits in terms of QoL, independence and control compared to residential campus living. However, costs were related to support needs indicating that different groups of people with ID may be better suited to different styles of housing.

Finally, as part of a RCT, (Glendinning et al., 2008) compared social care and health costs among people with ID who did and did not have access to individual personalised budgets (which can be used to fund self-directed support such as a personal support assistant), finding no evidence for relative cost-effectiveness for either group in relation to mental health or social care outcomes.

Supporting people with ID and additional needs

Of seven studies, six referred to interventions to reduce anger and/or behaviour that challenges and one to individuals with ID and psychosis (Table 3). Of the interventions or approaches for behaviour that challenges, two were cognitive behavioural therapy (CBT) related, one was pharmaceutical, one was active support training and one was positive behavioural support. In RCT studies, neither studies of psychosocial interventions (Felce et al., 2015; Hassiotis et al., 2009) nor of pharmaceutical interventions (Romeo, Knapp, Tyrer, Crawford, & Oliver-Africano, 2009) reported significant evidence for cost-effectiveness in terms of reduced resource use. In a longitudinal matched group study (Robertson et al., 2004), non-congregate settings were found to be more cost-effective than congregate settings (where people with behaviour that challenges live mostly with others also not with or with behaviour that challenges, respectively), being both lower cost overall (mean annual costs of £96,010 vs £115,830 including accommodation and non-accommodation) and associated with better outcomes in terms of choice and independence – though the study did not assess any impact on the frequency or severity of behaviour that challenges. Non-congregate settings were cheaper than congregate settings in terms of accommodation costs (£79,622 vs £105,448) but more expensive in terms of non-accommodation costs (£13,385 vs £7,293), including day activities, aids and adaptations, hospital and non-hospital services (health). In a small before and after study with estimated comparison group costs, positive behavioural support was associated with reduced behaviour that challenges and increased participation, and overall costs were similar to those estimated for treatment as usual (though no formal cost-effectiveness analysis was reported) (Iemmi et al., 2015). Finally, in a non-controlled repeated measures study, those receiving active support training identified reduced intensity of support needs over time, though no costs were reported of the intervention or of service use (Koritsas et al., 2008).

The study of individuals with psychosis (Hassiotis et al., 2001) was an RCT comparing intensive case management (ICM) to treatment as usual, the authors reported that although overall costs (including those associated with health service use and staffed accommodation) were lower for those receiving ICM, there was a significant interaction effect by sector such that for individuals with

borderline intellectual functioning (but not 'normal' IQ), ICM was associated with lower mean annual health care costs (£11,175 vs £21,213 for standard care) but higher mean annual staffed accommodation costs (£9,983 vs £5,068).

Promoting self-management of long-term conditions / improvement of health support

Two studies were identified in this domain (Table 3), one quasi-experimental study examining the impact of a health check intervention on health, social services and carer support and one single group repeated measures study examining the impact of a residential rehabilitation programme for people with ID and epilepsy. The health check intervention was found to be associated with lower mean annual costs linked to informal carer support, compared to standard care (£13,871 vs £41,268) though there was no difference in any other type of health or social care cost and no formal cost-effectiveness analyses were reported in relation to outcomes (Romeo et al., 2009). The rehabilitation study reported that individual support needs decreased over time, as assessed by the proportion of people living in supported living (rather than in residential settings), though no comparison group was available to assess time-varying confounders (Endermann, 2015).

Discussion

This systematic scoping review aimed to identify specific interventions or strategies which have been found to reduce the need for specialised or non-specialised formal social services support for adults with ID, or which reduced the costs of such services without compromising outcomes such as quality of life. Based on previous literature, we developed a preventative framework comprising six domains of such interventions or strategies to guide the searches. We identified 14 articles describing these outcomes relating to three of the preventative domains: promoting independence; supporting people with ID and additional needs; and, promoting self-management of long-term conditions/improving health support. No articles were identified in the three other domains: providing right care at a time of crisis; promoting informal care capacity; or, promoting healthy

lifestyles. Of the 14 included articles, only one assessed reduced care needs (as measured by changes in the Supports Intensity Scale). One article inferred reduced care needs based on change in accommodation type; however, there was no comparison group and such changes could have been a result of policy or structural changes to care provision. The remaining 12 included cost-comparison or cost-effectiveness data on social care costs. Due to the heterogeneity of strategies/interventions within each domain and differences in ways of assessing outcomes and costs, we were not able to quantitatively synthesise findings.

In the promoting independence domain, most studies examined different types of residential accommodation. This is perhaps unsurprising as the highest proportion of expenditure on adult social care for people with ID is linked to supported accommodation, often 'out of area placements' (National Audit Office, 2017). The use of such options has been associated with factors such as capacity of informal support networks, additional needs such as physical or mental health problems, and/or local service availability (Emerson & Hatton, 2008; Emerson et al., 2011). However, the identified studies compared the costs of different types of accommodation to one another rather than assessing the impact of interventions on accommodation costs. We were unable to identify any studies of interventions or approaches aiming to improve functional living skills, access to employment or engagement with community activities, which linked these outcomes with changes in support needs or costs of social care at individual or system levels. Nevertheless, ~~a~~ other ~~y~~ies conducted ~~by Glendinning et al. (2008)~~ in the UK (Glendinning et al., 2008; Gadsby, 2013; Zamfir, 2013), suggested that people with ID have the opportunity to employ a personal assistant using their own personal budget ~~and~~ or move to supported accommodation ~~or residential care~~; which to some extent may have an impact on social care services.

In the supporting people with ID and additional needs domain, all but one paper assessed various approaches to reducing behaviour that challenges, the other was linked to individuals with psychoses. While many studies of interventions have been found to be effective in reducing

behaviour that challenges (Heyvaert, Maes, & Onghena, 2010), we were not able to identify studies which included reduced need for social care support as an outcome. There was also limited evidence that the interventions studied were cost-effective, or effective in reducing social care costs. The study of intensive care management for people with psychosis and borderline intellectual functioning (Hassiotis et al., 2001) also indicated that while interventions may be identified as cost-effective overall, there may be an unequal cost outcome for health and social care sectors; finding that while costs to health services reduced, costs of social care increased.

Lastly, in the promoting self-management of long-term conditions/improving health support domain, only two studies were found. Neither carried out cost-effectiveness studies to assess costs against outcomes and neither presented findings in relation to social care needs. People with ID are at risk of significant inequalities in health and often have unmet care needs which if left unaddressed may increase the likelihood of need for formal care services (Cooper, Melville, & Morrison, 2004; Emerson & Baines, 2011; Krahn, Hammond, & Turner, 2006; Turner, 2011). Supporting the health needs of people with ID is a statutory requirement of social services and supporting self-management of chronic diseases and medications management may be a key component of preventing or delaying need for formal care services. However, we were unable to identify any studies assessing the impact of programmes or interventions aimed at improving these outcomes on social care needs or costs.

Strengths and limitations

This review has several strengths. First, review-level evidence about adults with intellectual disabilities in relation to adult social care is limited (Dickson, Sutcliffe, Rees, & Thomas, 2017; Sutcliffe, 2012), thus this study helps address this gap and identifies gaps in primary research needed as a basis for future higher level syntheses. Second, since managing demand for formal social care services involves action across sectors, our strategy enabled us to search for relevant findings across health, public health, employment and social care sectors about both carers and (actual or potential)

care users. We used a comprehensive search strategy including multiple databases across disciplines and a broad search of grey literature sources to identify any unpublished data relevant to the review aims. Third, the review questions are aligned with current policy and practice information needs and the findings, although patchy, provide clear avenues and targets for future research to address policy and practice relevant questions. The review is limited in that the questions are driven by UK-focused data and policy and thus the findings and interpretation may not generalise to other contexts in which social care is organised differently. In addition, we acknowledge that some relevant information may not have been captured in this systematic review, due to a lack of research in certain relevant areas. Further, while our review focusses on secondary and tertiary prevention rather than on primary prevention, the inclusion of articles focussed on children and/or adolescents may have revealed more relevant evidence in relation to managing demand. However, as the care for children is organised differently in England we only incorporated evidence about adults to focus the review and in recognition that the greatest growth in need for social care services is predicted to arise from adults and older adults with ID (Emerson & Hatton, 2008; Emerson et al., 2011).

Implications for future research and practice

Our initial search identified many studies linked to all six of the preventative framework domains. While these presented findings which may plausibly be linked to reduced need or costs of social care support (e.g., increased independence, reduced BMI, or improved informal carer life satisfaction), none of these studies explicitly linked these outcomes to any changes in support needs or costs and thus were excluded from the review. While acknowledging that interventions that are shown to enhance health equity should be available to people with ID regardless of the body of evidence about their impact on social care needs and costs, future research is needed which bridges these evidence gaps particularly in light of the changes in demand for social care as outlined in the introduction. In the first instance, finding robust associations between these broader outcomes and changes in support needs or costs over time, would be helpful. This research could usefully comprise

both primary research making better use of quasi-experimental and natural experimental designs, as well as practice-based evidence. The latter approach would provide timely feedback on current approaches and quality improvement initiatives but would require significant overhaul of social care data collection and recording. For example, recording structured information about support needs and care package costs in a way that could routinely be used to assess the impact of changes in provision alongside support needs and outcomes such as quality of life. Moreover, in the current UK context of cuts to social care funding, assessment of more recently implemented strategies, as well as their impact on improving independence, quality of life and wellbeing, is essential.

Further, there are inherent difficulties with conducting effectiveness research in social care in general and with people with ID more generally in that individual's care and support needs vary across individual, family, and local contexts, and the context in which social care is provided also varies within and between countries. Traditional approaches to assessing effectiveness may therefore usefully be supported by theory driven approaches which take the importance of context into consideration. For example, realist evaluation approaches may be better able to answer questions about 'what works, for whom, and in what circumstances' (Pawson & Tilley, 1997). However, such approaches require considerable engagement from a range of stakeholders and specialist research, including both quantitative and qualitative input.

Finally, our search did not identify studies which could encapsulate the contribution of informal services and support. This includes a broad range of activities from informal carers, charitable and other non-statutory organisations such as befriending services and local support groups. Understanding and valuing the contribution such work makes to preventing demand for formal social care services should also be a priority.

Conclusions

Empirical evidence for interventions or strategies to reduce or delay demand for formal adult social care services, or to reduce the costs of those services (without compromising individual quality of life) among adults with ID is limited. In particular, data linking health care or other health-related activities, support for informal caregivers, and providing the right care at a time of crisis, to social care demand or costs is lacking. Gaps in the literature have been identified which are important for future research, policy and practice. These include research and quality improvement practices which routinely assess social care support needs as outcomes; research which takes theory-driven approaches to evaluation and/or which makes better use of quasi-experimental or natural experiments; and, research which appropriately quantifies the contribution of informal support to preventing and delaying demand for adult social services so that resources can be better targeted.

Acknowledgements

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Funding

The research was supported by the National Institute for Health Research (NIHR) Collaboration for Leadership in Applied Health Research and Care North Thames at Barts Health NHS Trust. The views expressed are those of the authors and not necessarily those of the NHS, the NIHR or the Department of Health.

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Table 1 Preventative framework for managing demand for formal social care support.

Domain	*Examples of intervention goals*
Providing right care at a time of crisis	Supporting planned transitions after cessation of informal caregiver support
Promoting independence	Increasing functional living skills or improving access to employment
Promoting self-management of long-term conditions and improvement of health support	Promoting self-management of, for example, diabetes or epilepsy, improving primary care services for people with intellectual disabilities
Promoting healthy lifestyles	Increasing physical activity, smoking cessation and healthy diet
Supporting people with ID and additional needs (such as mental ill health or reducing behaviour that challenges)	Integrating support for those with complex needs, providing alternatives to out of area placements
Promoting informal support capacity	Supporting caregivers in their carer roles as well as promoting/maintaining their own health and wellbeing

Adapted from Emerson et al. (2011), Beresford et al. (2015), and Bolton (2016)

Table 2 Summary characteristics of included studies

Study characteristic	*n*
Type of study	
Cost-comparison	8
Cost-effectiveness	4
Quantitative	2
Country	
UK	10
Australia	2
USA	1
Germany	1
Severity of intellectual disabilities	
Mild	3
Mild to moderate	1
Mild to profound	4
Moderate to severe	1
Not stated	5
Prevention domain	
Providing right care at a time of crisis	0
Promoting self-management of long-term conditions / improvement of health support	2
Promoting healthy lifestyles	0
Promoting independence	5
Promoting informal support capacity	0
Supporting people with ID and additional needs	7

Table 3 Characteristics of included studies by preventative framework domain

First author (year)	Type of Intervention / Intervention vs control	Description of patients (as described by authors)/ Sample size	Study design	Type of analysis	Country	Main findings	Included costs	Quality score†
Promoting independence								
Bigby et al. (2017)	Residential setting / Supported living vs group homes	ID (no information on severity) / 29 matched pairs	Cross-sectional matched groups	Cost-comparison	Australia	Average annual cost for supported living, including day support, was $30,435 compared to the estimate of at least $80,000 per person, plus day program support, of approximately $19,000 for group homes. No difference in QoL between the two groups. Identified that 30–35% of people in group homes had the potential to live more independently.	Day support, health care, support for everyday living e.g., individualised support package, support from health care professional, social groups, day services etc.	13
Spreat et al. (2005)	Residential setting / Institutional vs community based living	MR (mild to profound) / 174 matched pairs	Cross-sectional matched groups	Cost-comparison	USA	Mean adjusted annual costs in institutional settings was $138,720, vs. $123,384 in community settings. No link between support needs and costs. Compared to people living in institutions, people in the community had significantly greater exposure to community activities, received more services, but lower levels of work or pre-work activities. No differences found with respect to health indices.	Housing, day program, case management, education, vocational support, medical costs	12
Hallam et al. (2002)	Residential setting / Village community vs residential campus vs dispersed housing	ID (no information on severity) / 86 community, 133 campus, 281 dispersed	Cross-sectional comparison	Cost-comparison & predictors of costs	UK	Total costs of weekly support significantly lower for village communities (£784) compared to community residential (£1018) and dispersed housing (£1039). Higher costs associated with supports for people with higher levels of ID and more severe behaviour that challenges. Costs of support higher in smaller facilities, for younger people, males, people who had not moved from an NHS hospital, & more sophisticated service processes. Systematic arrangements for staff supervision and training associated with lower costs.	Service package costs including accommodation costs, day activities, hospital and community services	14

Felce et al. (2008)	Residential setting / Semi-independent living vs fully staffed group homes	ID (low support needs) / 35 matched pairs	Cross-sectional matched groups	Cost-comparison	UK	Total weekly costs of care higher for fully staffed homes. Daytime activity costs contributed most to total non-accommodation costs for both groups and were higher for fully staffed participants. No significant differences in hospital or community-based professional costs. Costs of support staff, non-staff inputs, and agency overheads higher in fully staffed settings, as were total accommodation costs. Costs of on-site administration were similar.	Weekly costs of each type of living incl. non-accommodation costs (daytime activities, hospital based services, community-based professional input) and accommodation costs (direct staffing, non-staff inputs, onsite admin, agency overheads)	16
Glendinning et al. (2008)	Individual Budget (IB) / IB vs comparison group	LD (no information on severity) / 70 (IB), 63 (comparison)	Costs and cost-effectiveness	Cost-effectiveness	UK	Minimal cost difference between the groups. No evidence of relative cost-effectiveness for either IB or standard arrangements. IB might be slightly less cost-effective than standard arrangements (if using the General Health Questionnaire to measure outcome).	Overall social care costs, and break-down by (homecare, meal costs, personal assistant, supporting people, equipment, independent living fund, social worker care manager)	18
Supporting people with ID and additional needs								
Hassiotis et al. (2001)	Intensive case management (ICM) / ICM vs treatment as usual	Patients with psychosis – "borderline" vs "normal" intellectual functioning / 586 (104 borderline intellectual functioning)	RCT	Cost-comparison	UK	ICM significantly more beneficial for "borderline-intellectual functioning patients" in terms of reductions in days spent in hospital, hospital admissions, total costs and needs and increased satisfaction. ICM compared to standard care reduced total costs of care among "borderline functioning patients" (means £23 808 v. £28 983, respectively), but increased total costs for "normal functioning" subgroup. While ICM significantly reduced cost of health services (means £ 11 175 v. £21 213, respectively), it significantly increased cost of staffed accommodation (means £9983 v. £ 5068, respectively) for patients of "borderline functioning".	Costs included days in hospital, number of hospital admissions, health authority costs, staffed accommodation costs	17
Felce et al. (2015)	Cognitive Behavioural Therapy (CBT) anger management / Manualised group-based anger management	People with mild to moderate ID plus problem anger / 181 (91 intervention, 90 control) Cost data on 67 and 62 people respectively	Cluster RCT	Cost-effectiveness	UK	Intervention cost more than treatment as usual. Excess cost was £12.34 per person per hour. No evidence that excess intervention costs may be off-set by reduced health and social care resource usage.	Intervention/resource use (staff input, travel, consumables etc) against impact on cost of use of health and care services.	14

	intervention vs treatment as usual							
Hassiotis et al. (2009)	Community-based specialist behaviour team for behaviour that challenges / Standard treatment plus applied behavioural analysis vs standard treatment	ID (mild to profound) / 63 (32 (intervention, 31 standard care)	RCT	Cost-effectiveness	UK	Significant differences were found in the Aberrant Behavior Checklist and transformed lethargy and hyperactivity subscale scores. Total costs including and excluding treatment not significantly different between the two trial arms after adjustments but clear trend for lower overall costs of the intervention.	Non-psychiatric inpatient and outpatient services, treatment costs, day activities and community based services	15
Romeo et al. (2009)	Pharmaceutical treatment for behaviour that challenges / Risperidone vs Haloperidol vs placebo	People with ID (mixed severity) and behaviour that challenges / 29 (Risperidone), 28 (Haloperidol), 29 (placebo)	RCT	Cost-effectiveness	UK	Compared with placebo, haloperidol had a 50% chance of being cost-effective after 26 weeks. Risperidone had greater impacts on quality of life (QoL) than haloperidol. When QoL was compared with costs, risperidone had a 52% chance of being cost-effective at all values of a point improvement in QoL up to £3000. Haloperidol would have an 86% chance of being cost-effective based on a cost of £3000 for a one-point improvement in aggression.	Costs included treatment (medication), specialised accommodation, day activities, inpatient care, informal care, community based activities	11

Robertson et al. (2004)	Residential setting / Non-congregate settings (minority of residents had behaviour that challenges) vs congregate settings (most had behaviour that challenges)	ID (severity not stated) with challenging behaviour / 50 (25 in each group)	Longitudinal matched groups	Cost-effectiveness	UK	Non-congregate residential supports may be more cost effective than congregate. Congregate settings had 21% higher costs than non-congregate; higher staffing ratios, better quality internal working practices for person-centred planning, assessment and teaching, activity planning, and staff support of residents. But congregate settings associated with worse outcomes in terms of receipt of psychoactive medication; physical constraint; injury by co-tenants; deterioration in mental health and behaviour that challenges; and, more restricted access to day activities.	Costs included annual costs of day services, aids and adaptations, non-hospital services, hospital services, non-accommodation costs, accommodation costs	12
Iemmi et al. (2015)	Positive Behavioural Support / Positive Behavioural Support Service (PBSS) v (estimated) standard care	ID (severity not stated) / 5	Before and after (with estimated comparator)	Cost-comparison	UK	PBSS effective in decreasing frequency and severity of behaviours that challenge, and increasing level of activity engagement and community participation. Total cost of services for adults in receipt of additional support from PBSS were £2,296 per week (£119,408 per year). Estimated weekly cost of comparison was £1,567 - £1,823 (£81,478-£94,799 per year).	Residential care, inpatient services, accident and emergency, outpatient services, psychiatrist, psychologist, nurse, occupational worker, social worker, care worker, day care centre, and other services paid through direct payments.	12
Koristas et al. (2008)	Active support training / Active support training (no comparison)	ID (moderate and severe) / 12	Single group repeated measures	Quantitative	Australia	Support workers reported decrease in support needs (with an overall decrease for five activity domains, and no change for one). Supports intensity Scale (SIS) scores decreased over time, indicating that the intensity of perceived supports needed to enable residents to participate in activities within these domains decreased.	Change in support needs (Supports Intensity Scale (SIS))	*Good
Supporting self-management of long-term conditions and improvement of health support								
Romeo et al. (2009)	Health check intervention / Health check intervention vs standard care	People with ID (mild to profound) / 100 (50 intervention, 50 control)	Quasi-experimental (before and after matched control group)	Cost-comparison	UK	Health-check intervention was cheap and did not have higher service usage costs. Mean cost of care for adults receiving standard care only exceeded that for adults receiving the intervention. Higher costs were due to differences in unpaid carer support costs.	Services (daytime activities (e.g. supported employment/respite care), hospital inpatient and outpatient care, primary care, specialist ID services (health), other health services, social services, aids and adaptations) paid and unpaid carer support	13

Endermann (2015)	Residential rehabilitation for epilepsy / no comparison	ID (mild) / 51	Single group repeated measures	Quantitative	Germany	Reduced seizure frequency, less assistance needs (increased proportion in assisted housing), higher self-rated activities of daily living and health-related quality of life	Reduction in assistance needs (proxy measure= change in % living in supported housing vs. residential setting over time)	*Fair

†CHEC list score (*Quality assessment for non-economic studies)

ID = Intellectual Disabilities, MR=mental retardation, PBSS=Positive behavioural support service, QoL = quality of Life, IB = Individual Budget, ICM = Intensive Care Management, CBT = Cognitive Behavioural Therapy

Figure 1 PRISMA flowchart of the selection process for the review.

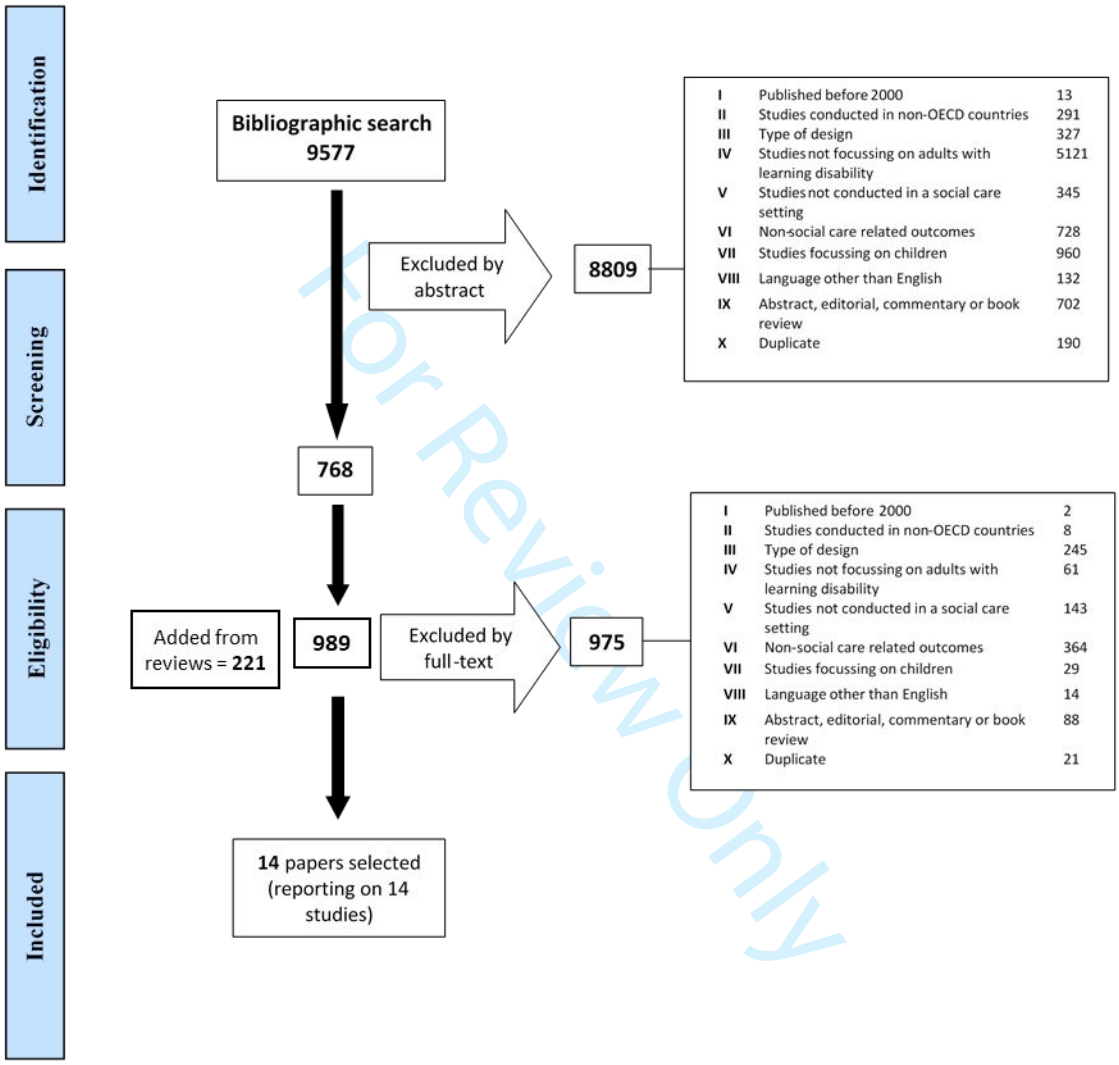

Table 1 Detailed search strategy by database

	Medline (WoS) Date: 31 October 2017	
Blocks	**Search terms**	**Results**
# 32	#31 AND #30 AND #29 AND #28 *Indexes=MEDLINE Timespan=2000-2017*	2,949
# 31	#23 OR #22 OR #21 OR #20 OR #19 OR #18 OR #17 OR #16 *Indexes=MEDLINE Timespan=2000-2017*	2,488,487
# 30	#15 OR #14 OR #13 OR #12 OR #11 OR #10 OR #9 *Indexes=MEDLINE Timespan=2000-2017*	3,557,975
# 29	#8 OR #7 *Indexes=MEDLINE Timespan=2000-2017*	222,867
# 28	#27 OR #24 *Indexes=MEDLINE Timespan=2000-2017*	62,913
# 27	#26 AND #25 *Indexes=MEDLINE Timespan=2000-2017*	709
# 26	#6 OR #5 *Indexes=MEDLINE Timespan=2000-2017*	47,401
# 25	#4 OR #3 *Indexes=MEDLINE Timespan=2000-2017*	11,174
# 24	#2 OR #1 *Indexes=MEDLINE Timespan=2000-2017*	62,773
# 23	ts:mapexp=(Qualitative Research) *Indexes=MEDLINE Timespan=2000-2017*	66,754
# 22	ts:mapexp=("Caregivers" or "Social Workers" or "Case Managers" or "Family") *Indexes=MEDLINE Timespan=2000-2017*	720,088
# 21	ts=("personal assistan$" or "support worker" or "outreach worker" or "carer$") *Indexes=MEDLINE Timespan=2000-2017*	10,340
# 20	ts=("Falls" or "social care costs" or "activities of daily living" or "Independen$" or "quality of life" or "social care waiting list" or "admission" or "readmission" or "social isolation" or "loneliness" or "cognitive function" or "long-term care" or "nursing care" or "cost" or "cost-effectiveness" or "cost saving" or "adult social care outcomes" or "delay$ dependen$" or "reduc$ need$") *Indexes=MEDLINE Timespan=2000-2017*	1,261,438
# 19	ts=("Delay$" near ("access$" or "care$" or "need$" or "transfer$" or "dependen$") *Indexes=MEDLINE Timespan=2000-2017*	10,654
# 18	ts:mapexp=("social isolation" or "Loneliness" or "Cognitive impairment" or "Social Participation" or "Cognitive function") *Indexes=MEDLINE Timespan=2000-2017*	684,371
# 17	ts:mapexp=("accidental falls" or "activities of daily living" or "Independent Living" or "quality of life") *Indexes=MEDLINE Timespan=2000-2017*	286,709
# 16	ts=("Social" near ("access$" or "need$" or "isolation" or "support$" or "care eligib$" or "function$")) *Indexes=MEDLINE Timespan=2000-2017*	97,018
# 15	ts=("reablement" or "rehabil$" or "recuperation" or "recovery" or "recovery-based interventions" or "recovery-based services" or "recovery model" or "progression model" or "promoting independence model" or "Care co-ordinat$" or "care coordinat$" or "care management" or "integrated care" or "multi-disciplinary" or "multi-professional" or "joint commissioning" or "coordinat$ care" or "co-ordinat$ care" or "case management" or "Personal budget" or "direct payment" or "personalisation" or "Self-management long term conditions" or "disease management" or "active management") *Indexes=MEDLINE Timespan=2000-2017*	327,637
# 14	ts:mapexp=("telemedicine" or "Social Support" or "rehabilitation" or "Recovery of Function" or "Intermediate Care Facilities" or "managed care programs" or "disease management" or "self care" or "Safety Management" or "Social Planning" or "Education of Intellectually Disabled" or "Early Interventions (Education)") *Indexes=MEDLINE Timespan=2000-2017*	2,322,953
# 13	ts=("intermediate care" or "rapid response teams" or "intensive rehabilitation services" or "recuperation facilities" or "one-stop shops" or "integrated home care teams" or "supported discharge" or "residential rehabilitation" or "admission avoidance services") *Indexes=MEDLINE Timespan=2000-2017*	1,685

# 12	ts=(“telecare” or “assistive technology” or “telehealth” or “telemedicine” or “community alarms” or “aids to daily living” or “telephone health coaching”) *Indexes=MEDLINE Timespan=2000-2017*	19,424
# 11	ts:mapexp=(“housing for the Elderly” or “housing” or “public housing”) *Indexes=MEDLINE Timespan=2000-2017*	742,597
# 10	ts=(“housing adaptation” or “handyperson” or “handyman” or “small adaptation$” or “minor adaptations” or “housing improvement” or “home safety” or “home security” or “fuel poverty” or “home adaptation$” or “housing advice” or “minor equipment” or “home security” or “minor repairs”) *Indexes=MEDLINE Timespan=2000-2017*	669
# 9	ts=(“health promotion” or “promoting healthy living” or “lifestyle advice” or “health behaviour” or “behavioural change” or “physical activity” or “exercise” or “diet” or “nutrition” or “smoking” or “social activity” or “healthy lifestyle” or “social participation” or “social prevention” or “social contact” or “social inclusion” or “social integration” or “befriending” or “social prescribing” or “welfare advice” or “welfare rights” or “debt advice” or “housing advice” or “community navigati$” or “mentoring” or “community services”) *Indexes=MEDLINE Timespan=2000-2017*	715,652
# 8	ts=(“social care” or “social service$” or “social program$” or “welfare service$” or “social program$” or “community care$” or “social support”) *Indexes=MEDLINE Timespan=2000-2017*	69,258
# 7	ts:mapexp=(“Community Health Services” or “Community Health Planning” or “Community Health Nurse” or “Home care services” or “Social Welfare” or “Social work”) *Indexes=MEDLINE Timespan=2000-2017*	165,682
# 6	ts:mapexp=(“cerebral palsy” or “Asperger Syndrome” or “Autism Spectrum Disorder” or “Autistic disorder”) *Indexes=MEDLINE Timespan=2000-2017*	39,601
# 5	ts=((Autism) or (“Asperger$ syndrome”) or (“challenging behavio?r”) or (“Cerebral Palsy”)) *Indexes=MEDLINE Timespan=2000-2017*	44,609
# 4	ts:mapexp=(“learning disorders” or “Specific learning disorder”) *Indexes=MEDLINE Timespan=2000-2017*	9,993
# 3	ts=((“learning disabilit$”) or (“learning disorder$”)) *Indexes=MEDLINE Timespan=2000-2017*	7,435
# 2	ts=((“intellectual$ disab$” or “intellectual$ disorder$” or “intellectual$ impair$” or “mental$ retard$” or “mental$ challenged” or “mental$ handicap$” or “mental$ impair$” or “mental$ deficien$” or “learning disab$” or “learning disorder$” or “learning impair$” or “development$ disab$” or “development$ disorder$” or “development$ impair$” or “subaverage intelligence”)) *Indexes=MEDLINE Timespan=2000-2017*	16,002
# 1	ts:mapexp=(“intellectual disability” or “Developmental Disabilities”) *Indexes=MEDLINE Timespan=2000-2017*	49,188

Embase (Ovid) Date: 31.10.2017

	Searches	Results	Type
1	exp intellectual impairment/ or exp developmental disorder/ or exp mental deficiency/	471440	Advanced
2	(intellectual$ disab$ or intellectual$ disorder$ or intellectual$ impair$ or mental$ retard$ or mental$ challenged or mental$ handicap$ or mental$ impair$ or mental$ deficien$ or learning disab$ or learning disorder$ or learning impair$ or development$ disab$ or development$ disorder$ or development$ impair$ or subaverage intelligence).mp	164506	Advanced
3	(learning disabilit$ or learning disorder$).mp	30343	Advanced
4	exp learning disorders/	31993	Advanced
5	(Autism or Asperger$ syndrome or challenging behavior or Cerebral Palsy).mp	92603	Advanced
6	exp cerebral palsy/ or exp Asperger Syndrome/ or exp Autism Spectrum Disorder/ or exp Autistic disorder/	85227	Advanced
7	exp Community Health Services/ or exp Community Health Planning/ or exp social work/ or exp Community Health Nurse/ or exp Home care services/ or exp Social Welfare/ or exp Social worker/	431988	Advanced
8	(social care or social service$ or social program$ or welfare service$ or social program$ or community care$ or social support).mp	159897	Advanced
9	(health promotion or promoting healthy living or lifestyle advice or health behaviour or behavioural change or physical activity or exercise or diet or nutrition or smoking or social activity or healthy lifestyle or social participation or social prevention or social contact or social inclusion or social integration or befriending or social prescribing or welfare advice or welfare rights or debt advice or housing advice or community navigati$ or mentoring or community services).mp	1721100	Advanced
10	(housing adaptation or handyperson or handyman or small adaptation$ or minor adaptations or housing improvement or home safety or home security or fuel poverty or home adaptation$ or housing advice or minor equipment or home security or minor repairs).mp	1354	Advanced
11	exp housing for the Elderly/ or exp housing/ or exp public housing/	31571	Advanced
12	(telecare or assistive technology or telehealth or telemedicine or community alarms or aids to daily living or telephone health coaching).mp	28735	Advanced
13	(intermediate care or rapid response teams or intensive rehabilitation services or recuperation facilities or one-stop shops or integrated home care teams or supported discharge or residential rehabilitation or admission avoidance services).mp	3164	Advanced
14	exp telemedicine/ or exp Home Care Services/ or exp rehabilitation/ or exp Recovery of Function/ or exp Intermediate Care Facilities/ or exp	3245889	Advanced

	managed care programs/ or exp disease management/ or exp self care/ or exp Safety Management/ or exp education of intellectually disabled/		
15	(reablement or rehabil$ or recuperation or recovery or recovery-based interventions or recovery-based services or recovery model or progression model or promoting independence model or Care co-ordinat$ or care coordinat$ or care management or integrated care or multi-disciplinary or multi-professional or joint commissioning or coordinat$ care or co-ordinat$ care or case management or Personal budget or direct payment or personalisation or Self-management long term conditions or disease management or active management).mp	1078439	Advanced
16	(Social adj2 (access$ or need$ or isolation$ or support$ or care$ eligib$)).mp	111993	Advanced
17	exp accidental falls/ or exp activities of daily living/ or exp Independent Living/ or exp quality of life/	491992	Advanced
18	exp social isolation/ or exp Loneliness/ or exp Cognitive impairment/	160770	Advanced
19	(Delay$ adj2 (access$ or care$ or need$ or transfer$)).mp	5713	Advanced
20	(Falls or social care costs or activities of daily living or Independen$ or quality of life or social care waiting list or admission or readmission or social isolation or loneliness or cognitive function or long-term care or nursing care or cost or cost-effectiveness or cost saving).mp	2884482	Advanced
21	(personal assistan$ or support worker or outreach worker or carer$ or (famil$ and care$)).mp	261666	Advanced
22	exp Caregivers/ or exp Social Workers/ or exp Case Managers/	69395	Advanced
23	exp qualitative research/ or exp qualitative analysis/	96718	Advanced
24	1 OR 2	519049	Advanced
25	3 OR 4	34976	Advanced
26	5 OR 6	95989	
27	25 AND 26	2699	
28	27 OR 24	519117	
29	7 OR 8	519608	Advanced
30	9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15	5278081	
31	16 OR 17 OR 18 OR 19 OR 20 OR 21 OR 22 OR 23	3363481	Advanced
32	28 AND 29 AND 30 AND 31	7405	Advanced

33	limit 32 to yr="2000 -Current"	6193	Advanced

CINAHL(EBSCOhost) Date: 3 November 2017

Blocks	Search terms	Search Modes	Results
S30	S26 AND S27 AND S28 AND S29	**Search modes** - Boolean/Phrase	361
S29	S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22	**Search modes** - Boolean/Phrase	283,091
S28	S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14	**Search modes** - Boolean/Phrase	261,695
S27	S6 OR S7	**Search modes** - Boolean/Phrase	44,536
S26	S23 OR S25	**Search modes** - Boolean/Phrase	18,510
S25	S5 AND S24	**Search modes** - Boolean/Phrase	267
S24	S3 OR S4	**Limiters** - Published Date: 20000101-20170131; Exclude MEDLINE records **Search modes** - Boolean/Phrase	6,192
S23	S1 OR S2	**Limiters** - Published Date: 20000101-20170131; Exclude MEDLINE records **Search modes** - Boolean/Phrase	18,510
S22	MH "Qualitative Studies+"	**Limiters** - Published Date: 20000101-20170131; Exclude MEDLINE records **Search modes** - Boolean/Phrase	42,964
S21	MM Caregivers or Social Workers or Case Managers or Family	**Limiters** - Published Date: 20000101-20170131; Exclude MEDLINE records **Search modes** - Boolean/Phrase	89,084
S20	(personal assistan$) or (support worker) or (outreach worker) or (carer$)	**Limiters** - Published Date: 20000101-20170131; Exclude MEDLINE records **Search modes** - Boolean/Phrase	4,993
S19	(Falls) or (social care cost*) or (activit* of daily living) or (Independen*) or (quality of life) or (social care waiting list) or (admission) or (readmission) or (social isolation) or (loneliness) or (cognitive function) or (long-term care) or (nursing care) or (cost) or (cost-effectiveness) or (cost saving)	**Limiters** - Published Date: 20000101-20170131; Exclude MEDLINE records **Search modes** - Boolean/Phrase	159,170
S18	Delay* AND ((access*) or (care*) or (need*) or (transfer*))	**Limiters** - Published Date: 20000101-20170131; Exclude MEDLINE records **Search modes** - Boolean/Phrase	5,104
S17	MM social isolation or Loneliness or Cognitive impairment	**Limiters** - Published Date: 20000101-20170131; Exclude MEDLINE records **Search modes** - Boolean/Phrase	4,827

S16	MM accidental falls or activities of daily living or Independent Living or quality of life	**Limiters** - Published Date: 20000101-20170131; Exclude MEDLINE records **Search modes** - Boolean/Phrase	39,812
S15	Social AND ((access*) or (need*) or (isolation*) or (support*) or (care eligib*))	**Limiters** - Published Date: 20000101-20170131; Exclude MEDLINE records **Search modes** - Boolean/Phrase	36,453
S14	(reablement) or (rehabil*) or (recuperation) or (recovery) or (recovery-based intervention*) or (recovery-based service*) or (recovery model) or (progression model) or (promoting independence model) or (Care co-ordinat*) or (care coordinat*) or (care management) or (integrated care) or (multi-disciplinary) or (multi-professional) or (joint commissioning) or (coordinat* care) or (co-ordinat* care) or (case management) or (Personal budget) or (direct payment) or (personalisation) or (Self-manageme ...	**Limiters** - Published Date: 20000101-20170131; Exclude MEDLINE records **Search modes** - Boolean/Phrase	88,114
S13	MM telemedicine or Home Care Services or rehabilitation or Recovery of Function or Intermediate Care Facilities or managed care programs or disease management or self care or Safety Management	**Limiters** - Published Date: 20000101-20170131; Exclude MEDLINE records **Search modes** - Boolean/Phrase	76,128
S12	(intermediate care) or (rapid response teams) or (intensive rehabilitation services) or (recuperation facilities) or (one-stop shops) or (integrated home care teams) or (supported discharge) or (residential rehabilitation) or (admission avoidance services)	**Limiters** - Published Date: 20000101-20170131; Exclude MEDLINE records **Search modes** - Boolean/Phrase	797
S11	(telecare) or (assistive technology) or (telehealth) or (telemedicine) or (community alarms) or (aids to daily living) or (telephone health coaching)	**Limiters** - Published Date: 20000101-20170131; Exclude MEDLINE records **Search modes** - Boolean/Phrase	9,695
S10	MM housing for the Elderly or housing or public housing	**Limiters** - Published Date: 20000101-20170131; Exclude MEDLINE records **Search modes** - Boolean/Phrase	5,782
S9	(housing adaptation) or (handyperson) or (handyman) or (small adaptation*) or (minor adaptation*) or (housing improvement) or (home safety) or (home security) or (fuel poverty) or (home adaptation*) or (housing advice) or (minor equipment) or (home security) or (minor repairs)	**Limiters** - Published Date: 20000101-20170131; Exclude MEDLINE records **Search modes** - Boolean/Phrase	1,120
S8	(health promotion) or (promoting healthy living) or (lifestyle advice) or (health behaviour) or (behavioural change) or (physical activity) or (exercise) or (diet) or (nutrition) or (smoking) or (social activity) or (healthy lifestyle) or (social participation) or (social prevention) or (social contact) or (social inclusion) or (social integration) or (befriending) or (social prescribing) or (welfare advice) or (welfare rights) or (debt advice) or (housing advice) or (community navigate*) or (me ...	**Limiters** - Published Date: 20000101-20170131; Exclude MEDLINE records **Search modes** - Boolean/Phrase	38
S7	(social care) or (social service*) or (social program*) or (welfare service*) or (social program*) or (community care*) or (social support)	**Limiters** - Published Date: 20000101-20170131; Exclude MEDLINE records **Search modes** - Boolean/Phrase	24,862
S6	MM Community Health Services or Community Health Planning or social work or Community Health Nurse or Home care services or Social Welfare or Social work	**Limiters** - Published Date: 20000101-20170131; Exclude MEDLINE records **Search modes** - Boolean/Phrase	28,978
S5	MM Cerebral palsy or Asperger Syndrome or Autism Spectrum Disorder or Autistic disorder	**Limiters** - Published Date: 20000101-20170131; Exclude MEDLINE records **Search modes** - Boolean/Phrase	10,728
S4	MM learning disorders	**Limiters** - Published Date: 20000101-20170131; Exclude MEDLINE records **Search modes** - Boolean/Phrase	1,916
S3	(learning disabilit*) or (learning disorder*)	**Limiters** - Published Date: 20000101-20170131; Exclude	6,192

		MEDLINE records **Search modes** - Boolean/Phrase	
S2	("intellectual* disab*) or (intellectual* disorder*) or (intellectual* impair*) or (mental* retard*) or (mental* challenged) or (mental* handicap*) or (mental* impair*) or (mental* deficien*) or (learning disab*) or (learning disorder*) or (learning impair*) or (development* disab*) or (development* disorder*) or (development* impair*) or (subaverage intelligence)	**Limiters** - Published Date: 20000101-20170131; Exclude MEDLINE records **Search modes** - Boolean/Phrase	18,510
S1	MM intellectual disability or developmental disabilities	**Limiters** - Published Date: 20000101-20170131; Exclude MEDLINE records **Search modes** - Boolean/Phrase	7,890

PsycINFO (Ovid) Date: 31.10.2017

	Searches	**Results**	**Type**
1	exp intellectual impairment/ or exp developmental disorder/ or exp mental deficiency/	42443	Advanced
2	(intellectual$ disab$ or intellectual$ disorder$ or intellectual$ impair$ or mental$ retard$ or mental$ challenged or mental$ handicap$ or mental$ impair$ or mental$ deficien$ or learning disab$ or learning disorder$ or learning impair$ or development$ disab$ or development$ disorder$ or development$ impair$ or subaverage intelligence).mp.	96445	Advanced
3	(learning disabilit$ or learning disorder$).mp.	27753	Advanced
4	exp learning disorders/	32512	Advanced
5	(Autism or Asperger$ syndrome or challenging behavior or Cerebral Palsy).mp.	52108	Advanced
6	exp cerebral palsy/ or exp Asperger Syndrome/ or exp Autism Spectrum Disorder/ or exp Autistic disorder/	41082	Advanced
7	exp Community Health Services/ or exp Community Health Planning/ or exp social work/ or exp Community Health Nurse/ or exp Home care services/ or exp Social Welfare/ or exp Social worker/	24058	Advanced
8	(social care or social service$ or social program$ or welfare service$ or social program$ or community care$ or social support).mp.	81387	Advanced

9	(health promotion or promoting healthy living or lifestyle advice or health behaviour or behavioural change or physical activity or exercise or diet or nutrition or smoking or social activity or healthy lifestyle or social participation or social prevention or social contact or social inclusion or social integration or befriending or social prescribing or welfare advice or welfare rights or debt advice or housing advice or community navigati$ or mentoring or community services).mp.	200544	Advanced
10	(housing adaptation or handyperson or handyman or small adaptation$ or minor adaptations or housing improvement or home safety or home security or fuel poverty or home adaptation$ or housing advice or minor equipment or home security or minor repairs).mp.	400	Advanced
11	exp housing for the Elderly/ or exp housing/ or exp public housing/	8248	Advanced
12	(telecare or assistive technology or telehealth or telemedicine or community alarms or aids to daily living or telephone health coaching).mp.	6757	Advanced
13	(intermediate care or rapid response teams or intensive rehabilitation services or recuperation facilities or one-stop shops or integrated home care teams or supported discharge or residential rehabilitation or admission avoidance services).mp.	713	Advanced
14	exp telemedicine/ or exp Home Care Services/ or exp rehabilitation/ or exp Recovery of Function/ or exp Intermediate Care Facilities/ or exp managed care programs/ or exp disease management/ or exp self care/ or exp Safety Management/ or exp education of intellectually disabled/	82169	Advanced
15	(reablement or rehabil$ or recuperation or recovery or recovery-based interventions or recovery-based services or recovery model or progression model or promoting independence model or Care co-ordinat$ or care coordinat$ or care management or integrated care or multi-disciplinary or multi-professional or joint commissioning or coordinat$ care or co-ordinat$ care or case management or Personal budget or direct payment or personalisation or Self-management long term conditions or disease management or active management).mp.	157561	Advanced
16	(Social adj2 (access$ or need$ or isolation$ or support$ or care$ eligib$)).mp.	75391	Advanced

17	exp accidental falls/ or exp activities of daily living/ or exp Independent Living/ or exp quality of life/	45480	Advanced
18	exp social isolation/ or exp Loneliness/ or exp Cognitive impairment/	41569	Advanced
19	(Delay$ adj2 (access$ or care$ or need$ or transfer$)).mp.	861	Advanced
20	(Falls or social care costs or activities of daily living or Independen$ or quality of life or social care waiting list or admission or readmission or social isolation or loneliness or cognitive function or long-term care or nursing care or cost or cost-effectiveness or cost saving).mp.	390940	Advanced
21	(personal assistan$ or support worker or outreach worker or carer$ or (famil$ and care$)).mp.	99741	Advanced
22	exp Caregivers/ or exp Social Workers/ or exp Case Managers/	35703	Advanced
23	exp qualitative research/ or exp qualitative analysis/	7632	Advanced
24	1 or 2	100535	Advanced
25	3 or 4	37253	Advanced
26	5 or 6	52108	Advanced
27	25 and 26	1546	Advanced
28	27 or 24	100611	Advanced
29	7 or 8	101827	Advanced
30	9 or 10 or 11 or 12 or 13 or 14 or 15	368706	Advanced
31	16 or 17 or 18 or 19 or 20 or 21 or 22 or 23	571562	Advanced
32	28 and 29 and 30 and 31	428	Advanced
33	limit 32 to yr="2000 -Current"	257	Advanced

	Social Policy and Practice (Ovid) Date: 31.10.2017		
	Searches	**Results**	**Type**
1	[exp intellectual impairment/ or exp developmental disorder/ or exp mental deficiency/]	0	Advanced
2	(intellectual$ disab$ or intellectual$ disorder$ or intellectual$ impair$ or mental$ retard$ or mental$ challenged or mental$ handicap$ or mental$ impair$ or mental$ deficien$ or learning disab$ or learning disorder$ or learning impair$ or development$ disab$ or development$ disorder$ or development$ impair$ or subaverage intelligence).mp.	15294	Advanced
3	(learning disabilit$ or learning disorder$).mp.	14113	Advanced
4	[exp learning disorders/]	0	Advanced
5	(Autism or Asperger$ syndrome or challenging behavior or Cerebral Palsy).mp.	3309	Advanced
6	[exp cerebral palsy/ or exp Asperger Syndrome/ or exp Autism Spectrum Disorder/ or exp Autistic disorder/]	0	Advanced
7	[exp Community Health Services/ or exp Community Health Planning/ or exp social work/ or exp Community Health Nurse/ or exp Home care services/ or exp Social Welfare/ or exp Social worker/]	0	Advanced
8	(social care or social service$ or social program$ or welfare service$ or social program$ or community care$ or social support).mp.	72141	Advanced
9	(health promotion or promoting healthy living or lifestyle advice or health behaviour or behavioural change or physical activity or exercise or diet or nutrition or smoking or social activity or healthy lifestyle or social participation or social prevention or social contact or social inclusion or social integration or befriending or social prescribing or welfare advice or welfare rights or debt advice or housing advice or community navigati$ or mentoring or community services).mp.	23999	Advanced

10	(housing adaptation or handyperson or handyman or small adaptation$ or minor adaptations or housing improvement or home safety or home security or fuel poverty or home adaptation$ or housing advice or minor equipment or home security or minor repairs).mp.	2664	Advanced
11	[exp housing for the Elderly/ or exp housing/ or exp public housing/]	0	Advanced
12	(telecare or assistive technology or telehealth or telemedicine or community alarms or aids to daily living or telephone health coaching).mp.	1916	Advanced
13	(intermediate care or rapid response teams or intensive rehabilitation services or recuperation facilities or one-stop shops or integrated home care teams or supported discharge or residential rehabilitation or admission avoidance services).mp.	750	Advanced
14	[exp telemedicine/ or exp Home Care Services/ or exp rehabilitation/ or exp Recovery of Function/ or exp Intermediate Care Facilities/ or exp managed care programs/ or exp disease management/ or exp self care/ or exp Safety Management/ or exp education of intellectually disabled/]	0	Advanced
15	(reablement or rehabil$ or recuperation or recovery or recovery-based interventions or recovery-based services or recovery model or progression model or promoting independence model or Care co-ordinat$ or care coordinat$ or care management or integrated care or multi-disciplinary or multi-professional or joint commissioning or coordinat$ care or co-ordinat$ care or case management or Personal budget or direct payment or personalisation or Self-management long term conditions or disease management or active management).mp.	16896	Advanced
16	(Social adj2 (access$ or need$ or isolation$ or support$ or care$ eligib$)).mp.	8521	Advanced
17	[exp accidental falls/ or exp activities of daily living/ or exp Independent Living/ or exp quality of life/]	0	Advanced
18	[exp social isolation/ or exp Loneliness/ or exp Cognitive impairment/]	0	Advanced
19	(Delay$ adj2 (access$ or care$ or need$ or transfer$)).mp.	265	Advanced
20	(Falls or social care costs or activities of daily living or Independen$ or quality of life or social care waiting list or admission or readmission or	47881	Advanced

	social isolation or loneliness or cognitive function or long-term care or nursing care or cost or cost-effectiveness or cost saving).mp.		
21	(personal assistan$ or support worker or outreach worker or carer$ or (famil$ and care$)).mp.	47594	Advanced
22	[exp Caregivers/ or exp Social Workers/ or exp Case Managers/]	0	Advanced
23	[exp qualitative research/ or exp qualitative analysis/]	0	Advanced
24	1 or 2	15294	Advanced
25	3 or 4	14113	Advanced
26	5 or 6	3309	Advanced
27	25 and 26	641	Advanced
28	27 or 24	15294	Advanced
29	7 or 8	72141	Advanced
30	9 or 10 or 11 or 12 or 13 or 14 or 15	43956	Advanced
31	16 or 17 or 18 or 19 or 20 or 21 or 22 or 23	91990	Advanced
32	28 and 29 and 30 and 31	429	Advanced
33	limit 32 to yr="2000 -Current"	346	Advanced

AMED (Ovid) Date: 31.10.2017

	Searches	Results	Type
1	exp intellectual impairment/ or exp developmental disorder/ or exp mental deficiency/	0	Advanced
2	(intellectual$ disab$ or intellectual$ disorder$ or intellectual$ impair$ or mental$ retard$ or mental$ challenged or mental$ handicap$ or mental$ impair$ or mental$ deficien$ or learning disab$ or learning disorder$ or learning impair$ or development$ disab$ or development$ disorder$ or development$ impair$ or subaverage intelligence).mp.	9907	Advanced
3	(learning disabilit$ or learning disorder$).mp.	4404	Advanced
4	exp learning disorders/	1067	Advanced
5	(Autism or Asperger$ syndrome or challenging behavior or Cerebral Palsy).mp.	4324	Advanced
6	exp cerebral palsy/ or exp Asperger Syndrome/ or exp Autism Spectrum Disorder/ or exp Autistic disorder/	3384	Advanced
7	exp Community Health Services/ or exp Community Health Planning/ or exp social work/ or exp Community Health Nurse/ or exp Home care services/ or exp Social Welfare/ or exp Social worker/	5859	Advanced
8	(social care or social service$ or social program$ or welfare service$ or social program$ or community care$ or social support).mp.	3713	Advanced
9	(health promotion or promoting healthy living or lifestyle advice or health behaviour or behavioural change or physical activity or exercise or diet or nutrition or smoking or social activity or healthy lifestyle or social participation or social prevention or social contact or social inclusion or social integration or befriending or social prescribing or welfare advice or welfare rights or debt advice or housing advice or community navigati$ or mentoring or community services).mp.	32658	Advanced

10	(housing adaptation or handyperson or handyman or small adaptation$ or minor adaptations or housing improvement or home safety or home security or fuel poverty or home adaptation$ or housing advice or minor equipment or home security or minor repairs).mp.	78	Advanced
11	exp housing for the Elderly/ or exp housing/ or exp public housing/	358	Advanced
12	(telecare or assistive technology or telehealth or telemedicine or community alarms or aids to daily living or telephone health coaching).mp.	1212	Advanced
13	(intermediate care or rapid response teams or intensive rehabilitation services or recuperation facilities or one-stop shops or integrated home care teams or supported discharge or residential rehabilitation or admission avoidance services).mp.	105	Advanced
14	exp telemedicine/ or exp Home Care Services/ or exp rehabilitation/ or exp Recovery of Function/ or exp Intermediate Care Facilities/ or exp managed care programs/ or exp disease management/ or exp self care/ or exp Safety Management/ or exp education of intellectually disabled/	55792	Advanced
15	(reablement or rehabil$ or recuperation or recovery or recovery-based interventions or recovery-based services or recovery model or progression model or promoting independence model or Care co-ordinat$ or care coordinat$ or care management or integrated care or multi-disciplinary or multi-professional or joint commissioning or coordinat$ care or co-ordinat$ care or case management or Personal budget or direct payment or personalisation or Self-management long term conditions or disease management or active management).mp.	65579	Advanced
16	(Social adj2 (access$ or need$ or isolation$ or support$ or care$ eligib$)).mp.	3535	Advanced
17	exp accidental falls/ or exp activities of daily living/ or exp Independent Living/ or exp quality of life/	16356	Advanced
18	exp social isolation/ or exp Loneliness/ or exp Cognitive impairment/	240	Advanced
19	(Delay$ adj2 (access$ or care$ or need$ or transfer$)).mp.	71	Advanced
20	(Falls or social care costs or activities of daily living or Independen$ or quality of life or social care waiting list or admission or readmission or	38434	Advanced

	social isolation or loneliness or cognitive function or long-term care or nursing care or cost or cost-effectiveness or cost saving).mp.		
21	(personal assistan$ or support worker or outreach worker or carer$ or (famil$ and care$)).mp.	8179	Advanced
22	exp Caregivers/ or exp Social Workers/ or exp Case Managers/	2629	Advanced
23	exp qualitative research/ or exp qualitative analysis/	0	Advanced
24	1 or 2	9907	Advanced
25	3 or 4	4404	Advanced
26	5 or 6	4447	Advanced
27	25 and 26	122	Advanced
28	27 or 24	9907	Advanced
29	7 or 8	9022	Advanced
30	9 or 10 or 11 or 12 or 13 or 14 or 15	91427	Advanced
31	16 or 17 or 18 or 19 or 20 or 21 or 22 or 23	46538	Advanced
32	28 and 29 and 30 and 31	244	Advanced
33	limit 32 to yr="2000 -Current"	174	Advanced

Table 3 Methodological quality criteria and scores for included studies

1. Consensus on Health Economic Criteria (CHEC) checklist

First author	1. Is the study population clearly described?	2. Are competing alternatives clearly described?	3. Is a well-defined research question posed in answerable form?	4. Is the economic study design appropriate to the stated objective?	5. Is the chosen time horizon appropriate to include relevant costs and consequences?	6. Is the actual perspective chosen appropriate?	7. Are all important and relevant costs for each alternative identified?	8. Are all costs measured appropriately in physical units?	9. Are costs valued appropriately?	10. Are all important and relevant outcomes for each alternative identified?	11. Are all outcomes measured appropriately?	12. Are outcomes valued appropriately?	13. Is an incremental analysis of costs and outcomes of alternatives performed?	14. Are all future costs and outcomes discounted appropriately?	15. Are all important variables, whose values are uncertain, appropriately subjected to	16. Do the conclusions follow from the data reported?	17. Does the study discuss the generalizability of the results to other settings and patient/ client interest of study researcher(s) and	18. Does the article indicate that there is no potential conflict of	19. Are ethical and distributional issues discussed appropriately?	CHEC score
Bigby et al. (2018)	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	No	No	Yes	Yes	Yes	Yes	13
Spreat et al. (2005)	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No	No	Yes	Yes	Can't tell	Can't tell	12
Hallam et al. (2002)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	Can't tell	Can't tell	14
Felce et al. (2015)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Can't tell	Yes	16
Glendinning et al. (2008)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	18
Hassiotis et al. (2001)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	17
Felce et al. (2008)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	17
Hassiotis et al. (2009)	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes	Yes	14
Romeo et al. (2009)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Can't tell	No	15
Roberston et al. (2004)	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No	No	No	Yes	Yes	Can't tell	No	11
Iemmi et al. (2015)	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes	Yes	12
Romeo et al. (2009b) - health check	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	N/A	N/A	No	No	Yes	Yes	Yes	Yes	12

2. Quality assessment for studies not reporting costs.

	1. Did the study address a clearly focused issue?	2. Did the authors use an appropriate method to answer their question?	3. Was the study population clearly specified and defined?	4. Were measures taken to accurately reduce measurement bias?	5. Were the study data collected in a way that addressed the research issue?	6. Did the study have enough participants to minimize the play of chance?	7. Did the authors take sufficient steps to assure the quality of the study data?	8. Was the data analysis sufficiently rigorous?	9. How complete is the discussion?	10. To what extent are the findings generalizable to other international contexts?	Your overall judgment of the paper
Endermann (2015)	Good	Fair	Fair	Fair	Good	Poor	Good	Fair	Good	Poor	Fair
Koristas et al. (2008)	Good	Good	Good	Good	Fair	Good	Fair	Good	Good	Fair	Good

Note. N/A= Not Applicable

PRISMA 2009 Checklist

Table 2 Prisma checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	2-4
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	4
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	-
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	6
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	5
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	(Appendix 1)
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	5
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	6
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	4-6
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	6
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	-
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	6-7

PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	-
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	-
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	7
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	7
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	7 and (Appendix 2)
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	7-9
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	-
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	-
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	-
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	9-11
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	11
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	11-12
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	-

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

PRISMA 2009 Checklist