October 2018

what works wellbeing

An overview of reviews:

the effectiveness of interventions to address loneliness at all stages of the life-course

Corresponding Author: Professor Christina Victor[1]

Co-authors: Professor Louise Mansfield[2], Professor Tess Kay[2], Professor Norma Daykin[4], Mr Jack Lane[3], Ms Lily Grigsby Duffy[2], Professor Alan Tomlinson[3], Professor Catherine Meads[5]

[1]. Ageing Studies, Institute for Environment Health and Societies, Brunel University London
[2]. Welfare, Health and Wellbeing, Institute for Environment, Health and Societies, Brunel University London.
[3]. University of Brighton
[4]. University of Tampere, Finland
[5]. Anglia Ruskin University

HM Government | UNIVERSITY OF TAMPERE | THE UNIVERSITY OF WINCHESTER | Brunel University London

About the What Works Centre for Wellbeing

We are an independent organisation set up to produce robust, relevant and accessible evidence on wellbeing. We work with individuals, communities, businesses and government, to enable them to use this evidence make decisions and take action to improve wellbeing.

whatworkswellbeing.org

info@whatworkswellbeing.org

@whatworksWB

Executive Summary

Introduction

The protocol for this review was registered on the PROSPERO International Prospective Register of Systematic Reviews (Registration number CRD42018097293 Available from:
https://www.crd.york.ac.uk/PROSPERO/display_record.php?RecordID=97293

The review sought to address the question: What is the effectiveness of interventions to alleviate loneliness in people of all ages across the life-course?

Review approach

This is an overview of systematic reviews conducted on loneliness between 2008-2018. Unpublished grey literature published between 2008-2018 and in the form of evaluation reports is also included. We have only included findings from studies using controlled study designs and measuring loneliness as reported in the reviews.

Results

After duplicates were removed, the electronic searches returned 364 published reviews for screening. Fourteen reviews were relevant and focused on assessing interventions to alleviate loneliness. The findings from fourteen unpublished grey literature reports are synthesised in the report.

Characteristics of included studies

The review includes published data from participants from the United Kingdom (England, Northern Ireland, Scotland, Wales), the Netherlands. Finland, Japan, New Zealand, Sweden, Taiwan and the USA.

All published and grey literature studies included focused on older populations. None of the studies of other age groups met our inclusion criteria In the unpublished literature some evaluations focused on diverse older groups including LGBT people, vulnerable adults and men's groups but none explicitly focussed on young or mid-life adults.

Interventions in the published literature varied and included animal interventions, technology of many kinds, gardening, physical activity, reminiscence therapy, befriending, service resign, residential and school-based camps. Delivery took place in community and care home contexts. Interventions in the unpublished literature were equally varied, mostly focused on community contexts and included befriending, homesharing, shared meals, social activities, and music.

A wide variety of loneliness measures were used, and the concept of loneliness was not clearly defined. For example, the terms loneliness and social isolation were used interchangeably. Further there was substantial heterogeneity across the studies. Meta-analysis including loneliness data was conducted in only one review on befriending in which no significant effect was found from befriending on loneliness outcomes.

Summary of study findings

The results from controlled study designs in community settings and care homes showed no effect of interventions on loneliness, although this does not mean that loneliness is not alleviated at all by a range of interventions. In the published literature loneliness is seldom reported as a primary outcome; it is most often reported alongside other outcomes including related concepts such as social isolation, social support, social networks, and health outcomes including anxiety and depression.

An extremely diverse range of interventions were included in the published reviews and it was noted in some that there is no one-size-fits all approach to loneliness interventions. Authors in the published and unpublished literature suggested that programmes tailored to the circumstances and needs of individuals, specific groups or type of loneliness experienced would be more likely to result in reductions in loneliness. A small amount of work attempted to compare one-to-one interventions with group interventions in both the published and unpublished literature, but findings were mixed, and it is not possible to be conclusive about which might lead to best reductions in loneliness. The studies included in the reviews were overwhelmingly focused on older age groups. The emphasis on older people did not account for socio-economic, ethnic and other elements of diversity which characterise the adult population. Regardless of setting there appeared to be little evidence of interventions targeting those who were lonely or at risk/vulnerable to loneliness despite the recognition that targeted interventions at those vulnerable to loneliness may be more beneficial. The unpublished literature did address evaluations of loneliness interventions for some diverse groups including LGBT people, men's groups, and vulnerable adults. The unpublished literature suggested that a number of mediating factors are central to the development of successful loneliness interventions including; the development of companionship, supporting meaningful relationships, tailoring interventions to the needs of those for whom interventions are designed.

Reviews included data from USA, the Netherlands, Finland, Japan, New Zealand, Sweden, Taiwan and only two reviews included studies from the UK, both of which focused on befriending.

There was no evidence that interventions did any harm. However, there was a suggestion that some technology-based interventions could reinforce a sense of social isolation if participants did not have the requisite physical or mental capacity or lacked confidence in using the equipment and related systems. In the unpublished literature, the complexities of befriending (offering supportive

reliable relationships usually in person and by volunteers) were noted by emphasising the need for appropriate promotion of interventions emphasising the development of meaningful relationships rather than as 'loneliness' interventions which may be both unappealing and stigmatising.

In larger reviews loneliness often constitutes a small part of the total review. There is a clear need for conceptual clarity and focused research on loneliness.

Strengths and limitations of the review

The comprehensive search strategy ensures that this overview represents a wide-ranging summary of all existing eligible systematic reviews in the English language published prior to the search dates and the pre-publication of our protocol on PROSPERO ensures methodological transparency and militates against potential post-hoc decision-making which can introduce bias to the process. Dual screening of searches and data extraction and independent quality assessment of included reviews ensured a rigorous process. Taking published systematic reviews as the sole evidence increases the potential risk of publication lag, wherein possible important new evidence that has not yet been included in published systematic reviews is not identified and included. The inclusion of grey literature reports goes some way to ensuring that current programmes for alleviating loneliness are included in this report. The included reviews used a range of different methodological quality and risk of bias assessment tools. Given that we relied primarily on the judgement of quality and assessment of bias of the authors of included reviews and did not systematically apply a standard risk of bias tool to each original study, it is possible that important sources of potential bias may have been missed or that judgements in the included reviews were too lenient or punitive. The use of systematic reviews as our evidence base means that we are reliant on the details of individual studies reported by the authors in these reviews. It is beyond the scope of this work to review the original studies to gather additional information not reported in the source reviews.

Implications for research and policy

This overview highlights the need for any future trials of interventions to be large enough to offer a reliable answer, designed to reduce risk of bias as far as possible, based on sound theoretical foundations, delivered with adequate fidelity, and importantly, reported to standards of best practice and transparency. For most of the interventions considered in this overview, further small exploratory trials are unlikely to increase certainty. For both trials and reviews we would strongly encourage better reporting of numerical data and a focus on effect sizes and precision rather than using p values as a surrogate for effectiveness. We note the absence of any evidence in our included studies around the costs of loneliness interventions and these should be factored into future evaluations alongside long-term as well as short measurement of loneliness outcomes.

For policy making in this area we recommend:

- focusing on person-centred and tailored loneliness interventions which are designed for the specific needs of a targeted population defined in terms of socio-demographic, vulnerability or types of loneliness, developing programmes to alleviate loneliness across the life course and with due attention to diverse population groups and social contexts and change over the lifecourse
- the promotion of programmes to alleviate loneliness which pay attention to the avoidance of stigma or the reinforcement of marginalisation isolation
- the development of programmes to alleviate loneliness which emphasise meaningful relationships and improved social connections for those who are lonely or at risk of loneliness
- policy support for conceptual clarity in loneliness work
- policy support for developing social impact models of the processes and mechanisms by which loneliness interventions work
- policy support for better evaluations and primary research in the field including measures of costs

Background

One of the key challenges to wellbeing is loneliness. Since the initial study of older people in 1948 loneliness has been largely seen as a problem of old age. Sheldon (1948) wrote ''A distressing feature of old age is loneliness. All who have done welfare work among the old have found it the most common, if at the same time the most imponderable, of the ills from which the aged suffer, and its frequency was amply confirmed by our study". Until recently this stereotype has persisted with loneliness being something that accompanies ageing. However, the contemporary policy interests in the broad topic area of wellbeing has generated renewed interest in loneliness as a factor that compromises wellbeing across the adult life course rather than being confined to old age/older adults.

As with the concept of wellbeing, loneliness is a debated and contested concept. Some philosophers such as Rotenberg (1999) or Mijuskovic (1981) argue that loneliness is a universal human experience. It is an experience that most of us will encounter at some point in our lives either as momentary experience or a more protracted experience resulting from the loss of a parent or friend. Others have problematised loneliness because of the associations with a range of negative health outcomes including mortality, morbidity, health behaviours and 'excess' service use. Such linkages have led to the development of a plethora of interventions focussed upon loneliness. This review seeks to synthesise the existing evidence of effectiveness of interventions to combat loneliness for adults.

There are several underlying assumptions about loneliness. We presume a universal understanding of what loneliness is, that it is a homogeneous, static and/or linear experience, that it is quantitatively accessible (i.e. we can measure it). We further presume that there is 'something' that we can and should do to prevent or cure it. However, there is a debate as to what loneliness is. The most widely used definition of loneliness is the cognitive deficit model of Peplau & Perlman (1981). This defines loneliness as the perceptual gap between actual and desired social relationships. These deficiencies can be in terms of either the quantity or quality of the relationships. For example, loneliness can arise when individuals define their social relationships as deficient because either have fewer relationships than they would like, or the quality of their relationships is lacking. We might speculate that there is another potential dimension where relationships may not fulfil expectations in terms of the relationship modality. Loneliness may be generated when relationships are on-line/digital rather than being in person. These differences in the sources of dis-satisfaction with our social relationships which generates loneliness has implications for the development

of appropriate interventions. It is highly likely that solutions developed to tackle loneliness generated by having insufficient 'quality' of social relationships would be distinct from those where loneliness is the outcome of having fewer relationships than an individual desired or of reliance upon digital relationships.

Terms and terminology are especially important when undertaking research in the field of loneliness as distinct but related concepts such as living alone, or isolation are often used as synonyms for loneliness. Social isolation is focused upon the size of an individual's social network. Isolation may be defined broadly as having few and infrequent social ties. Living alone describes an individual's household composition. Both living alone, and isolation are objective quantifiable constructs. This contrasts with loneliness which is the outcome of an individual's evaluation of their social relationships as not meeting their expectations. Conceptually and empirically loneliness, isolation and living alone are distinct but related concepts and are not linguistically, empirically or conceptually interchangeable. When interpreting the literature looking at interventions for loneliness these conceptual challenges are not mere semantics. Rather they have a profound influence on the generation and interpretation of evidence as to what interventions work, for whom and in what context.

The topic of loneliness was identified through discussion with the Cabinet Office/DCMS. It is a priority topic for policy development. Given the existence of evidence reviews on the topic of loneliness it was agreed that an overview of systematic reviews would be conducted to assess evidence on the effectiveness of interventions to alleviate loneliness in people across the lifecourse.

The protocol for this review was registered on the PROSPERO International Prospective Register of Systematic Reviews (Registration number CRD42018097293 Available from: https://www.crd.york.ac.uk/PROSPERO/display_record.php?RecordID=97293

Research Question

What is the effectiveness of interventions to alleviate loneliness in people of all ages across the life-course?

Methodology

Types of studies

We included systematic reviews of either qualitative studies or quantitative comparative studies i.e. with concurrent or historical controls. We included reviews reported within the last 10 years and published in any language. To meet the definition of a systematic review, we only included reviews that achieve a judgement of "Yes" on the third criterion on the AMSTAR tool for assessing the quality of systematic reviews (Shea 2007): "Was a comprehensive literature search performed?" as we consider this a minimum requirement for a review to be considered 'systematic'. Our minimum criteria for considering a search "systematic" are that authors must have searched at least 2 electronic databases using a clear search strategy and screened the reference lists of identified studies.

Types of participants

The review included adult participants of any age (healthy or with any physical or mental morbidity) experiencing loneliness however defined or described, and who may or may not be living alone. We only included populations based in an OECD country.

Types of outcome measure

To be included, reviews needed to have measured loneliness as our focus was on loneliness not isolation. We required studies to report and demonstrate empirically the measure of loneliness used. This enables a range of measures to be used including recognised scales specifically designed to measure loneliness, domains measuring loneliness within broader wellbeing outcome measures and self-rating scales.

A summary of the loneliness measures used in the studies included in this review can be found in Appendix 1.

Types of interventions

We included interventions that were focused on alleviating loneliness and which were delivered directly to people (e.g. community interventions, book clubs, writing groups, social prescribing, etc.) in both community and communal settings (e.g care homes, assisted living facilities or group homes).

Comparison

We only included quantitative data where there is comparison data from a control group (i.e. no intervention or usual care).

Search methods for identification of reviews

Electronic searches

Electronic databases were searched using a combination of controlled vocabulary (MeSH) and free text terms. Search terms were incorporated to target systematic reviews and loneliness. We included the BMJ Clinical Evidence search filter for systematic reviews. The OVID MEDLINE search strategy can be found below. All database searches were based on this strategy but appropriately revised to suit each database. The following databases were searched from 2008 to 2018:

- Cochrane Database of Systematic reviews
- OVID MEDLINE
- Scopus
- CINAHL
- Eric
- PsychInfo
- Arts and Humanities Citation Index (Web of Science)
- Social Science Citation Index (Web of Science)
- Science Citation Index

Search Strategy (OVID MEDLINE)

An example search strategy for one database (Ovid Medline) is shown below:

1. MeSH descriptor: [loneliness] explode all trees)
2. meta-analysis.pt.
3. meta-analysis.sh.
4. (meta-analys* or meta analys* or metaanalys*).tw,sh.
5. (systematic* adj5 review*).tw,sh.
6. (systematic* adj5 overview*).tw,sh.
7. (quantitativ* adj5 review*).tw,sh.
8. (quantitativ* adj5 overview*).tw,sh.

9. (quantitativ* adj5 synthesis*).tw,sh.
10. (qualitativ* adj5 review*).tw,sh.
11. (qualitativ* adj5 overview*).tw,sh.
12. (qualitativ* adj5 synthesis*).tw,sh.
13. (methodologic* adj5 review*).tw,sh.
14. (methodologic* adj5 overview*).tw,sh.
15. (integrative research review* or research integration).tw.
16. OR/ 2-15
17. 1 AND 16

Searching other sources

The reference lists of all eligible reviews of reviews were hand-searched to attempt to identify additional relevant texts. In addition, a search of 'grey literature' will be conducted via an online call for evidence. Grey literature was included if it was an evaluation report measuring loneliness outcomes and/or evaluated the processes and/or mechanism by which loneliness outcomes are achieved. Grey literature was included if the evaluation methods were qualitative, quantitative or mixed methods and the report was completed within the last 10 years (2008-2018).

Identification of studies for inclusion

Search results were independently checked by two overview authors and eligible reviews were included. Initially the titles and abstracts of identified studies were reviewed. If clear from the title and abstract that the study did not meet the inclusion criteria it was then excluded. Where it was not clear from the title and abstract whether a study is relevant the full text was checked to confirm its eligibility. The selection criteria were independently applied to the full papers of identified reviews by two overview authors. Where two independent reviewers did not agree in their primary judgements, they discussed the conflict and attempted to reach a consensus. If they could not agree then a third member of the review team considered the text and a majority decision was made.

A table of excluded studies can be found in Appendix 2.

Data collection and analysis

Data extraction and management

Data were extracted independently by an overview author using standardised forms and cross-checked by a second overview author. Discrepancies were

resolved by consensus. Where agreement could not be reached a third overview author considered the paper and a majority decision was reached. The data extraction forms included the following details where relevant to the study design:

- the assessment of methodological quality of the included review,
- the objectives of the review,
- details of the included participants including a focus on protected characteristics including socio-economic status
- the interventions studied and where relevant, the control conditions (if appropriate), including detail where available on the intervention content, implementation, and adherence
- the outcomes (primary and secondary) and time-points assessed/evaluated and where relevant estimates of effectiveness, and precision
- the assessment of the methodological quality and/or risk of bias of the included trials and judgements of the quality of the body of evidence (for example using the GRADE approach). The presence of possible conflicts of interest for authors of the included trials within a review, and for the authors of the review themselves.

Our protocol allowed us to contact the authors of reviews in the event that the required information could not be extracted from the reports. We were not permitted to contact authors from the studies within the reviews. We did not need to take any action in this regard.

Assessment of methodological quality of included reviews

Two review authors independently applied the AMSTAR tool (see Appendix 3) to assess the methodological quality of the included reviews. Discrepancies were resolved by consensus. The AMSTAR tool was used to indicate if a specific study had been well designed, appropriately carried out and suitably analysed. This score has a range of 0-11 with higher scores indicative of higher quality reviews. The quality of included reviews is displayed in table 2. We present the judgement of quality on individual studies made by review authors in Appendix 5.

The PHE Arts for Health and Wellbeing Evaluation Framework (Daykin with Joss, 2016) was used to judge the quality of the grey literature in terms of the appropriateness of the evaluation design, the rigour of the data collection and analysis and precision of reporting. We report the findings narratively as is usual practice.

Assessment of the quality of the evidence in included reviews

Included reviews have assessed the methodological quality and/or risk of bias of included studies in a variety of ways. We have used the judgements made by the authors of original reviews regarding the quality of evidence and/ or risk of bias but report it within the context of our assessment of the quality of the review itself (see table 2 for a summary and Appendix 5 for an overview of quality assessment by review authors on individual studies).
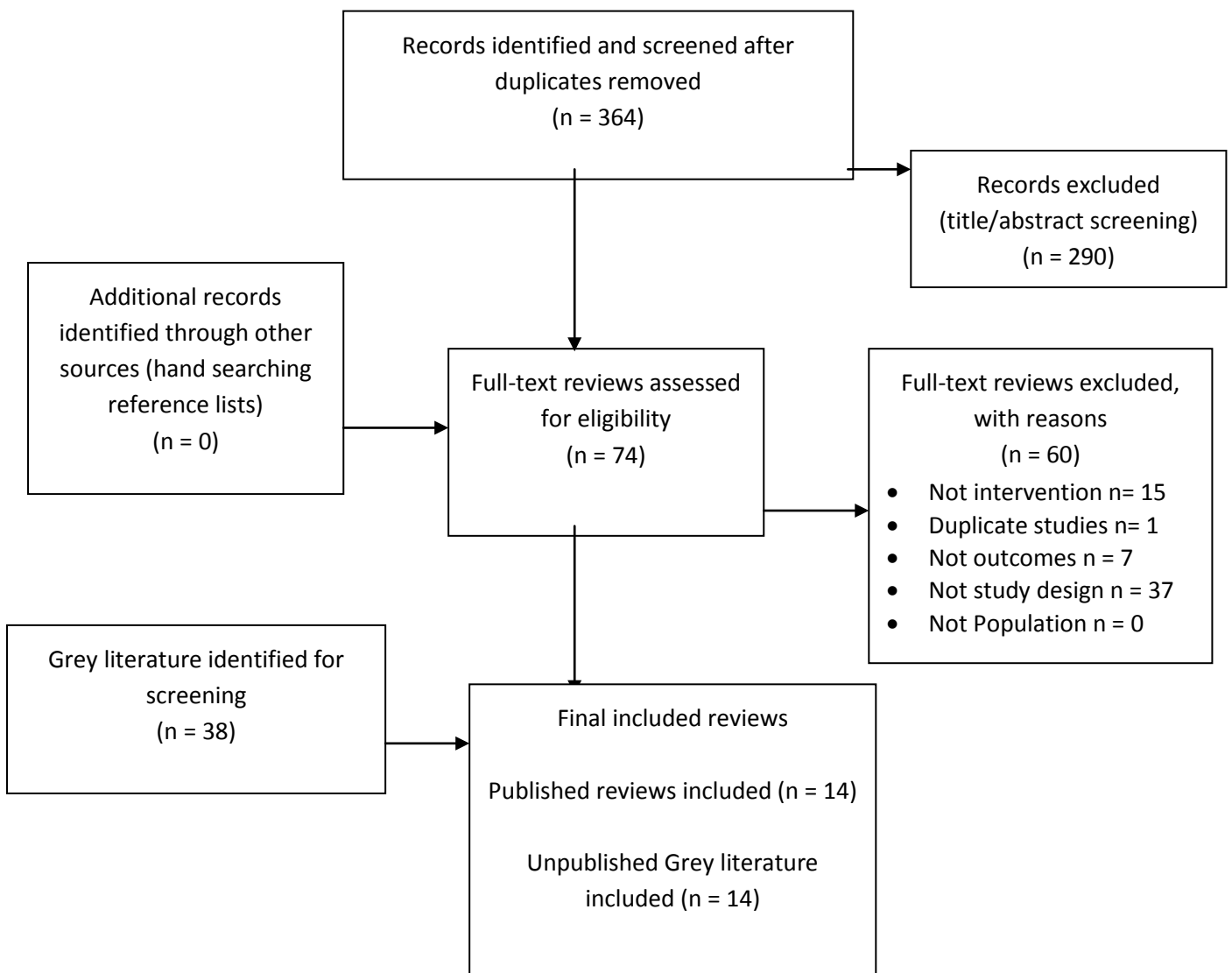
Data synthesis

We have tabulated summaries of the characteristics of the included reviews and unpublished grey literature (see table 1 and Appendix 4 respectively). The precise comparisons presented have been primarily determined by the content of the included reviews. We have presented numerical data narratively using metrics as reported in the systematic reviews and where it is available. Data has been grouped where possible in the findings according to the population, the type of intervention, and outcome measure. A summary of findings, completeness and quality, strengths and limits of the review and implications for research and policy are presented.

Findings – overview of search results

Results of the searches (published literature)

After removal of duplicates the electronic searches returned 364 records for screening. After title and abstract screening, 74 full texts were assessed for eligibility against the inclusion criteria. The full text screening process identified 14 published reviews of interventions loneliness for adults which included randomised controlled trials. The search screening process is illustrated in Figure 1.

Figure 1 PRISMA flow diagram of the search screening process

```
┌─────────────────────────────────────────┐
│ Records identified and screened after     │
│ duplicates removed                         │        ┌──────────────────────────────┐
│ (n = 364)                                  │───────▶│ Records excluded                │
│                                            │        │ (title/abstract screening)      │
└─────────────────────────────────────────┘        │ (n = 290)                        │
                     │                               └──────────────────────────────┘
                     ▼
┌──────────────────────────┐                         ┌──────────────────────────────┐
│ Additional records        │                         │ Full-text reviews excluded,     │
│ identified through other  │        ┌──────────────┐ │ with reasons                    │
│ sources (hand searching   │───────▶│ Full-text    │ │ (n = 60)                        │
│ reference lists)          │        │ reviews       │▶│   • Not intervention n= 15      │
│ (n = 0)                   │        │ assessed      │ │   • Duplicate studies n= 1      │
│                           │        │ for eligibility│ │   • Not outcomes n = 7          │
└──────────────────────────┘        │ (n = 74)     │ │   • Not study design n = 37     │
                                      └──────────────┘ │   • Not Population n = 0        │
                                             │         └──────────────────────────────┘
┌──────────────────────────┐                │
│ Grey literature identified │               ▼
│ for screening              │        ┌──────────────────────────┐
│ (n = 38)                   │───────▶│ Final included reviews     │
│                            │        │                            │
└──────────────────────────┘        │ Published reviews included │
                                      │ (n = 14)                   │
                                      │                            │
                                      │ Unpublished Grey literature│
                                      │ included (n = 14)          │
                                      └──────────────────────────┘
```

Characteristics of included studies (published literature)

The included reviews examined loneliness in older age populations broadly defined as those aged 55+ years. Interventions were broadly defined in terms of the nature of the activity provided and the mode of delivery (group or individual based). Included reviews reported studies conducted in care homes and residential facilities as well as community settings.) Reviews either examined specific loneliness interventions (befriending, physical activity, gardening, technology, peer group telephone meetings, assistive animal projects) for an identified population or mixed social interventions which reported loneliness as an outcome in some but not all included studies. The mixed intervention reviews included those interventions listed above plus psychological therapy, health and social care approaches, leisure/skill development and details of the targeting of interventions, their specific natures such as the context of delivery, the duration of the intervention, the frequency of activity and adherence to the interventions were sparse. Details of how interventions addressed issues of inequality and diversity and the longer-term impact of the intervention on loneliness were absent in the published literature.

The most common measure of loneliness in the studies included in reviews was the UCLA Loneliness Scale. This scale comes in a variety of form including the 60, 40,20, and 3 (range 3-9) or 4 item (range 4-12) versions. For each variation higher scores indicate increased loneliness. Results are usually presented as mean values. Thresholds for the categorisation of loneliness severity or creation of a dichotomised score vary between studies. For the 3 item measure, Steptoe et al (2013) used a score of 6+ to differentiate the lonely (18%) from non-lonely. The English Longitudinal Study of Ageing suggests that the mean score on the 4 item UCLA scale for the population aged 50+ is around 5. European data suggest a mean score for the 3 item scale for adults aged 18+ of around 3.5 (Rico-Uribe et al 2016). Another widely used scale is that developed by De Jong Gierveld. This comes in two versions consisting of 11 (range 0-11) or 6 item (range 0-6) versions. Each version can be calculated as the total score or sub-scores focused upon emotional and social loneliness. Data are reported as mean vales. For the 6-item measure a score of 2 is used to differentiate the lonely from non-lonely and the score may also be categorised into: not lonely (0-2), moderately lonely (3-4) and significantly lonely (5-6). For the 11-item version the thresholds are: not lonely (0-2), moderately lonely (3-8) and severely lonely (9+). In a Dutch population aged 55+ the mean score was 2.6 and 6% were severely lonely and 32% moderately lonely (Uysal-Bozkir etal, 2017). Self-rating questions ask participation to rate their level of loneliness. The variability in these types of questions relates to the reference period (i.e.

evaluating loneliness in the last week/month/year) and response categories (range from simple yes/no to scales with 3,5 or 7 options). Data from the Community Life Survey suggests that prevalence of loneliness, defined as being often/always lonely, ranges from 10% for those aged 16-24 to 3% for those aged 65+ (ONS 2018).

The heterogeneous nature of the interventions, settings (care home v community; individual v group based) and populations included in this overview of reviews presents a challenge in drawing conclusions for policy recommendations. By focussing upon controlled study designs we minimise issues of methodological diversity and exclude study designs where evidence of effectiveness is less clearly demonstrable. As a consequence of this decision there were no studies included which focused upon young or mid-life adults.

A summary of the characteristics of the included reviews is presented in Table 1 and the references section contains citation details. The list of excluded studies is included in Appendix 2.

Table 1 Overview of reviews on loneliness – Characteristics of included reviews

Title Authors (date)	Total studies included in our review Total no. of study participants	Population	Population characteristics	Intervention or programme	Comparison (quantitative only)	Outcome measures relevant to loneliness	Study Quality Tool Used	Overall review conclusions
Use of socially assistive robot (SAR) technology in elderly care. Abdi et al 2017	2 RCTs N=72	Older population (included studies of those aged 60+)	Older adults receiving care either at home or in a facility.	Group or individual interactions with socially assistive robots (SAR), including a seal like robot and 2 x dog like robots.	No intervention No interaction with robotic animal. Usual care.	- University of California Los Angeles Loneliness Scale (UCLA LS)	NR	.Positive effects on loneliness reported but significant methodological issues with studies noted. Suggested further research into the effects and potential use of socially assistive robotics with older people should be undertaken. Such studies should be of high quality
Loneliness in Old Age: Interventions to Curb Loneliness in Long-Term Care Facilities. Brimelow et al 2017	15 studies: Majority RCTs but study designs NR in full. N = 576	Older adult (ageing) population	Residents of long-term aged care facilities with no cognitive impairment and moderate cognitive impairment.	Gardening; Reminiscence therapy; Cognitive Enhancement Program; Videoconferencing with family members; Eden alternative; Small group computer training;	Six studies receiving usual care and four with comparative controls	- UCLA LS (20 items) - UCLA short version (5 items).	NR	Interventions largely showed success in reducing loneliness in long term care residents. noted there is a paucity of interventions including participants with cognitive impairment. A one-pronged approach to decrease loneliness may

				Companion bird (caged) placed in resident's room; Animal Assisted Therapy				not be effective. A number of strategies, appropriate to different demographics within LTCFs, may need to be simultaneously implemented to have the broadest impact on loneliness.
The Effect of Information Communication Technology Interventions on Reducing Social Isolation in the Elderly :A Systematic Review Chen & Schulz 2016	5RCTs N = 692	Adults age 55+	Living in nursing homes, assisted and independent living communities, and congregate	Information Communication Technology (ICT) Interventions. Mostly internet or web-based apps on computers (e.g., search, email, online chat rooms, videoconferencing, social networking apps, and Web-based telehealth systems); 1 telephone befriending intervention; 1 mobile phones (smartphones); 1 iPad use; 1 Nintendo Wii video game system; 1 visual pet companion - interact with a pet avatar	Control condition NR	- Self developed Social isolation scale with 3 items - UCLA LS - de Jong Gierveld & Kamphuis - nature & frequency of social networks - Social support behavior scale (Hsiung, 1999) -	Effective Public Health Practice Project (EPHPP) tool	ICT a promising tool for tackling loneliness social isolation for older adults but will not suit all seniors. Research identifying who among the elderly population can most benefit from ICT use and how the training and implementation of such intervention should be tailored to maximize its effect offers great value for clinical practice.

				through android tablet				
Interventions for Alleviating Loneliness Among Older Persons: A Critical Review Cohen-Mansfield & Perach 2015	15 RCTs N = 2592	Older adults (aged 55+)	Single women; Chronically ill; Healthy people; Chronic pain; Long-term care receivers; Physically handicapped; Cognitively able;	Computer training; Visits of occupational therapists; Mentorship; Supportive therapy via telephone; Chorale group with performances; Meetings focused on self-management abilities related to well-being; Friendship enrichment program; Physical activities, group discussions, and lectures; Art and inspiring activity, group exercise and discussions, and therapeutic writing and group therapy; Discussions of	Mixed, including normal care and no intervention.	- UCLA LS (versions: 10; 20; Taiwan 10; China 20; Israel 20) - PGCMS lonely dissatisfaction subscale - de Jong-Gierveld and Kamphuis's Questionnaire - Social activities from the RAND Social Health Battery; one item on social participation - Items from the OARS social resource rating scale; custom item on satisfaction with socialization - ''Do you feel yourself lonely?'', and 2 additional items - Participants self-report of the impact of the intervention on their loneliness - Self-report of social interactions	NR	A range of interventions showed promise but flawed designs prevent robust evaluation. Effectiveness of interventions types was inconsistent across studies. Better quality research needed and inclusion of specific groups such as those with cognitive impairment.

				reproductions of well-known artists' work; Videoconference interaction; Assisted Animal Therapy; Indoor gardening; Humor therapy; Cognitive enhancement program				
Social capital interventions targeting older people and their impact on health: a Systematic review Coll-Planas et al 2017	8 RCTs N = 1213	Older adults aged 60+ or where mean aged was 64	Older people feeling lonely; Women living alone and feeling lonely; Women with low income and low social support; Persons with good cognitive function; People with dementia and people with Mild Cognitive Impairment; Family carers of people with dementia; People who had moved to a new city.	Social capital interventions: Small neighbourhood groups among peers; Home befriending intervention; Social engagement in a unstructured conversation; Friendly staff telephone contact + peer support telephone dyads; Art and inspiring activities, group exercise and discussions, and therapeutic writing and group therapy; Paro, a seal robot, was incorporated into	Controls NR. Comparison groups do not contain social capital components so should only include normal care, or no intervention.	- UCLA LS (short version) - Loneliness (Stroebe et al., 1996) - 3-item Loneliness scale (Hughes et al, 2004). - 7-item loneliness scale (Paloutzian and Ellison) - De Jong Gierveld Loneliness Scale - AOKLS	Adapted the Cochrane risk of bias tool	Review highlights the lack of evidence and the diversity among trials, while supporting the potential of social capital interventions to reach comprehensive health effects in older adults. Trials were generally ineffective on loneliness. Loneliness effect statistically significant in favour of the intervention in 2 studies (Robinson, 2013 and Saito, 2012). The 6 other studies had non-significant findings.

				group activities; Various activities in a group-based program				
Interventions targeting social isolation in older people: A systematic review Dickens et al 2011	16 RCTS N = 2705	Older people the focus of the intervention	Included care-givers, disease-sufferers, hosing residents, residents in institutional settings, community-dwelling older people	Interventions targeting people identified as socially isolated and/or lonely. Included activity interventions (social or physical programmes); support interventions (discussion, counselling, therapy or education); home visiting; internet training; service provision intervention	No intervention; usual care; waiting list; attentional control groups; multiple comparators	A large range of measures used to measure loneliness, including: - revised Social Adjustment Scale (RSAS) - revised UCLA LS - De Jong Gierveld Loneliness Scale - Social Production Function Index Level Scale - Lubben's Social Network Scale - Duke Social Support Index - Many studies asked questions on no./frequency of social activities/friends/visits/calls/social support/isolation	Cochrane risk of bias tool (RCTs) and the Newcastle-Ottawa Scale	Identified a need for well-conducted studies to improve the evidence base regarding the effectiveness of social interventions for alleviating social isolation. However, it appeared that common characteristics of effective interventions may include having a theoretical basis and offering social activity and/or support within a group format. Interventions in which older people are active participants also appeared more likely to be effective.

Interventions to reduce social isolation and loneliness among older people: an integrative review Gardiner et al 2018	6 RCTs N= 1112	Older adultse	Participants in a wide range of interventions targeting isolation and loneliness.	Social facilitation interventions; psychological therapies; health and social care provision; animal interventions; befriending interventions; and leisure/skill development.	Usual activity	- UCLA LS - Lubben Social Network Scale, - - others included single item indicators of loneliness -	Evidence for Policy and Practice Information and Co-ordinating Centre (EPPI) guidelines	The majority of studies showed some success n reducing loneliness/social isolation but evidence was weak because of methodological quality. Need to develop theoretical understanding of successful interventions.
Companion Animals and Loneliness: A Systematic Review of Quantitative Studies Gilbey & Tani 2015	3 RCTs N=123	All ages		Animal assisted therapy (AAT), including caged bird, dogs, and robot dogs	No AAT	- UCLA LS	RCTs assessed using Jadad scores Other quality criteria decided by authors assessed (study design, power analysis, results and methodolog	No evidence of effectiveness and methodological quality of studies low. No benefit in further cross-sectional research and future research should focus on large RCTs g

								y)
Reducing loneliness amongst older people: a systematic search and narrative review Hagan et al 2014	9 controlled trials/RCTs N = 1182	Older adults	Age range 53-103 years, mainly female	Interventions wide ranging: Group based were social /friendship enrichment, day centre, social groups Individual; mentoring & befriending; New tech; animal therapy, wi games, webcam/video conferencing with family/friends : 6 looking at new technology; 3 1 to 1 interventions and 8 group	NR	- UCLA - De Jong Gierveld - Not explicit (Internally developed social support scale) - Not explicit (Social Provisions Scale) -	NR	4 interventions report reductions in loneliness:- videoconferencing, robot/real dog; wii games and a group mindfulness stress reduction programme. Evidence for effect weak as all these are under powered and future research needed that could produce definitive results
Interventions targeting loneliness and social isolation among the older people:	3 RCTs N =196	Older people	Older adults, mainly female participants	1 social support interventions; 1 companion robot intervention; 1 telephone befriending	No intervention; usual daily activities; other activities.	- Oslo-3 Social support scale (OSS-3) - AOKLS - Indicators of social support, network and activity - De Jong Gierveld Loneliness	Effective Public Health Practice Project (EPHPP) tool	This review was inconclusive. Some interventions, new technology and community arts, have brought promising

An update systematic review Poscia et al 2018						Scale - UCLA Loneliness scale -	for quantitative studies.	results, even though their generalizability is questionable because of methodological issues.
Physical activity interventions for treatment of social isolation, loneliness or low social support in older adults: A systematic review and meta-analysis of randomised controlled trials Shvedko et al 2018	38 RCTs N= 5,288	Community-dwelling older adults ≥60 years of age.	Mean age ranged from 51-82. Females: 67% Mix of healthy and unhealthy populations (excluded dementia) Setting: 37 independently living residents, 1 assisted living village	Physical activity, including aerobic exercise, resistance exercise training, and mixed. 19 studies also included an additional social interaction component.	Usual care, sedentary conditions, health education, social visits, recreational or educational activity, sleep hygiene	Loneliness: - UCLA LS - De Jong Gierveld loneliness scale - 1-item question: "Do you feel lonely?" Social isolation/support: - Turkish version of the Nottingham Health Profile questionnaire - revised social support questionnaire - Multidimensional Scale of Perceived Social Support - short version of the Medical Outcomes Study (MOS) Social Support Survey - Chinese version of the Inventory of Social Supportive Behaviours - 6-item Lubben's Social Network Scale	12 criteria Cochrane Review Book risk of bias	This review shows, for social functioning, the specific aspects of PA interventions can successfully influence social health. PA did not appear to be effective for loneliness, social support and social networks.

Effectiveness of befriending interventions: a systematic review and meta-analysis Siette et al 2017	5 RCTs N=1,035	Adults of all ages	Carers in dementia; isolated elderly women with low support; socially isolated elderly individuals; individuals with severe mental illness; older adults receiving end-of-life care services	Befriending interventions. Included face to face in home or community, telephone, group telephone support	Usual care or no treatment	- De Jong Gierveld Loneliness Scale - Social and Emotional Loneliness Scale for Adults - 2 used own scale	Cochrane Collaboration Risk of Bias tool	There was moderate quality evidence to support the use of befriending for the treatment of individuals with different physical and mental health conditions. This evidence refers to an overall improvement benefit in patient-reported primary outcomes, although with a rather small effect size. There were no significant effects o single outcome measures (eg loneliness) The current evidence base does not allow for firm conclusions on more specific outcomes. Future trials should hypothesise a model for the precise effects of befriending and use specified inclusion and outcome criteria.

Reablement, Reactivation, Rehabilitation and Restorative Interventions With Older Adults in Receipt of Home Care: A Systematic Review.

Sims-Gould et al 2017 | 1 RCT

N = 88 | Older aged 65+ or where mean age of sample was 65+ | older adults in receipt of home care services. Average age 82 years Female: 75.3% Male: 24.7% | Reablement, reactivation, rehabilitation, and restorative(4R) interventions in the home | No lifestyle programme control group | - De Jong and Kamphuis Loneliness Scale | Cochrane Collaboration's Risk of Bias | . 4r interventions showed promise in terms of costs and clinical outcomes but not for individual outcomes including self-assessed wellbeing, quality of life, loneliness, depression, mood, pain, and social support. Generalisability problematic because of lack of details of interventions and staff training., |
| Effect of animal-assisted therapy on the psychological an d functional status of elderly populations and patients with psychiatric | 2 RCTs

N= 78 | Older populations and those with medical or psychological conditions | Institutionalised and non-institutionalised | Animal-assisted therapy. Animals included dog, robotic dog, and bird | Control conditions NR | - UCLA LS | 100-point scale using an adapted version of the criteria developed by Downs and Black (1998) for randomised and non-randomised studies of | Evidence inconclusive because of limited quality-future research should focus on large RCTs to provide precise estimates of effect. |

						heath care interventions. Range: 0 (lowest quality) – 100 (highest quality)	
disorders: a meta-analysis Virués-Ortega et al 2012							

Note: this table reports only on the studies within the reviews relevant to loneliness

NR = Not reported

Characteristics of the unpublished studies (grey literature)

Fourteen evaluation reports were included in the unpublished grey literature on loneliness. A detailed summary of the characteristics of the grey literature is presented in Appendix 4 and the references section contains citation details. We synthesise the data together with the findings for the published literature in terms of population, intervention type and outcome measure.

The evidence included evaluation of programmes to alleviate loneliness conducted nationally and regionally across England and one project reported on loneliness projects in Wales. Programmes and projects were delivered by established organisations working with older populations including Home Share, Age UK and local authorities delivering 'Ageing Well' and other 'Wellbeing Services'. As with the published data there was a lack of conceptual clarity regarding loneliness. The terms loneliness and social isolation were commonly used synonymously in the grey literature. This poses challenges for making policy recommendations from a review that is specifically focussed on loneliness.

All programmes evaluated aimed to decrease social isolation and/or loneliness in older age populations predominantly those aged 55+ years and mostly in community settings. There was no evidence on loneliness interventions for those at other stages of the adult lifecycle or on children. Some programmes considered diversity in addressing loneliness by targeting older people from specific communities or population groups including BAME (black and minority ethnic), women or men, LGBT (lesbian, gay, bisexual and transgendered), those with learning difficulties and people living with dementia. A range of research strategies were used and most employed mixed methods including surveys or questionnaires and interviews, focus groups and reviews of policy documents. Loneliness was measured using established tools such as the UCLA Loneliness Scale, the De Jong Gierveld Scale, or the Conor Davidson Resilience Scale. However the degree to which the application of these measures matched standard scoring and analysis protocols varied. Peoples' personal experience of loneliness was evaluated using interviews and focus groups.

As with the published literature, the grey evidence encompasses a wide range of programmes and an extensive and diverse set of activities aiming to alleviate loneliness. These included: welfare benefit or other advice and signposting; transport support; social engagement; community and practical support; signposting; volunteering; counselling; one-on-one and group befriending; mentoring; arts and crafts; music; walking; making food; singing, dancing; storytelling; hosting visiting speakers; meeting to have a drink and a chat; events and

trips (e.g. restaurants, pubs, stately homes, the seaside); healthy eating sessions; practical skills groups; gardening; social events and activities (including social history, storytelling sessions, film screenings); shared meals; undefined 'wellbeing activities'; Home sharing; singing; Men in Sheds; social prescribing and inter-generational projects. The most commonly reported loneliness programme in the grey literature was befriending which was reported in 25 projects. Advice and signposting services were also commonly used in programmes to alleviate loneliness in older population groups.

Overview of quality of included studies

The AMSTAR quality assessment scores for the published reviews which reported findings from controlled study designs ranged from 2 (Brimelow et al. 2017) to 10 (Shvedko et al. 2017) out of a maximum of 11 (median 6;8 papers scored 5 or less). Based on the AMSTAR grading the reviews included were of modest quality. Most common areas where reviews failed to achieve a positive judgement on the AMSTAR scale were the presentation of a list of excluded studies, the inclusion of grey literature, the lack of quality grading of included papers, the consideration of the risk of publication bias and the reporting of conflicts of interest, particularly those relating to the authors of the included trials. The opportunity to use online supplements means that most of these attributes could have been reported online even if they were not in the main paper. The full results for the AMSTAR quality assessment of our 14 reviews are presented in Table 2.

Using the PHE Arts for Health and Wellbeing Evaluation Framework the quality of the evaluations was judged as 'good' (as opposed to poor). Thirteen (13/14) evaluations provided detailed reporting of the programmes/interventions, theoretical and methodological detail and included some theoretical interpretation of the findings. These reports recognised the limitations of the methods used and of the programme delivery. They employed appropriate data-collection techniques by measuring outcomes using relevant techniques and evaluating experiences through established qualitative approaches. Uniquely, one Age UK project included a cost analysis (Brown, et al., 2018) of the interventions provided. The average cost per person who took part in the 'Community Webs' intervention in Bristol was £357.57. Participants were supported for an average of 8 hours, resulting in an hourly cost to the service of £44.70 per person. A cost-effectiveness analysis was not conducted. One project provided poor detail, limited data, and claims to methods for which there was not adequate evidence.

Table 2 AMSTAR quality assessment for included reviews

Review	1. 'a priori' design provided?	2. duplicate study selection and data	3. comprehensive literature	4. grey literature and all languages included?	5. list of studies (included and excluded)?	6. characteristics of the included studies	7. scientific quality of the included studies assessed and	8. scientific quality used appropriately in formulating conclusions?	9. appropriate methods used to combine the findings?	10. likelihood of publication bias assessed?	11. conflict of interest stated for review and	Total score/11
Abdi et al 2017	Y	N	Y	N	N	Y	N	Y	N	N	N	4
Brimelow et al 2017	CA	CA	Y	N	N	Y	N	N	N	N	N	2
Chen & Schulz 2016	CA	Y	Y	N	N	Y	Y	CA	Y	N	N	6
Cohen-Mansfield & Perach 2013	CA	N	Y	N	N	Y	N	N	NA	N	N	3
Coll-Planas et al 2017	Y	Y	Y	N	N	Y	Y	Y	Y	Y	N	8
Dickens et al 2011	CA	Y	Y	N	N	Y	Y	Y	NA	Y	N	6
Gardiner et al 2018	CA	N	Y	CA	N	Y	N	Y	N	N	N	4
Gilbey & Tani 2015	CA	N	Y	CA	N	Y	N	Y	N	N	N	3
Hagan et al 2014	CA	N	Y	CA	N	Y	N	Y	N	N	N	3
Poscia et al 2018	CA	CA	Y	N	N	Y	Y	Y	N	Y	N	5
Shvedko et al 2018	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	10

Siette et al 2017	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	9
Sims-Gould et al 2017	Y	Y	Y	N	N	Y	Y	Y	NA	N	N	7
Virués-Ortega et al 2012	CA	Y	Y	N	Y	Y	Y	Y	Y	Y	N	8

KEY: Yes = Y, no =N, can't answer = CA, not applicable = NA

Findings of included reviews

In presenting our results we synthesise the findings from the published and grey literature and differentiate between reviews/studies based in care home or residential accommodation and community settings. A further distinction is drawn between reviews that include a broad range of activities aimed at reducing loneliness, those that are specific in nature such as befriending or physical activity. We are unable to address issues of costs and costs (and cost-effectiveness) of interventions of all types across different populations and setting because of the lack of evidence.

Mixed loneliness interventions for older people in care homes or residential accommodation

Six reviews included RCTs investigating the effectiveness of a mixed portfolio of loneliness interventions for older people resident in care homes or residential accommodation or other communal living arrangements such as assisted living facilities (Abdi et al., 2017; Brimelow et al., 2017; Cohen-Mansfield et al 2015; Coll-Planas et al., 2017; Dickens et al., 2011).

Abdi et al. (2017) examined the effectiveness of socially assistive robot technology in care settings for older people reviewing 33 studies and had an AMSTAR rating of 4. The review included two RCTs which were individually based (Banks et al, 2008;Robinson et al, 2013), with a total of 72 participants in a care home in the USA (n=38) and retirement home in New Zealand (n=34). Both these reviews looked at socially assistive technology focused on robot animals including dogs and a seal. The study by Banks et al (2008) involved 30 minutes a week with a robot dog or real dog for 8 weeks. Robinson et al (2008) compared 2 one-hour sessions per week with a robot seal with Paro (a robot seal) or comparable activities with The review concluded that interactions with socially assistive technology led to decreases in loneliness at the end of the intervention as measured by the UCLA scale. The UCLA scale for the intervention group in the study by Banks et al (2008) decreased by 6 points and 9 points in the study by Robinson et al (2008) (scores for control groups increased by 5.7 and 3.8 respectively). Absolute scores are not provided. For the Banks et al (2008) study it is commented that the loneliest in the control group became lonelier over the course of the project. Data are not reported for either study and there did not appear to be any longer-term follow-up to see improvements/differences were maintained in either study.

Brimelow et al.(2017) investigated interventions to reduce loneliness for older people in long term care with/without moderate cognitive impairment. The AMSTAR rating was 2. The review included 13 studies of which nine could be considered as RCTs. Details of study design included in this review are very limited and it is no clear if all studies used random allocation to intervention and control groups. The study included 576 residents of whom 411 (71%) had no or mild cognitive impairment. There was no assessment of study quality or risk of bias and descriptions of effectiveness are narrative. No empirical outcome data are presented.

Four studies focused on animal-based interventions, of which the studies by Robinson et al (2013) and Banks et al (2008) were reported earlier. The 2002 study by Banks and Banks involved 45 older people without cognitive impairment and involved 1 weekly or 3 times a week 30 minutes session with a dog for 6 weeks. It is reported that there was a significant reduction in UCLA loneliness scores of approximately 10 points (>25%). However, no supporting data are provided in terms of actual scores. Jessen et al. (1996) in the United states evaluated the impact of caged birds placed in resident's room for ten days. Care of the bird was provided by staff without interaction with the resident. The mean age of participants was 76 (range 65–91) and the sample size was 40 (20 in both intervention and control groups) and there was no difference in loneliness, as measured by the UCLA scale, between groups.

Two studies in this review looked at indoor gardening and very limited details are provided about these activities. Brown et al. (2004) in the United States compared indoor gardening for five weeks with 20-minute garden visits with a total of 66 residents equally divided between intervention (mean age of 81 - range 64–96) and control (mean age 83 (range 60–93). Tse (2010) evaluated an eight-week indoor gardening program in four care homes in Hong Kong. The 53 residents had no to moderate cognitive impairment and were in their mid-80s (Intervention group: n = 26, age 85.23 ± 5.20. Control group: n = 27, age 83.00 ± 7.85). Both studies narratively reported a decrease in loneliness at the end of the intervention but numerical data were not reported.

Two studies investigated digital interventions. Tsai et al. (2010) evaluated weekly five-minute video conferencing with family members for three months in 14 long- term care facilities in Taiwan. The study included 57 residents without severe cognitive impairment (intervention group: n = 24, age 74.42 ± 10.18. Control group: n = 33, age 78.48 ± 6.750). White et al. (2002) evaluated the impact of facilitating internet access by offering an initial nine hours of small group computer training conducted over two weeks with computers available for continued use by residents for five months and access to a trainer for two hours per week if necessary. The trial was in four

congregate (group) housing sites and two nursing facilities in the United States. The study involved 93 residents with sufficient cognitive capacity to participate (Intervention group: n = 48, age 71 ± 12 Control group: n = 45, age 72 ± 11). No change in loneliness scores was reported for the latter study but the video conference intervention reported decreased loneliness scores as measured at one week and three months post implementation (numerical data not reported).

The final three studies included in this review evaluated reminiscence therapy in Taipei (Chiang et al. 2010), a cognitive enhancement program in the United States (Winingham & Pike, 2007) and the implementation of the Eden Alternative Intervention in the United States (Bergman-Evans, 2004). The reminiscence intervention was a weekly 90-minute group session for eight weeks with a waiting list control. No further details of the intervention are provided. 92 male residents without cognitive impairment took part (intervention group: n = 45, age 77.42 ± 3.71. Control group: n = 47, age 77.06 ± 4.23). Winingham & Pike (2007) conducted an evaluation of a Cognitive Enhancement Program consisting of three times a week session for three months in six assisted living facilities in the United States. The sample consisted of 58 residents, 29 each in intervention and control groups, with and without cognitive impairment, age 82.11 ± 9.62 (range 61–98). No effect on loneliness was reported for the cognitive enhancement programme. Improvements in loneliness scores, as measured by the UCLA scale, were reported at intervention completion and three-month follow-up for the reminiscence therapy. However, numerical data are not provided. Bergman-Evans (2004) evaluated the implementation of the Eden Alternative Intervention, a form of person centred care, in a state veterans home and a private long-term care facility in the Mid-West of the United states. Thirty four participants without cognitive impairment took part: control group n=13, mean age 85.7 and 21 in the intervention group with a mean age of 85.7 years. Loneliness was measured at baseline and one year follow and did not decline following implantation of the project (details of loneliness measure or levels of loneliness not reported).

Cohen-Mansfield and Perach (2015) included thirty-four studies (fourteen identified as RCTs which reported a loneliness outcome of which three were in care homes) and had an AMSTAR rating of 3. They devised a bespoke system of evaluating intervention effectiveness as follows: (a) effective (statistically significant outcomes of reduced loneliness or loneliness-related outcomes; (b) potentially effective (studies with a nonsignificant improvement in loneliness or loneliness-related outcomes, and an intervention group size smaller than 100); (c) ineffective (significant changes in loneliness and had a sound design) and (d) inconclusive (studies with an unsound design and limited interpretability). They did not undertake a formal evaluation of study

quality and empirical data are not provided in this review in the effectiveness summary for included studies.

This review provides no further details about the studies by Banks and Banks (2002) and Tsai et al (2010) which have been discussed previously. They are assessed as effective by the review authors because statistically significant reductions in loneliness are attributed to these interventions (numerical data not provided in the review) using the UCLA 20 and 10 item scales respectively. Tse et al (2010) studied 70 nursing home residents with chronic pain aged 60–92 and evaluated a humour therapy intervention using the UCLA 20 item scale. The review authors report that significant decreases in perceived loneliness were found in the intervention participants but not in controls from baseline to post intervention. Humour therapy was judged as an effective intervention. No details of the intervention are provided other than it consisted of 8 x 1-hour sessions.

Coll-Planas et al (2017) reported on 8 RCT intervention studies and had an AMSTAR grade of 8. This review focused on the health impact of social capital interventions targeted at older adults and included one RCT in a nursing home with a loneliness outcome. This is the study by Robinson et al 2013) also reported in the Abdi review but provides additional details of the study population and intervention. The study included participants with age range of 55-100 years. Women formed two thirds of participants (67.5%) and. 48%, had cognitive impairment. Paro, a seal robot, was incorporated into group activities. During those sessions, discussion groups were held, and all residents had the opportunity to interact with the robot. The intervention consisted of two week-day afternoons for 12 weeks. Loneliness as measured by the UCLA scale (3-item version) is described by the review authors as decreased at the end of the intervention (numerical data not reported). The reviewers assessed this study as at high risk of bias.

Dickens et al (2011) aimed to assess the effectiveness of interventions in alleviating both social isolation and loneliness. The review included 16 RCTs and had an AMSTAR grade of 6. Of the 16 RCTs, one study was based in a care home/group living setting in the United States and evaluated internet access (White et al, 2002). No additional details of this study are provided to add to those discussed in the Brimelow review other than confirmation that the loneliness measure was a modified form of revised UCLA Loneliness scale for use with older adults. Dickens et al (2010) assessed this study as having a moderate risk of bias.

Gardiner et al. (2018) sought to conduct an integrative review which would demonstrate the range and scope of interventions that target social isolation and loneliness amongst older people, gain insight into why interventions are

successful and to determine the effectiveness of those interventions. 39 studies were included and two were RCTs in nursing homes settings with a total sample of 75. The AMSTAR grade for this review was 4. Both studies were from the USA and the one by Banks et al (2008) reported in the Abdi review. Gardiner et al (2018) provide additional details of the group sizes: living dog (n=13), robotic dog (n=12) against control (n=13). Visits were 30 minutes weekly for eight weeks. Gardiner et al (2018) report that there are significant reductions in loneliness for both intervention groups at the end of the intervention as measured by the UCLA scale but empirical data was not reported. This study was graded 8 (out of 9 on their quality score). This review provides some additional details about the earlier trial by Banks and Banks (2002). They randomised 37 residents of three long-term care facilities aged 75-90 to receiving animal assisted therapy (AAT) one to one, or in a group setting with two to four participants. The UCLA scale was used, and it is reported that 'the loneliest individuals benefited most'. Assessments of outcome were not blinded and empirical data underpinning the observation of effectiveness are not reported.

Hagen et al., (2014) aimed to identify studies that report on the effectiveness of interventions to reduce loneliness or social isolation and to make recommendations as to the choice of interventions for practice. The AMSTAR rating for this review was 3. The review authors do not report on study quality and empirical results in terms of loneliness scores are not reported. Studies are presented by type of intervention; new technology, community-based and individual interventions. One US care home-based intervention was the evaluation by Winingham and Pike (2008) of a group based cognitive enhancement scheme design to enhance brain function and social networks already reported. The sample size was 58 with an age range 61–98 (mean= 82.11). Hagen et al (2014) conclude there was little change in loneliness for group participants and comment that those in the control group reported much higher loneliness at the study's conclusion.

Poscia et al., (2018) aimed to summarize and update current knowledge on the effectiveness of existing interventions for the alleviation of loneliness and social isolation among older persons. The AMSTAR grade for this review is 5. They include 3 controlled studies - one is the evaluation of the Paro robot seal noted earlier (Robinson et al, 2013) - and supply no further study details to complement those already noted.

No grey literature was received/included that focused exclusively upon those living in care settings

Mixed loneliness interventions for older people in community dwellings

Six reviews investigated a wide range of interventions to alleviate loneliness for older people living in community settings (Cohen-Mansfield and Perach, 2015; Coll-Planas, 2017; Dickens et al., 2011; Gardiner et al., 2018; Poscia et al., 2018; Sims-Gould et al., 2017). Nine unpublished grey literature reports included evaluations of mixed loneliness interventions for older people living in community contexts (Age UK/Vina Karania, 2017; Brown et al. / Age UK Bristol, 2018; Care Connect, Andrea Wigfield and Sarah Alden, 2017; Care Connect 2017b, 2017c, 2017d; Hotham, 2018; Ageing Well Torbay, 2017; Leicester Ageing Together, 2017).

Cohen-Mansfield and Perach (2015) included eleven RCTs with 2368 participants of which one intervention was rated as effective by the review authors for significantly reducing loneliness. There is only one study in this category. This is the Care Receiver Efficacy Intervention (CREI) (Cox et al, 2007) program which teaches care receivers how to optimise their relationships with their caregivers and the treatment they receive. The study had 177 cognitively able care receivers, aged 51–96 (I=i=120 c=57). Loneliness was assessed using the PGCMS lonely dis-satisfaction subscale and is significantly lower in intervention group.

Seven studies were assessed as potentially effective. This means they showed a non-significant improvement in loneliness or loneliness-related outcomes, and an intervention group size smaller than 100. The interventions included in this category differed in their type and mode of delivery (group v individual). This classification included three studies from Finland. Ollonqvist et al. (2008) evaluated a new model of rehabilitation for frail adults aged 65+ recruited from rehabilitation centers. This combined group-based activities (e.g. physical activities, group discussions, and lectures on topics such as older persons' life situation and possible problems, self-care promotion, and social services) as well as individual counseling. The study included 708 participants (intervention (n=343) and control (n=365). Loneliness was measured by 3 items including a self-rating scale:-''Do you feel yourself lonely?''. At 12 months follow-up, intervention participants showed a nonsignificant decrease in feelings of loneliness, lasting two to three months postintervention, while controls showed a nonsignificant increase in loneliness. Routasalo et al. (2008) reports Finnish data evaluating the effectiveness of three different psycho-social activities art and inspiring activity, group exercise and discussions, and therapeutic writing and group therapy) on loneliness as measured by the UCLA-LS (20). The trial included

235 persons aged 75. There were no significant differences in loneliness at three, six and 12-month follow-ups. Savikko et al.(2010) reports the results of a psycho-social group-based intervention targeted specifically at lonely people aged 75+ living at home. Outcome was measured using a self-reported loneliness question with most participants reporting decreased levels of loneliness at postintervention and at three-month follow-up.

Of the other four potentially effective three came from the United States. Morrow-Howell et al (1998) evaluated a telephone crisis program, including a multidimensional assessment, tailored service arrangement, and supportive therapy including building communication skills in the United States. Participants were aged 61-92 and the sample size was 61. The analysis only compares the groups at four months rather than preintervention compared with postintervention for each group. Rook and Sorkin (2003) evaluated a foster grandparent programme in the United states with 180 persons aged 60–92. The programme brings older adults into daily contact with other participating peers, each helping to care for a developmentally disabled person assigned to them. It is reported by the review authors that peer ties increased but there no effect upon loneliness as measured by UCLA scale. Cohen et al. (2006) reported a study of chorale participation for 166 health adults aged 65+ in Washington Dc 9I=90; C=76). No details of the intervention are provided other than the choir was professionally conducted and gave several public performances. Loneliness was measured using the 20 item UCLA scale and at baseline loneliness was higher in the control group and at 1 year follow up both groups reported a decrease in loneliness which was greater in the intervention group. No empirical data are reported. Kremers et al. (2006) evaluated a self-management programme for 142 single women aged 55 in The Netherlands. Groups were of eight –12 participants. Loneliness, as measured by the DJG scale was high for both groups and reduced for both groups at six months follow up.

Three studies were classified as ineffective all of which were individual interventions. Bickmore et al (2005) evaluated the provision of computers to 21 individuals aged 63-85 years (n = 10 I and n= 11 C) in the USA and Slegers et al (2008) 236 individuals aged 64-75 (I=62, control=45,) in the Netherlands. Neither study demonstrated any impact on loneliness. De Craen et al (2006) evaluated the effect of visits of unsolicited occupational therapists who offered training and education on assistive devices to 402 participants (I=202 C=20) aged 85 and above with good cognitive function in The Netherlands.

The review by Coll-Planas et al (2017) was focused upon evaluating the health impact of social capital interventions for older people.. As such loneliness was predominantly a secondary outcome in the eight RCTs where

it was reported.. The AMSTAR rating was 8. Six community based interventions were evaluated by the review authors as ineffective in terms of the impact upon loneliness. These were the intervention specific to women in Sweden (Andersson, 1985); a psycho-social group intervention for lonely older people in Finland (Routasalo et al, 2008) and befriending/friendship enrichment in the UK and United States (Charlesworth, 2008;. Dodge, 2014; Heller, 1991; Hind, 2014). It is not clear how effectiveness was defined. The one intervention judged effective was the study by Saito et al (2012) but there are no details about this study in the review paper but it was judged as being at high risk of bias. No details are provided about the interventions.

Dickens et al (2011) included seven community based RCTS reporting results for participants reporting loneliness as an outcome. The AMSTAR rating was 6. All these studies were assessed as being at moderate or high risk of bias. Two RCTs reported statistically significant reductions in loneliness as measured by UCLA scale and DJG scales respectively at the completion of the intervention. The self-management group for single women in the Netherlands which meet for 2.5 hours for 6 weeks (n=142; mean ages 62.8 (i) and 65.2 (c) (Kremers et al 2006). Fukui et al (2003) evaluated a weekly 90-minute educational support group over six weeks for women with breast cancer from Japan (n=50; 25 I and 25C: mean age 53.5 overall 52.6 (i) 54.3 (c) =53) and These were both assessed as being at moderate and high risk of bias respectively.

The studies with a loneliness outcome where the review cites no evidence to support an effect on loneliness include two from Finland of   frailty management (Ollonqvist et al, 2008, Finland) and psycho-social activities (Routasalo et al, 2008) described extensively in the review by Cohen-Mansfield. Also included in this group were the twice weekly discussion groups for 12 weeks for adults with handicaps set in a day care centre (Lokk, 1990, Sweden n=65; i=33 and c=3210 2-hour discussion groups over 13 weeks for . patients with chronic rheumatic disorder (Savelkoul & de Witte (2004), Netherlands, n=168 overall (i = 56, c1= 56, c2 = 56. Two individual interventions were also assessed as showing no evidence of effect. These were provision of a PC and 3 x 4 hour training sessions and use of a PC for 12 months (Slegers et al, 2008, Netherlands) and an individual telephone support service, but few details of the intervention are provided (Heller et al, 1991, USA) and internet support.

Gardiner et al (2018) included studies which targeted social isolation and/or loneliness in older people. The AMSTAR rating was 4. 39 studies were included of which three were RCTs reporting loneliness outcomes for psychological interventions in community settings (n=326 for those aged 55+) which the authors judge to be effective. Study quality was assessed by a

39

customised measure (range 0-9). . One of these studies was the psycho-social group based interventions undertaken by Routasalo et al (2008) which the reviewers graded as 9 (the maximum-best-score) and which has been described elsewhere. The study by Saito et al (2012) consisted of an eight week group based educational, cognitive and social support program to improve community knowledge, improve networking for older peopled (aged 65+) who had moved to Tokyo. Sessions were for two hours every two weeks with 20 participants in the intervention group and 40 in the control group. The other study the review authors report as effective at reducing loneliness was a mindfulness intervention in a volunteer sample of 29 healthy adults recruited via newspaper advertisements in (Cresswell et al 2012). This intervention was eight weeks long with weekly two-hour mindfulness sessions, 30 minutes daily practice and a one-day retreat. Both these studies were graded as 9 by the reviewers.

Hagen et al., (2014) aimed to identify studies that report on the effectiveness of interventions to reduce loneliness or social isolation and to make recommendations as to the choice of interventions for practice. The AMSTAR rating for this review was three. The review included 17 studies of which 9 were trials, six focussed on loneliness and all used the UCLA scale. The review authors do not report study quality evaluations. Studies are presented by type of intervention; new technology; community-based and individual interventions. There were four RCTs for community-based interventions including 695 participants. Interventions included social engagement (Kremers et al 2006; mean age of participants was 64 and psycho-social (Routasalo et al 2008: mean age 80). Studies used either the DJG scale and the rest the UCLA scale in various forms and no additional details of the interventions are provided. The study reports additional details for the mindfulness study by Cresswell et al 2012. This reported a significant difference in loneliness at the end of the trial using the UCLA 20 item score. This ranges from 0-60 with higher scores indicative of increased loneliness. At the end of the trial the intervention group mean reduced from 42.35 to 37.40, compared with the control group's increase from 38.40 to 40.75; p = 0.008). This review identifies one further study not noted previously. This is a 12-week programme focussed on friendship enrichment for women only (mean age 63) undertaken by Martina and Stevens (2006. Participants were significantly more likely to develop new friendships (65%) in comparison with the control group (33%) but there were no significant differences in loneliness found between group attendees and the control group (p ¼ 0.51).

Poscia et al. (2018) aimed to summarize and update current knowledge on the effectiveness of existing interventions for the alleviation of loneliness and social isolation among older persons. The AMSTAR grade for this review is 5. They report on one RCT among the 15 studies included in their review which

report a loneliness outcome for a community study. This is the education intervention for older adults moving to Tokyo (Saito et al 2012) noted in earlier reviews. This review identified the outcome measure used as the Ando-Osada-Kodama - AOK loneliness scale but numerical data are not reported.

Sims-Gold et al., (2017) bring together 15 RCTs aiming to systematically review the impact of 'reablement, reactivation, rehabilitation, and restorative' (4R) programmes for older adults receiving home care services. This review has an AMSTAR grade of 7. One 6-month trial of care co-ordination by specialist care of older people nurses includes the DJG loneliness measure as a secondary outcome and was based in The Netherlands (Melis et al, 2008). The intervention group consisted of 88 individuals with a mean age of 82 and 75% were female. No effect on loneliness as measured by the DJG scale is reported and no empirical loneliness data are reported.

There are a series of unpublished studies reporting the effectiveness of a portfolio of loneliness focussed interventions for older people in community settings. Age UK/Vina Karania, (2017) examined different community approaches to identifying and reaching older people who were lonely, understanding their needs through a person-centred conversation, and providing tailored support to the older people. The evaluation was by a before-after design for participants. Support was provided to 1021 participants, baseline data from 648 and follow up data for 530. Most participants were female and average age of around 80 years, with most aged 71 – 95. The UCLA 3-item loneliness scale, which ranges from 3-9, was used to measure loneliness at baseline and between 6-12 weeks into the project and after their initial guided conversation. At *initial guided conversation* almost half (46%) were hardly lonely at the time of the, around one-third (37%) lonely some of the time and nearly one-fifth (17%) lonely often. It is unclear how these categories were generated. Interventions included welfare benefit advice; other advice; transport; social engagement; condition support; practical support; signposting; volunteering; social physical; counselling; befriending. 48% of participants reported a reduction in their loneliness scores, with an average (median) reduction of two points. The reported findings showed that social engagement had the most impact for those who were often lonely whilst for those who were lonely some of the time or hardly lonely welfare benefit advice had the biggest impact. Advice in general and transport also featured as support that had an impact for older people in terms of loneliness reduction.

Brown et al. / Age UK Bristol (2018) evaluated the role of a person-centred supported referral/signposting services to reduce GP visits for non-medical issues. Measures included the De Jong Gierveld Loneliness Scale (range 0-6) and the 3 item UCLA Loneliness Scale (range 3-9) and the assessment points were at the start of project contact, once input had ended (exit) and at follow-

up three months post intervention. 318 patients were referred to the project and 239 actually supported. Evaluation data were collected from 129 completed baseline and 93 completed exit measures.

There was a reported statistically significant decrease in De Jong Gierveld 6-Item Loneliness Scale from baseline (M=4.67, SD=1.62) to exit (M=3.99, SD=1.79), t (69) = 1.42, p= < 0.000. The mean 3 item UCLA Loneliness Scale scores decreased from 8.83 to 7.98 which was statistically significant decrease from baseline (M=8.83, SD=2.33) to exit (M=7.98, SD=2.15), t (5.23) = 0.85, p= < 0.000. These scores are, however, very high as the maximum for the 3-item version is 9 but may reflect success in targeting interventions at the loneliest. The impact of Community Webs seems to be sustained into the medium term. Follow up questionnaires (n=41) completed at three months post-exit showed continued improvement for measures of loneliness and mental wellbeing but these data are not reported.

Care Connect, Andrea Wigfield and Sarah Alden (2017) completed an unpublished report to evaluate a variety of interventions to reduce social isolation and loneliness amongst older people in Leeds (UK). Loneliness was measured using the revised three-item UCLA loneliness scale and the De Jong Gierveld Loneliness Scale. A significant positive change was found between loneliness at follow up compared to baseline. The proportion of respondents assessed as sometimes feeling lonely, defined as a score of 1.5 on the scale fell from 35.2% to 28.7%. Similarly, the follow up sample were slightly less likely to be assessed as lonely often (13.1% compared to 16.4% at baseline). For the De Jong scale, aside from people who live with someone else, no difference was found.

Three additional unpublished reports from Care Connect evaluations were conducted in 2017 to investigate the impact of mixed community interventions to alleviate loneliness in older LGBT populations (2017b), vulnerable older people (2017c) and on older people broadly (2017d). A mix of methods were used including before and after questionnaires, review of documents and qualitative methods (focus groups and interviews). Across these projects, a range of interventions were reported to impact positively by reducing loneliness. The findings in all reports suggest that offering targeted programmes is a useful way of giving people the confidence to try something by offering a safe, comfortable space, but perhaps can also act as a springboard to get people socializing in different settings, which, of course, will contribute to sustainability at the individual level.

Hotham's (2018) unpublished report on the impact of a range of wellbeing interventions for older people in Thanet included 1064

participants who were mostly female (n=820, 77.1%). Ages ranged from 50-95 years, with an average of 65.8 years.92.9% (n=975) of participants identify themselves as 'white British. Just over half of participants report they have a disability- 54.5% (n=562). The evaluation measured loneliness by the De Jong Gierveld 6-item loneliness scale and they state that, social Isolation is measured by the UCLA 3-item loneliness scale which is unconventional The report also included self- reported current level of social activity and current level of contact with friends and family. Overall a statistically significant improvement was observed between loneliness at the start of the wellbeing activities compared to the end. Breaking down the result by loneliness sub-group, participants classified at baseline as 'moderately lonely' reported a statistically significant reduction in loneliness from an average of 3.55 at baseline to 3.00 at follow-up. This pattern is replicated in those who were categorised as 'intensely lonely', with levels of loneliness decreasing from a baseline average of 5.56 to 4.74 at follow-up. However it isn't clear if these categories follow the typology suggested by the scale author. The largest proportion of participants -39.0% (n=168)-reported no change in levels of loneliness. A decrease in loneliness was noted by 35.7% (n=154) and an increase in 25.3% (n=109).

Whilst not reporting any empirical findings the Ageing Well Torbay (2017) evaluation examined the role of neighbourhood activities on loneliness reductions. Findings showed that loneliness was reduced through involvement in a variety of neighbourhood projects. Reconnecting people was considered to be the most visible change brought about by the project. Social groups and activities were identified as the primary successful mechanisms in assisting isolated older people in making new connections.

The unpublished report from Leicester Ageing Together (2017) examined a range of interventions and impact on loneliness including Singing for the Brain, Befriending & Mentoring, Men in Sheds, Social Prescribing and Inter-generational projects, among others. The report examined one-to-one and group interventions and used a baseline questionnaire when first enrolled on to a loneliness programme with a follow up completed 6 months later. One-to-one interventions did not show a significant effect on loneliness. Evidence of effectiveness for group interventions one loneliness is provided by significant changes in specific items in the DJG scale and for isolation by single items from the UCLA scale. This is an unconventional way of using these scales. For group interventions significant difference was seen on the loneliness scale

item c) There are many people I can trust completely, with this recording a 16% positive change (p=<.05). Item f) I often feel rejected showed a slight negative difference (9%). All other items showed a positive difference. All items relating to isolation showed a positive movement with item b) how often do you feel left out showing a 10% change which was significant (p=<.05). The difference of other items were between 4-7%.

Targeted loneliness interventions for older people in care homes or residential accommodation

Technology and IT interventions

Chen and Schulz (2016) explored the effects of ICT interventions on reducing social isolation for older people. The AMSTAR rating was 5. Their review included 25 studies of which 2 were RCTs based in nursing homes and nursing homes/assisted living facilities and included 157 participants. The two interventions were video-conferencing (Tsai et al 2010) and internet access (White et al., 2002) which they characterise as based on convenience samples. They report for the Tsai et al study (2010) that loneliness, as measured by the UCLA scale (version not specified) was lower in the intervention group at 1 week (β = -1.21, P = .002) & 3 months (β = -2.84, P = .003) with no effect reported for the White study. Using the effective Public Health Project Practice Tool both studies were evaluated as strong. The review authors concluded that evidence for the effectiveness of these computer-based interventions was inconclusive.

Animal interventions

Gilbey and Tani (2011) included studies investigating the effect of animal-assisted therapy (AAT) on loneliness among humans. The AMSTAR rating for this review was 6 and they identified 21 studies of which 3 RCTs were in care homes. These were the previously mentioned two studies of animal therapy by Banks et al (2008) and Banks and Banks (2002) and companion birds (Jessen et al., 1996). No additional details about these studies were provided by this review but they were all evaluated as low quality using the Jadad score.

Music

One unpublished study included a project on the role of music on loneliness for residents of nursing homes (RCM/Imperial, 2018). Measures of loneliness included the use of the Short Warwick Edinburgh Mental Wellbeing Scale and the Connor-Davidson Resilience Scale [CDRISC]. Qualitative data were collected via semi-structured interviews and focus groups. No sample size

was reported. 79.3% of participants identified that the project helped them to feel less lonely. There was also a significant increase in self-reported vitality (which has an established relationship with lower levels of loneliness and depression) for older adults in nursing homes taking part in 10-week music programmes, compared with a decrease in vitality among older adults in non-music groups.

Targeted loneliness interventions for older people in community settings

Technology and IT interventions

The review by Chen and Schulz (2016) reported outcomes from three community based RCTs evaluating the effectiveness of internet use at home with training (Cotton et al 2013 and Slegers et al 2008) and WII use (Kahlbaugh et al 2011) on ameliorating loneliness. The AMSTAR rating of the review was 5. Overall these studies included 445 participants. The mean age of intervention group participants was 82.8 and controls in the study by Cotton et al (2013). Two studies were not identified in previous reviews. Cotton evaluated an 8-week course of home based internet training (details of training not provided) with 205 participants (trial: 79, control: 126) with a mean age of 82.8. Kahlbaugh et al (2011) evaluated WII use1 hour/week for 10 weeks' with 36 participants aged on average 82 years. Slegers et al (2008) study of 222 individuals aged 65-74 years .All three studies used the UCLA scale with two reporting significant differences in loneliness between the intervention and control groups (Cotton et al 2013 and Kahlbaugh et al 2011). Two studies were graded strong by the reviewers (Slegers et al 2008 and Kahlbaugh et al 2011) and the other moderate (Cotton et al, 2013).The review authors concluded that evidence on the effect of the computer and Internet and of social networking sites on improving loneliness among older people living at home was inconclusive.

Physical Activity interventions

Schvedko et al (2018) reviewed studies on the effects of physical activity (PA) interventions on social isolation, loneliness or low social support in older adults. The AMSTAR rating of this review was 10. Of the 38 RCTs, three studies reported loneliness as an outcome for community-based interventions. For one study, Ollonqvist (2008), this review provided no further details of note to add to those provided in previous reviews. Two additional studies were identified by Mutrie (2012) (n=41: mean age 72;75% female) and Chan (2017) (n=46: mean age=77:76% female). Chan (2017) used the 11 item DJG scale (range 0-11) (intervention =3.4 and control 3.5) and Mutrie (2012) the 20 item UCLA scale (range 20-80 (I = 32.9 and c = 32.4)). None of these three studies showed any effect of PA on loneliness. The authors concluded that there was insufficient evidence of effectiveness.

Befriending interventions

Siette et al. (2018) examined the effectiveness of befriending programmes on reducing loneliness in older people. The AMSTAR rating of this review was 9. Of the 14 trials in the review five measured loneliness as an outcome. These studies included 1271 participants and covered a range of different populations: those receiving end of life care (Walshe et al., 2016: n=179); carers (Charlesworth et al., 2008; n=236); Heller et al., 1991 (isolated women: n=265); Mountain et al., 2014 (isolated elders: n=248) and Sheridan et al., 2015 (adults with severe mental illness: n=107).All studies were undertaken in England, with exception of that by Sheridan which was based in Ireland. No age data are reported. Outcome measures used were the DJG scale (Mountain and Walshe); custom designed measure (Charlesworth and Heller) and the social and emotional loneliness scale for adults (Sheridan). This latter study was rated as medium quality and all the others as high. No studies reported any effect of befriending on loneliness (empirical data on loneliness outcomes not reported in review).

This review does report details about the interventions. Of the 5 studies all but one (Heller) used volunteers. Training of varying lengths and intensities was reported for all studies and matching of befriender and befriended was reported. One study used telephone befriending (Mountain)with the others face to face in the recipient's home. The duration and intensity of support varied from an hour a week for 6 months (Charlesworth) and 12 months (Heller), 2 hours for 9 months (Sheriden) and 1-3 hours for 4 weeks (Walshe). The intensity of the phone befriending was a weekly call (call duration of 10 to 20 minutes) for 6 weeks and then a weekly hour-long teleconference for 6 months. The studies by Charlesworth and by Heller report details of the service uptake (i.e. the percentage of those offered the befriending service

who took up the offer and what proportion received the full period of befriending). Of those approached by Charlesworth 48% requested a befriender and 32% had the full 6 months. Heller reports that 23% never took up the befriender offer and 40% completed the full 12 months. Due to methodological limitations and risk of bias in the studies no firm conclusions were reported for the effect of befriending on loneliness and the authors recommended future trials should hypothesise a model for the precise effects of befriending and use specified inclusion and outcome criteria.

In the unpublished literature Care Connect (2017e) and Huw-Bryer and Old Bell 3 Ltd (2014) reported on evaluations of projects using befriending to reduce loneliness for older people living in community settings. The Care Connect (2017e) project included older people living in Leeds with some focus on the male Irish community. Befriending was delivered through the use of volunteer befrienders. The organisation Cara supported older Irish people to re-engage with their local communities. Survey data and qualitative interviews were used in the evaluation. Overall, befriending was a complex intervention which required the right kind of promotion, the avoidance of stigma and the development of meaningful relationships. Loneliness was reportedly alleviated to some extent when people took part in activities that reconnected them with their Irish heritage. This included group led activities, such as watching an Irish film but also lone activities, such as listening to an Irish voice on the radio or reading an Irish newspaper.

Huw-Bryer and Old Bell 3 Ltd reported on 20 Befriending projects in Wales. Project duration was three to five years with some unknown. Some projects provided one to one befriending while others are more focused on facilitating or developing group-based activities in the community. Several projects provided a 'mixed' service including one to one and group based befriending activities. Projects used survey and qualitative data collection techniques although not all reported details of findings. For participants there is some evidence of positive outcomes in terms of: Improved confidence levels, Increased involvement in and engagement with 'the community', Making new friends, Having stronger support networks in place, An up-lift in mood and general outlook, Health and well-being - physical, mental and emotional, A reduction in the sense of loss of independence, Overall, the evidence suggests that beneficiaries of one to one befriending have experienced slightly stronger positive outcomes than those participating in group based befriending activities. Volunteers in befriending programmes felt a sense of reduced isolation generated by their involvement in the project and helped by 'feeling needed again' and by 'doing something worthwhile'. No further details of the impact on volunteers is provided.

Animal interventions

Vires Ortega et al (2012) aimed to examine the effect of animal-assisted therapy on the health status of elderly populations and those with schizophrenia and depression using a meta-analysis. The AMSTAR rating of this review was 8. They identified 21 studies to include in their analysis of which 4 reported loneliness as an outcome (3 in care homes and covered in previous reviews) and were included in the meta-analysis. One additional study by Riddick (1985) was also included. This was a trial of 22 people aged 57-94 living in a subsidised housing complex in the United States and the intervention was an aquarium. There were 2 groups; 7 in the intervention group and 15 in the control. The UCLA scale was used but detailed numerical results are not provided. The authors evaluated studies using the Downs and Black criteria which ranges from 0 to 100. The scores were assessed as follows: Riddick – 52, Banks and Banks – 58, Banks et al - 61 and Jessen et al - 68. The authors conclusion is that trials data suggest that animal assistive therapy has little effect on loneliness outcomes.

Music

One unpublished study included a project on the role of music on loneliness for older people living in community dwellings (RCM/Imperial, 2018). Measures of loneliness included the use of the Short Warwick Edinburgh Mental Wellbeing Scale and the Connor-Davidson Resilience Scale CDRISC]. Qualitative data were collected via semi-structured interviews and by focus groups. No sample size was reported. Creative one-to-one and group sessions were included. Findings reported that Learning music in older adulthood can enhance social interactions both in and beyond the session, not only providing opportunities to meet and socialise with new people but also enabling new forms of interaction with existing family members and friends.

Home-share programme and shared meals

Care Connect (2017a) and Macmillan et al., (2018) sought to use the principles of community sharing in interventions to reduce loneliness in older people. Macmillan et al (2018) Homeshare projects bought together older people and others who need support to stay in their homes (known as householders), with young people and others (known as homesharers), who provide companionship and ten hours per week of low level practical support in return for an affordable place to live. Participants were those with low income, seeking companionship and needing support with daily living.   The average age of householders was 81 years and of homesharers 34 years. The UCLA loneliness scale was used to measure loneliness alongside interviews with participants. No data was reported from the UCLA loneliness scale.

Interviews showed that. Householders identified the benefits of having a homesharer as simply having someone to talk to on a regular basis, reducing loneliness and isolation previously faced. Companionship was identified as a mechanism for reducing loneliness.

The Care Connect project (2017a) used shared meals to bring together independent single people to eat as a group at tables reserved at various local restaurants/pubs, with each table hosted by a volunteer. The activities take place at different venues and times, many during evenings and weekends. Overall, a total of 69 facilitated shared meals took place with 53 older people who lived alone and / or were bereaved. Many said that getting involved in Shared Tables had led to the development of new friendships. The intimate nature of sitting together in a small group of six to eight people was identified as much more rewarding than large coffee mornings (which some found daunting). As a result of making friends through 'Shared Tables', small groups have shared unfacilitated meals or coffee together and gone out to the cinema. The key mechanism for reducing social isolation and potentially loneliness was the development of meaningful relationships.

Discussion

In this review we have evaluated 14 existing reviews of loneliness interventions across the adult life course published 2008-2018. We differentiated between reviews that reported the effectiveness of a portfolio of different interventions on loneliness and those that focussed upon a specific intervention type (animal therapy, ICT, physical activity and befriending) and by delivery setting (care home/assisted living or community based). We have included only those studies in the reviews that have adopted a controlled study design and seek to assess effectiveness of interventions in alleviating loneliness. Across our 14 reviews we identified 40 different studies with a total sample size of 5040 (a mean of 126 participants per study). Of these studies 5 were based in the UK: 4 studies looking at befriending and 1 at physical activity and loneliness. None of the reviews or studies included within them reported cost/cost-effectiveness data.

Summary of main findings

The key findings from this overview of reviews is that evidence from the published literature for the effectiveness of interventions to alleviate loneliness is limited. The results from controlled study designs showed no effect of

interventions on loneliness regardless of setting (care home or community), mode of delivery (individual or group) or type of activity. This does not mean that interventions to alleviate loneliness do not work. Rather that studies were overwhelming small scale and short term making it highly unlikely that effects on loneliness would be identifiable (if present). In addition, the published evidence included in our selected reviews is drawn from studies conducted in the USA, the Netherlands, Finland. Only five of the 40 studies included in the 14 reviews were undertaken in the UK although the unpublished literature focuses on UK interventions. No data on costs/cost-effectiveness were reported.

A challenge for this review is the lack of conceptual clarity surrounding loneliness in both the published and unpublished literature. Loneliness is often used interchangeably with other terms such as social isolation, social support, social networks. Further, in the published literature loneliness is not always reported as a primary outcome and may be reported alongside other outcomes including health outcomes such as anxiety and depression. Conceptually interventions should identify their goals in terms of either loneliness reduction in those already lonely or loneliness prevention for those at risk (or both). Regardless of setting there appeared to be little evidence of interventions targeting those who were lonely or at risk/vulnerable to loneliness despite the recognition that targeted interventions at those vulnerable to loneliness may be more beneficial.

An extremely diverse range of loneliness interventions were included in the published reviews . From this we conclude that there is no one-size-fits all approach to loneliness interventions and concur with review authors suggestion that tailored and/or targeted programmes to combat loneliness would be more likely to result in reductions in loneliness. This was broadly supported in the unpublished grey literature where there was an indication that a potential mechanism for successful loneliness interventions may be in 'reconnecting' those who are experiencing loneliness with their community (however defined) via the development of meaningful relationships. We note that for specific populations, such as those in care homes or group housing, there are a range of interventions as in community settings. However, it is here that animal and 'robot animals' are proposed as solutions to loneliness. Whilst it is argued that humans can have meaningful relationships with companion animals, the use of robots to combat loneliness in the most vulnerable populations of older people raise ethical and moral concerns which are not addressed in the reviews.

We may hypothesise from the grey literature in particular that central to the development of successful loneliness interventions would be tailored interventions, in terms of socio-demographic, spatial or loneliness experience characteristics, to individuals and which included development of meaningful human relationships. It is clear that the underpinning mechanism are complex and these were rarely investigated. There is little evidence that directly compared one-to-one interventions with group interventions in both the published and unpublished literature. Findings were mixed and is not possible to be conclusive about which might lead to best reductions in loneliness. For example, the studies of befriending included in the selected reviews varied in duration (X months to 12 months), focused on a range of populations, delivered befriending in a variety of ways (phone v in-person) and measured outcome in 3 different ways. Such heterogeneity of approach underpins our caution in promoting one form of intervention and one approach over alternative models. The absence of any data about costs and other inputs (e.g. volunteer time) Consequently we cannot comment upon the most cost-effective means of delivery.

The studies in the reviews were overwhelming focused on older age groups although there was a low starting age in definitions of old age in some reviews (55 years). The emphasis on older people did not account for socio-economic, ethnic and other elements of diversity which characterise the adult population. However, the unpublished literature did address evaluations of loneliness interventions for some diverse groups including LGBT people, men's groups, and vulnerable adults. The lack of evidence specific to young and mid-life adults is a clear gap in our knowledge base and reflects the conceptualisation of loneliness as a problem of later life. The lack of diversity I the published studies is disappointing and, again, does not reflect the current (and future) socio-demographic profile of this population.

Whilst there is little evidence of effectiveness there was no evidence that interventions did any harm. There was a suggestion that some technology-based interventions could reinforce a sense of social isolation if participants did not have the requisite physical or mental capacity to use equipment (Chen and Schulz, 2016). In the unpublished literature whilst not harm per se there was a recognition that loneliness interventions could potentially stigmatise users if not advocated sensitively.

Completeness and quality of included studies

The 14 reviews we included focused on older age populations and many different interventions. This heterogeneity in intervention types and a focus on older people is reflected in the 14 grey literature reports received. Although narrow in the population addressed these two sets of evidence probably reflect the broad spectrum of approaches to tackling loneliness and the state of our current evidence..

We only report on studies in reviews that use a controlled study design to assess effectiveness of interventions to alleviate loneliness. In many of the reviews making clear distinctions between the evidence arising from controlled study designs and that arising from non-controlled studies was challenging. Some reviews lacked clarity in terms of whether the reported effects were based on the between group difference, and therefore reflected the effectiveness of the interventions, or on within-group differences, which do not provide specific estimates of treatment effect. Furthermore, most reviews did not include meta-analysis (justified by heterogeneity of studies) and rarely reported adequately on numerical data which was largely presented as a narrative assessment. Only three of the reviews included a meta-analysis: Virués-Ortega et al (2012) had one on loneliness but 2 out of the 4 studies were not controlled study designs and so the meta-analysis does not meet our inclusion criteria; Shvedko et al (2018) did not have enough data on loneliness and social isolation outcomes to perform a meta-analysis and Siette et al (2017) was the only one that had a meta-analysis on loneliness that met our criteria and it reported no significant benefit from befriending on loneliness outcomes.

The quality of the included systematic reviews (measured using the AMSTAR tool) varied considerably. Many of the included reviews omitted key aspects of good practice in systematic review methods, raising the risk that important evidence may have been missed. It should be noted that the AMSTAR assessment effectively assesses the quality of reporting rather than directly measuring the quality of the review conduct. The varied quality of reviews and the common lack of pre-registration of review protocols on PROSPERO introduces a further risk of bias. The judgement of quality of studies included in the reviews was mixed and five out of 14 reviews did not provide any reporting on quality. Some of the highest quality studies can be found in the following reviews although high quality studies also found no effect of interventions: Chen and Shultz, 2016 (IT interventions), Gardiner et al., 2018 (social facilitation interventions), Siette et al., 2017 (befriending interventions) and Schvedko et al., 2018 (physical activity interventions). Of note is that the different quality review methods/classifications used may result in the same study being evaluated differently. For example the Banks et al (2008) study of

animal therapy is evaluated as effective by Cohen-Mansfield , scored 7 out of 9 on the Gardiner measure , 61 out of 100 and the Downs and Black sore and graded low quality on the Jadad score.

A key challenge in understanding the findings in this review concerned the ways in which loneliness is measured. Measures of loneliness are implicitly designed to measure persistent rather than transient feeling of loneliness which may be considered as normative. There are, potentially, three dimensions to persistent loneliness: (a) frequency-how often does it happen, (b) intensity-how strong is the feeling, and (c) duration-how long does it last. Loneliness measures typically look at the frequency of the experience. Consequently, this forms the reported outcome of loneliness interventions. They may or may not be influencing frequency or duration as these dimensions are largely not included in the existing suite of measurement tools.

As noted in the introduction well-established scales such as the University of California Los Angeles scale (UCLA scale) or the De Jong Gierveld scale come in a variety of formats (UCLA scale has 20,3 and 4 item versions; De Jong Gierveld has 11and 6 item versions with both two sub-scales as well as a total score calculable). There are variations in how scales are reported either as mean scores or using a threshold to determine the score above which people may be categorised as lonely to determine prevalence. In addition it is unclear how these two major scales relate to each other and how scores changes between scales compare. At the moment we do not have a 'common currency' of loneliness scores/measures. Further we need to develop our understanding of the 'meaning' of changes in loneliness scores across and within scales. When using mean scores, we have little qualitative understanding of what a change from, for example 3.1 to 2.9 may mean for the lives of individuals and their experience of loneliness. Thus, statistical differences in scores resultant from the studies we reviewed may (or may not) have 'clinical significance'(i.e. result in a meaningful reduction in loneliness for individuals).

Conducting controlled studies and synthesising the findings of complex interventions on loneliness is challenging. These types of interventions vary in myriad ways and in this overview the included interventions commonly varied in terms of content, underpinning theory, setting, the health professionals involved, context, measurement of outcomes, duration and dose. In addition to this there is likely substantial heterogeneity in the fidelity of the interventions in terms of quality of delivery and the engagement and adherence of participants. These multiple sources of heterogeneity meant that in many cases meta-analysis was not possible and any reporting of statistical

findings should be treated cautiously. Overarching narrative summary statements regarding effectiveness are unavoidably broad and lack specificity. Meta-analyses where conducted were often unable to include data from loneliness studies most commonly due to inadequate reporting of outcomes in the trials themselves.

It is difficult from the evidence reviewed to make confident statements regarding the characteristics that might increase the effectiveness of interventions to alleviate loneliness. We were reliant on the level of detail reported in the included reviews regarding intervention characteristics, and those reviews were dependent largely on the detail in the original trial reports. This further degree of separation from the original evidence represents a limitation of overview of reviews.

Few reviews formally considered possible mediators of better outcomes. Some observed that it was difficult to identify characteristics common among interventions for achieving successful maintenance of outcomes, compared to those that did not. It should be noted that there does not appear to be a one-size-fits all approach to loneliness interventions and indeed the grey literature identifies that tailored approaches, designed with the needs of specific populations in mind may lead to better reductions in loneliness. The lack of direct comparisons between different types of intervention in controlled study designs means that we cannot confidently identify specific intervention characteristics as causal agents in any positive outcomes observed.

Strengths and weakness of the review process

The comprehensive search strategy ensures that this overview represents a comprehensive summary of all existing eligible systematic reviews in the English language published prior to the search dates and the pre-publication of our protocol on PROSPERO ensures methodological transparency and militates against potential post-hoc decision making which can introduce bias to the process. Dual screening of searches and data extraction and independent quality assessment of included reviews ensured a rigorous process. Taking published systematic reviews as the sole evidence increases the potential risk of publication lag, wherein possible important new evidence that has not yet been included in published systematic reviews is not identified and included. The inclusion of grey literature reports goes some way to ensuring that current programmes for alleviating loneliness are included in this report. The included reviews used a range of different methodological quality and risk of bias assessment tools. Given that we relied primarily on the quality and bias judgements of the included reviews and did not systematically apply a standard risk of bias tool to each original study, it is possible that important

54

sources of potential bias may have been missed or that judgements in the included reviews were too lenient or punitive.

Implications for research

The included reviews presented evidence from controlled trial study designs and yet substantial uncertainty remains. This overview highlights the need for any future trials of interventions to be large enough to offer a reliable answer, designed to reduce risk of bias as far as possible, based on sound theoretical foundations, delivered with adequate fidelity, and importantly, reported to standards of best practice and transparency. For most of interventions considered in this overview, further small exploratory trials are unlikely to increase certainty. For both trials and reviews we would strongly encourage better reporting of numerical data and a focus on effect sizes and precision rather than using p values as a surrogate for effectiveness. Two further areas for further study include the development of a common currency of loneliness measures and understanding the significance of score changes in the lives of individuals. The need for future trials to include measures of cost/cost-effectiveness is self-evident.

Future reviews

There are relevant reviews on studies of loneliness and for many intervention types. However, the overwhelming focus is on older age populations with little discussion about loneliness across the life course. We would recommend that future reviews have a specific focus in terms of intervention type and population and seek to examine how loneliness is conceptualised across the life course in relevant studies. Such reviews should include pre-registered protocols and comply with the PRISMA and MOOSE reporting guidelines (see http://www.equator-network.org/). Given the complex nature of these interventions there is a case for conducting realist synthesis incorporating both traditional effectiveness evidence with information from process evaluations and qualitative enquiry to better understand the complex interaction of contextual factors in these interventions.

Future primary intervention research

In future trials of loneliness interventions, we would recommend compliance with the MRC guidance on the development and testing of complex interventions, with interventions being strongly driven by theory and identified need, developed in close collaboration with service users and providers to optimise the relevance and acceptability of the intervention. Outcomes of importance to service users should have primacy, measured with validated tools for the target population and over the long term. We would suggest that

long-term follow up should be the key focus. After feasibility testing definitive trials should endeavour to include diverse and representative samples and carefully consider mechanisms for optimising treatment fidelity in terms of dose, quality and adherence. There would be value in embedding a mixed method approach to careful process evaluation. Where trials demonstrate significant benefits, there is a need for further implementation studies to better understand how successful these interventions are under "real-world conditions" and the factors that influence that success. Finally, we have identified a dearth of economic evaluation evidence on lifestyle interventions. We recommend that future primary intervention research includes appropriate economic evaluation and that those interventions with existing evidence of effectiveness are appraised for their cost-effectiveness.

Implications for policy

For policy making in this area we recommend:

- focusing on person-centred and tailored loneliness interventions which are designed for the specific needs of a targeted population
- developing programmes to alleviate loneliness across the life course and with due attention to diverse population groups and social contexts
- the promotion of programmes to alleviate loneliness which pay attention to the avoidance of stigma or the reinforcement of isolation
- the development of programmes to alleviate loneliness which emphasise meaningful human relationships and improved social connections for those who are lonely
- policy support for conceptual clarity in articulating aims and scope of loneliness interventions
- policy support for developing social impact models of the processes and mechanisms by which loneliness interventions work
- policy support for better evaluations and primary research in the field and for the development of cost-effectiveness elements in evaluation studies

References

Included studies published

Abdi, J., Al-Hindawi, A., Ng, T. and Vizcaychipi, M.P., 2018. Scoping review on the use of socially assistive robot technology in elderly care. *British Medical Journal open*, *8*(2), p.e018815.

Bemelmans, R., Gelderblom, G.J., Jonker, P. and De Witte, L., 2012. Socially assistive robots in elderly care: A systematic review into effects and effectiveness. *Journal of the American Medical Directors Association*, *13*(2), pp.114-120.

Brimelow, R.E. and Wollin, J.A., 2017. Loneliness in Old Age: Interventions to Curb Loneliness in Long-Term Care Facilities. *Activities, Adaptation & Aging*, *41*(4), pp.301-315.

Chen, Y.R.R. and Schulz, P.J., 2016. The effect of information communication technology interventions on reducing social isolation in the elderly: a systematic review. *Journal of medical Internet research*, *18*(1).

Cohen-Mansfield, J. and Perach, R., 2015. Interventions for alleviating loneliness among older persons: a critical review. *American Journal of Health Promotion*, *29*(3), pp.e109-e125.

Coll-Planas, L., Nyqvist, F., Puig, T., Urrútia, G., Solà, I. and Monteserín, R., 2017. Social capital interventions targeting older people and their impact on health: a systematic review. *Journal of Epidemiology Community Health*, *71*(7), pp.663-672.

Dickens, A.P., Richards, S.H., Greaves, C.J. and Campbell, J.L., 2011. Interventions targeting social isolation in older people: a systematic review. *BMC public health*, *11*(1), p.647.

Gardiner, C., Geldenhuys, G. and Gott, M., 2018. Interventions to reduce social isolation and loneliness among older people: an integrative review. *Health & social care in the community*, *26*(2), pp.147-157.

Gilbey, A. and Tani, K., 2015. Companion animals and loneliness: A systematic review of quantitative studies. *Anthrozoös*, *28*(2), pp.181-197.

Hagan, R., Manktelow, R., Taylor, B.J. and Mallett, J., 2014. Reducing loneliness amongst older people: a systematic search and narrative review. *Aging & Mental Health*, *18*(6), pp.683-693.

Poscia, A., Stojanovic, J., La Milia, D.I., Duplaga, M., Grysztar, M., Moscato, U., Onder, G., Collamati, A., Ricciardi, W. and Magnavita, N., 2018. Interventions targeting loneliness and social isolation among the older people: an update systematic review. *Experimental gerontology*, *102*, pp.133-144.

Shvedko, A., Whittaker, A.C., Thompson, J.L. and Greig, C.A., 2017. Physical activity interventions for treatment of social isolation, loneliness or low social support in older adults: A systematic review and meta-analysis of randomised controlled trials. *Psychology of Sport and Exercise*. 34. pp.128–137.

Siette, J., Cassidy, M. and Priebe, S., 2017. Effectiveness of befriending interventions: a systematic review and meta-analysis. *BMJ open*, *7*(4), p.e014304.
Sims-Gould, J., Tong, C.E., Wallis-Mayer, L. and Ashe, M.C., 2017. Reablement, reactivation, rehabilitation and restorative interventions with older adults in receipt of home care: a systematic review. *Journal of the American Medical Directors Association*, *18*(8), pp.653-663.

Virués-Ortega, J., Pastor-Barriuso, R., Castellote, J.M., Población, A. and de Pedro-Cuesta, J., 2012. Effect of animal-assisted therapy on the psychological and functional status of elderly populations and patients with psychiatric disorders: a meta-analysis. *Health Psychology Review*, *6*(2), pp.197-221.

Included studies – grey literature

Age UK/Vinal K Karania (2017) Testing Promising Approaches to Reducing Loneliness.

Brown, C., Hammond, J., Jones, M., Kimberlee, R., BAB Community Researchers, Age UK Bristol (2018) Community Webs Final Evaluation Report. Southmead Development Trust, Bristol CCG, Bristol City Council, Bristol Ageing Better, and the University of the West of England: Bristol

Huw Bryer, Old Bell 3 Ltd (2014) A meta-analysis of evaluation evidence gathered by Big Lottery funded AdvantAGE befriending projects in Wales. V2

Care Connect, Andrea Wigfield and Sarah Alden (2017) Report Summary: Evaluation of Time to Shine Year 2. University of Sheffield

Care Connect, (2017a) More Than a Mealtime shared tables: Sharing and Enjoying Food Together

Care Connect, (2017b) Reducing social isolation amongst older LGBT people: A case study of the Sage project

Care Connect, (2017c) Reducing the loneliness of vulnerable groups: A Case study of the Small Funds project

Care Connect (2017d) Time to Shine Programme Evaluation: Summary of beneficiary outcomes

Care Connect, (2017e) Extending the Hand of Friendship': Exploring loneliness among the older Irish community in Leeds through an exploration of the Cara Project

Centre for Performance Science - a partnership of the Royal College of Music and Imperial College London (2018) 'Inquiry into the effectiveness of interventions to alleviate loneliness'

Hotham, Sarah (2018) EVALUATION OF AGELESS THANET: WELLBEING WORKSTREAM

Ageing Well Torbay (2017) Interim Findings Year Two Key Learning's Report

Tarran Macmillan, Melissa Ronca, Tim Bidey, Perla Rembiszewski (2018) Evaluation of the Homeshare pilots. Final Report. Social Care Institute for Excellence (SCIE)

Leicester Ageing Together (2017) A snap shot of comparisons between group and one to one interventions.

Additional references

Daykin with Joss (2016) Public Health England Arts and Health Evaluation Framework
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/496230/PHE_Arts_and_Health_Evaluation_FINAL.pdf

Mijuskovic, B., 1981. Loneliness and human nature. *Psychological Perspectives*, *12*(1), pp.69-77.

Office for National statistics (ONS) 2018..
https://www.ons.gov.uk/peoplepopulationandcommunity/wellbeing/articles/lonelinesswhatcharacteristicsandcircumstancesareassociatedwithfeelinglonely/2018-04-

Uysal-Bozkir, O et al 2017. Translation and Validation of the De Jong Gierveld Loneliness Scale Among Older Migrants Living in the Netherlands, *The Journals of Gerontology: Series B*, Volume 72, Issue 1, 109–119,

Perlman, D. and Peplau, L.A., 1981. Toward a social psychology of loneliness. *Personal relationships*, *3*, pp.31-56.

Rotenberg, K.J. and MacKie, J., 1999. Stigmatization of social and intimacy loneliness. *Psychological reports*, *84*(1), pp.147-148.

Sheldon, J.H., 1948. The Social Medicine of Old Age. Report of an Enquiry in Wolverhampton. *Journal of Gerontology*, 3(4). pp. 306–308.

Steptoe, A., Shankar, A., Demakakos, P., & Wardle, J. (2013). Social isolation, loneliness, all-cause mortality in older men and women. *PNAS*, *110*, 5797

Rico-Uribe LA, Caballero FF, Olaya B, Tobiasz-Adamczyk B, Koskinen S, Leonardi M, et al. (2016) Loneliness, Social Networks, and Health: A Cross-Sectional Study in Three Countries. PLoS ONE 11(1): e0145264

Appendix 1 – Summary of loneliness measures in published studies

Measurement tool	Description	Scoring/ interpretation	Validity & Reliability
Ando Osada and Kodama Loneliness Scale (AOKLS)	NR	NR	Had high reliability and concurrent validity as an instrument of measuring loneliness
DeJong Gierveld Loneliness Scale	6-item scale, three statements are made about 'emotional loneliness' (missing an "intimate relationship") and three about 'social loneliness' (when someone is missing a wider social network).	range of scores from 0 (least lonely) to 6 (most lonely)	Tested on older migrants in the Netherlands: internally consistent and adequate convergent validity among all ethnic groups. Tested on older Spanish populations: Reliability and criterion-related validity estimates were adequate.
Social and Emotional Loneliness Scale for Adults (**SELSA**)	Items scored on a sale of 1 (strongly disagree) – 3 (strongly agree). Includes 3 subscales: romantic, family, and social.	Higher scores indicate higher levels of loneliness	All subscales have high internal consistencies, with Cronbach alphas ranging from 0.89 to 0.93. Examination of the SELSA's relationship to several other criteria, including the revised UCLA Loneliness Scale, the Dyadic Adjustment Scale, and dating frequency, indicate it has good concurrent, discriminant and convergent validity.
University of California Los Angeles Loneliness Scale (UCLA LS) (versions: 10; 20; Taiwan 10; China	A 20-item scale designed to measure subjective feelings of loneliness as well as	Participants rate each item as either O ("I often feel this way"), S ("I sometimes feel this way"), R ("I rarely feel this way"), N ("I never feel this	*Reliability* Version 3 internal consistency coefficient a ranging from .89 to .94

20; Israel 20, short version, version 3 and 4)	feelings of social isolation.	way"). O's =3, all S's =2, all R's =1, and all N's =0. Higher scores indicate more loneliness	and test-retest reliability over a 1-year period (r = .73). *Validity* Version 3 Convergent validity - significant correlations with other measures of loneliness. Construct validity - significant relations with measures of the adequacy of the individual's interpersonal relationships, and by correlations between loneliness and measures of health and well-being.
3-itemUCLA Loneliness scale (Hughes et al, 2004)	short loneliness scale developed specifically for use on a telephone survey. 3 items rated 1 (hardly ever) – 3 (often). 1. how often do you feel that you lack companionship? 2. How often do you feel left out? 3. How often do you feel isolated from others? The 4 item version included in the English Longitudinal study of Ageing and other studies includes the question : How often do you feel in tune with the people around you?	Higher scores indicate higher levels of loneliness (range 3-9)	Tested on two population based samples satisfactory reliability and both concurrent and discriminant validity and corresponds to the scale formed from the same three items when asked in the full in-person scale.

Additionally, there were other non-validated measures used to assess loneliness (such as their own scales or one item questions) and single items selected from other scales not measuring loneliness specifically that are not reported in this table

Appendix 2: Reasons for exclusions and table of excluded studies (published literature)

Reasons for Exclusion:

- **Population** - Does not include the population of interest i.e. People of any age (healthy or with any morbidity) experiencing loneliness however described, and who may or may not be living alone. We only included populations based in an OECD country.
- **Outcome** - Included reviews needed to have measured loneliness using a recognised method or measure (if quantitative) or identified loneliness as the phenomenon or theme of interest (if qualitative).
- **Intervention** - Does not include interventions of interest i.e. any interventions or programmes that could alleviate loneliness and are delivered directly to people (e.g. community interventions, book clubs, writing groups, social prescribing, etc.).
- **Study design** – Systematic reviews of either qualitative studies or quantitative comparative studies. We only included reviews reported within the last 10 years and published in any language. To meet the definition of a systematic review, authors must have searched at least 2 electronic databases using a clear search strategy and screened the reference lists of identified studies.
- **Comparator** – Only included quantitative data where there is comparison data from a control group (i.e. no intervention or usual care), or historical time-based comparators (i.e. pre-post test data). These criteria not applied to qualitative data.

Authors	Year	Reason for Exclusion
Alexandra P., Angela H., Ali A.	2018	Intervention
Balaam, Marie-Clare	2015	Outcome
Bemelmans, Roger; Gelderblom, Gert Jan; Jonker, Pieter; de Witte, Luc	2012	Duplicate Studies
Biagianti B., Quraishi S.H., Schlosser D.A.	2018	Outcome
Brooks H.L., Rushton K., Lovell K., Bee P., Walker L., Grant L., Rogers A.	2018	Study Design
Cacioppo S., Grippo A.J., London S., Goossens L., Cacioppo J.T.	2015	Study Design
Chen Y., Hicks A., While A.E.	2014	Intervention
Chipps J., Jarvis M.A., Ramlall S.	2017	Study Design
Choi M., Kong S., Jung D.	2012	Study Design
Christiansen H.L., Bingen K., Hoag J.A., Karst J.S., Velázquez-Martin B., Barakat L.P.	2015	Study Design
Courtin, E; Knapp, M	2017	Outcome
Dahm KT; Landmark B; Reinar LM	2009	Study Design
Davis, Alana; Doyle, Michael; Quayle, Ethel; O'Rourke, Suzanne	2015	Intervention
Deckx L., van den Akker M., Buntinx F., van Driel M.	2018	Intervention
Dickman Portz, Jennifer	2017	Study Design

Elias, SMS; Neville, C; Scott, T	2015	Study Design
Ettema E.J., Derksen L.D., Leeuwen E.V.	2010	Intervention
Franck L., Molyneux N., Parkinson L.	2016	Study Design
Fritsch T., Steinke F., Silbermann L.	2013	Study Design
Gelbar N.W., Smith I., Reichow B.	2014	Outcome
Hackett S., McWhirter P.T., Lesher S.	2015	Outcome
Hadi, Hunaina; Hadi, Shamsa.	2017	Study Design
Hagan R., Manktelow R., Taylor B.J., Mallett J.	2014	Study Design
Holm A.L., Severinsson E.	2014	Study Design
Johnson C.E., Danhauer J.L., Ellis B.B., Jilla A.M.	2016	Study Design
Khosravi P., Rezvani A., Wiewiora A.	2016	Study Design
Kitzmüller, Gabriele; Clancy, Anne; Vaismoradi, Mojtaba; Wegener, Charlotte; Bondas, Terese	2018	Study Design
Koller, D; Le Pouesard, M; Rummens, JA	2018	Outcome
Koutsogeorgou, Eleni; Davies, John Kenneth; Aranda, Kay; Zissi, Anastasia; Chatzikou, Maria; Cerniauskaite, Milda; Quintas, Rui; Raggi, Alberto; Leonardi, Matilde	2014	Study design
Kuiper J.S., Zuidersma M., Oude Voshaar R.C., Zuidema S.U., van den Heuvel E.R., Stolk R.P., Smidt N.	2015	Intervention
Lasa, SM; Bocanegra, NM; Alcaide, RV; Arratibel, MAA; Donoso, EV; Ferriero, G	2015	Study Design
Laugeson E.A.	2013	Study Design
Leist, AK	2013	Study Design
Lim M.H., Gleeson J.F.M., Alvarez-Jimenez M., Penn D.L.	2018	Intervention
Lindsay Smith G., Banting L., Eime R., O'Sullivan G., van Uffelen J.G.Z.	2017	Intervention
Liu D., Baumeister R.F.	2016	Study Design
Mann, F; Bone, JK; Lloyd-Evans, B; Frerichs, J; Pinfold, V; Ma, RM; Wang, JY; Johnson, S	2017	Study Design
Masi C.M., Chen H.-Y., Hawkley L.C., Cacioppo J.T.	2011	Study Design
Matchock, RL	2015	Study Design
Morris M.E., Adair B., Ozanne E., Kurowski W., Miller K.J., Pearce A.J., Santamaria N., Long M., Ventura C., Said C.M.	2014	Study Design
Naef, Rahel; Ward, Richard; Mahrer-Imhof, Romy; Grande, Gunn	2013	Intervention
Newsom D., Mallow J., Watson J., Miner A., Legg K., Theeke L.A.	2013	Intervention
O'Rourke H.M., Duggleby W., Fraser K.D., Jerke L.	2015	Intervention
Ong, AD; Uchino, BN; Wethington, E	2016	Study Design
Pels F., Kleinert J.	2016	Intervention
Petitte T., Mallow J., Barnes E., Petrone A., Barr T., Theeke L.	2015	Intervention
Pool, MS; Agyemang, CO; Smalbrugge, M	2017	Study Design
Purewal R., Christley R., Kordas K., Joinson C., Meints K., Gee N., Westgarth C.	2017	Study Design

Queiros A., Santos M., Rocha N.P., Cerqueira M.	2017	Study Design
Seabrook EM., Kern ML., Rickard NS	2016	Study Design
Snowden M.B., Steinman L.E., Carlson W.L., Mochan K.N., Abraido-Lanza A.F., Bryant L.L., Duffy M., Knight B.G., Jeste D.V., Leith K.H., Lenze E.J., Logsdon R.G., Satariano W.A., Zweiback D.J., Anderson L.A.	2015	Outcome
Soga M., Gaston K.J., Yamaura Y.	2017	Study Design
Song H., Zmyslinski-Seelig A., Kim J., Drent A., Victor A., Omori K., Allen M.	2014	Intervention
Spain D., Blainey S.H.	2015	Study Design
Stojanovic J., Collamati A., Mariusz D., Onder G., La Milia D.I., Ricciardi W., Moscato U., Magnavita N., Poscia A.	2017	Study Design
Tokunaga R.S.	2017	Intervention
van der Aa H.P.A., Margrain T.H., van Rens G.H.M.B., Heymans M.W., van Nispen R.M.A.	2016	Study Design
Victor, C.	2012	Study Design
Wang, D; MacMillan, T	2013	Study Design
Wethington, Elaine; Pillemer, Karl; Principi, Andrea	2016	Study Design

Appendix 3: AMSTAR data extraction form and quality assessment

DATA EXTRACTION FORM: LONELINESS REVIEW OF REVIEWS
Reviewer:
Authors/Year:
Review Title:

Review Objectives	
Search dates	
Number and Design of included studies	
Participants included Number (at baselines and follow ups), characteristics, protected characteristics (incl. SES)	
Intervention(s) or programmes relevant to this review type, setting, duration	
Outcomes measured How was loneliness measured; include scale(s) used and time-points / describe the phenomenon of interest in reviews of qualitative studies	
Assessment of the methodological quality/ risk of bias of the included studies include the scale used by the review and any summary judgements	
Meta-analysis details (quantitative) or synthesis of findings (qualitative) <u>Quantitative</u> Include where appropriate for each analysis: comparison made, type of meta-analysis e.g. generic inverse variance, (fixed/random effects), summary outcome used, effect size with 95% CIs, heterogeneity (I^2 & chi squared) n= subgroup analysis details meta-regression details Any statement/ analysis of publication bias	

Qualitative Extract the method used to synthesis results.	
Results For each relevant intervention and outcome included in the review extract the time-point, estimate of effect size (with precision estimates e.g. confidence intervals/ p values).	
GRADE ratings for key findings* State if it was reported in the review or judged by you	
Review conclusions For each comparison made	
Conflicts of interest (for authors of included trials, for authors of the review)	

QUALITY ASSESSMENT FORM: LONELINESS REVIEW OF REVIEWS

Reviewer:
Authors/Year:
Review Title:

AMSTAR QUALITY ASSESSMENT	YES	NO	CAN'T ANSWER	N
1. Was an 'a priori' design provided? The research question and inclusion criteria should be established before the conduct of the review.				
2. Was there duplicate study selection and data extraction? There should be at least two independent data extractors and a consensus procedure for disagreements should be in place.				
3. Was a comprehensive literature search performed? At least two electronic sources should be searched. The report must include years and databases used (e.g. Central, EMBASE, and MEDLINE). Key words and/or MESH terms must be stated and where feasible the search strategy should be provided. All searches should be supplemented by consulting at least one of current contents, reviews, textbooks, specialized registers, or experts in the particular field of study, and/or by reviewing the references in the studies found.				
4. Was the status of publication (i.e. grey literature) used as an inclusion criterion? The authors should state that they searched for reports regardless of their publication type. The authors should not exclude reports (from the systematic review), based on their publication status, language etc.				
5. Was a list of studies (included and excluded) provided? A list of included and excluded studies should be provided.				
6. Were the characteristics of the included studies provided? In an aggregated form such as a table, data from the original studies should be provided on the participants, interventions and outcomes. The ranges of characteristics in all the studies analyzed e.g. age, race, sex, relevant socioeconomic data, or disease status should be				

reported.				
7. Was the scientific quality of the included studies assessed and documented? 'A priori' methods of assessment should be provided (e.g., for effectiveness studies if the author(s) chose to include only randomized, double-blind, placebo controlled studies, or allocation concealment as inclusion criteria); for other types of studies alternative items will be relevant.				
8. Was the scientific quality of the included studies used appropriately in formulating conclusions? The results of the methodological rigor and scientific quality should be considered in the analysis and the conclusions of the review, and explicitly stated in formulating recommendations.				
9. Were the methods used to combine the findings of studies appropriate? For the pooled results, a test should be done to ensure the studies were combinable, to assess their homogeneity (i.e. Chi squared test for homogeneity, I2). If heterogeneity exists a random effects model should be used and/or the clinical appropriateness of combining should be taken into consideration (i.e. is it sensible to combine?). N/A for reviews on qualitative data				
10. Was the likelihood of publication bias assessed? An assessment of publication bias should include a combination of graphical aids (e.g., funnel plot, other available tests) and/or statistical tests (e.g., Egger regression test). For reviews on qualitative data, they will have identified key findings by theme or phenomenon and applied a quality appraisal Formal assessment is not always possible – award a point if the issue is reasonably discussed				
11. Was the conflict of interest stated? Potential sources of support should be clearly acknowledged in both the systematic review and the included studies.				
Total Score				

*Score a point for "not applicable" judgements

Appendix 4: Unpublished (grey) literature – summary of included studies

Author/ Title	Aims/ objectives	Participants	Programme	Measures Used (+ time points & N of participants inc in data)	Key Loneliness Findings
1. Age UK/Vinal K Karania (2017) Testing Promising Approaches to Reducing Loneliness.	Aimed to test different approaches to: (i) identifying and reaching older people who were lonely, (ii) understanding their needs through a person-centred conversation, and (iii) providing tailored support to the older people.	1,021 older people supported. Data collected for 648 participants. Mostly female and average age of around 80 years, with most aged 71 – 95.	There were several types of intervention including: welfare benefit advice; other advice; transport; social engagement; condition support; practical support; signposting; volunteering; social physical; counselling; befriending. The pilot project ran for 15 months	The UCLA 3-item loneliness scale

Measured at baseline and between 6-12 weeks into the project and after their initial guided conversation

N = 530 participants completed pre and post test. | Almost half of these older people (253 out of 530) experienced a reduction in their loneliness scores, with an average (median) reduction of 2 points; those who were lonely some of the time or often at the time of the *initial guided conversation* experienced the largest reductions of 70% (145 of 207) and 88% (81 of 92) respectively.

Almost 90% of the older people reassessed (461 of the 530) provided information on which of the support services that they received, they felt had the biggest impact on how they feel about life. Older people reassessed (who were often lonely at the time of the *initial guided conversation)* felt that support categorised as **social engagement had the most impact for them**, and for those who were lonely some of the time or hardly lonely **welfare benefit advice had the biggest impact. Advice in general and transport also featured as support that had an impact for older people.** |
| 2. Brown, C., Hammond, J., Jones, M., Kimberlee, R., BAB Community Researchers, Age UK Bristol (2018) Community Webs | To reduce use of GPs for non-medical issues | 239 patients that were actually seen and supported by a link worker. 67% of were female, 33% | Community Webs is a person-centred supported referral/signposting service. Clients were supported to access an average of six community activities, | 1. De Jong Gierveld Loneliness Scale, 2. UCLA Loneliness Scale 3. Qualitative logs

Assessment at the start of project contact, once input has ended (exit) | There was a statistically significant decrease in De Jong Gierveld 6-Item Loneliness Scale from baseline (M=4.67, SD=1.62) to exit (M=3.99, SD=1.79), t (69) = 1.42, p= < 0.000. The mean decrease in De Jong Gierveld 6-Item Loneliness Scale scores was 0.68 with a 95% confidence interval ranging from 0.282 to 0.805. The eta-squared statistic (0.30) indicates a large effect.

Examining the UCLA Loneliness scale scores we see a similar change. The mean scores show an improvement in Loneliness Scale scores from 8.83 to 7.98. A paired |

Final Evaluation Report. Southmead Development Trust, Bristol CCG, Bristol City Council, Bristol Ageing Better, and the University of the West of England: Bristol		male. Mostly white, British, >80%	groups or Services.	and at follow-up 3 months post programme. N =129 completed baseline and n = 93 completed exit measure.	samples t-test was conducted to evaluate the impact on loneliness. There was a statistically significant decrease in the UCLA Loneliness Scale from baseline (M=8.83, SD=2.33) to exit (M=7.98, SD=2.15), t (5.23) = 0.85, p= < 0.000. The mean decrease in UCLA Loneliness Scale scores was 0.85 with a 95% confidence interval ranging from 0.526 to 1.17. The eta-squared statistic (0.37) indicates a large effect. The impact of Community Webs seems to be sustained into the medium term. Follow up questionnaires (n=41) completed at three months post-exit showed continued improvement for measures of loneliness and mental wellbeing.
3. Huw Bryer, Old Bell 3 Ltd (2014) A meta-analysis of evaluation evidence gathered by Big Lottery funded AdvantAGE befriending projects in Wales. V2	Aims to improve the lives of older people by providing access to befriending or advocacy services. Outcome objectives include: Reduced loneliness and increased wellbeing through improved social interaction.	Targeting people over the age of 50 living in Wales	20 Befriending projects. Project duration are a mix of 3 and 5 years, some unknown. Some projects provide one to one befriending while others are more focused on facilitating or developing group based activities in the community. A number of projects provide a 'mixed' service including one to one and group based befriending activities.	Not reported in full for each programme included in the evaluation. Monitoring data and evaluation evidence (including self-evaluation evidence) collated by the individual AdvantAGE befriending projects.	*Outcomes for participants:* The information available to date shows that the befriending projects are making a positive difference to reducing loneliness and social isolation. They are also making a positive difference in terms of **social and community interaction**. The evidence shows positive outcomes for beneficiaries in terms of: o Improved confidence levels o Increased involvement in and **engagement with 'the community'** o Making new friends o Having stronger support networks in place o An up-lift in mood and general outlook o Health and well-being - physical, mental and emotional o A reduction in the sense of loss of independence • **Overall, the evidence suggests that beneficiaries of one to one befriending have experienced slightly stronger positive outcomes than those participating in group based befriending activities.** • There is some (albeit very limited) evidence to suggest that where there

					are **time limits on the length of a one to one befriending relationship – this can prove challenging.** *Outcomes for volunteers (befrienders):* A sense of reduced isolation generated by their involvement in the project and helped by 'feeling needed again' and by 'doing something worthwhile'.
4. Care Connect, Andrea Wigfield and Sarah Alden (2017) Report Summary: Evaluation of Time to Shine Year 2. University of Sheffield	Aims to reduce social isolation and loneliness amongst older people in Leeds,	The programme targeted older men; LGBT, Black and Minority Ethnic (BME) older people; and older people with learning difficulties. Over 2,600 older people participating regularly in Time to Shine projects ☐ Almost 500 older people involved in one-off	Various interventions supported by the different delivery partners.	1.Revised 3-item UCLA loneliness scale. 2. De Jong Gierveld Loneliness Scale The extent to which TTS beneficiaries and volunteers have become less isolated and lonely over time was examined through analysis of the Common Measurement Framework (CMF) data and through the qualitative research	**Impact on feelings of loneliness** A significant positive change was found between loneliness at follow up compared to baseline. The proportion of respondents assessed as sometimes feeling lonely fell from 35.2% to 28.7%. Similarly, the follow up sample were slightly less likely to be assessed as lonely often (13.1% compared to 16.4% at baseline). For the De Jong scale, aside from people who live with someone else, **no difference was found**. **Impact on social connectedness** Social contact, overall, increased very slightly across the two timepoints, with 69 per cent reporting either the same levels, or increased social contact. A high proportion of respondents also reported regularly speaking with people in their local area, with 82.5 per cent reporting doing so at baseline. The follow up survey showed that this had risen even higher, to 86.1 per cent. Respondents were asked how often they would say they take part in social activities compared to other people of their age. The proportion of people who viewed that they either took part in the same number or more activities showed a statistically significant rise across all groups at follow up (overall, just over 78% of the sample

		activities or events.			recorded the same, or an improved perception of involvement compared to others of the same age). This suggests that being involved in TTS is helping some to feel that they are more involved in their local area. **Interviews and focus groups** All one to one interviewees felt that their loneliness had fallen through taking part in TTS, and all agreed that their social network had increased.
5. Care Connect, (2017a) More Than a Mealtime shared tables: Sharing and Enjoying Food Together	Reduce Social isolation for elderly people in Leeds.	53 older people - aimed at people who live alone or are bereaved	Shared meals brings together independent single people to eat as a group at tables reserved at various local restaurants/pubs, with each table *hosted* by a volunteer. The activities take place at different venues and times, many during evenings and weekends. Overall, a total of 69 facilitated shared meals took place.	Information was collected through: ☐ _Scrutiny of quarterly monitoring data, participant stories and marketing material shared with Time to Shine ☐ _An indepth interview with one member of Shared Tables during year one ☐ _A focus group of nine participants and volunteers in Shared Tables in year two ☐ _An additional focus group which included a volunteer and participant	***Social isolation was reduced through developing meaningful relationships*** Many said that getting involved in Shared Tables had led to the development of new friendships: *"I feel happy and have a host of new friends* and *I have cemented relationships* In fact, while some enjoyed visiting a variety of restaurants and trying interesting food, the social contact was viewed as more important: *[its] not about the food, it's about the company.*" **The intimate nature of sitting together in a small group of six to eight people was identified as much more rewarding than large coffee mornings** (which some found daunting). Meeting new people was recognised as difficult, but a participant, recently bereaved, spoke of leaving her first meal feeling she had known everyone for years. Another, valued the opportunity to really get to know other people and several spoke of the comfort sharing time with likeminded people had brought: *"I knew people by name or in passing, but now I feel I have much deeper connections as a result of spending time with small groups on the shared tables"* **As a result of making friends through Shared Tables, small groups have shared unfacilitated meals or coffee together and gone out to the cinema**. Shared Tables has even produced its first *Time to Shine marriage.*

				☐ _Interviews and questionnaires with two of the scheme organisers (one was interviewed once, another three times throughout the progress of the project)	
6. Care Connect, (2017b) Reducing social isolation amongst older LGBT people: A case study of the Sage project	Aims to reduce social isolation and loneliness amongst older LGBT people in Leeds	Older LGBT people	The project offers: fortnightly informal drop-in sessions, supported by volunteer 'buddies'; social events and activities (including social history, storytelling sessions, film screenings, provision of an accessible space for the Leeds pride event), and signposting services.	Review of documents, including: updates provided by the project team, press releases, monitoring returns, promotional material (including an article published in the Yorkshire Evening post). ☐ Analysis of baseline survey data of beneficiaries and volunteers. ☐ A focus group carried out in November 2017 consisting of four Sage volunteers (all participants also identified as beneficiaries) ☐ Two telephone interviews with the	***Sage is reducing isolation through enabling meaningful relationships to develop*** Focus group participants felt that social isolation and loneliness may be experienced by LGBT people through having limited contact with those who share their identity: *At first I thought, no, I am not socially isolated, I see lots of people…but when I thought about it again, it was yes, I am… as far as LGBT and lesbian was concerned (Female Volunteer)* *I have got quite a lot of friends and am involved in quite a lot of activities, but, I am isolated from my own group, and because I live in a retirement block, where there [are] some very archaic views… that can almost induce a sense of loneliness at times (Female Volunteer)* For this volunteer, her experiences led to her confiding in a professional, yet her need was initially identified as being emotional, which she disagreed with: *Counselling had been mentioned, I had no interest whatsoever, I didn't wish to be counselled, I wished to be part of a social group (Female Volunteer)* The participant then went on to say that Sage was able to meet her social need, **by introducing her to likeminded people.** Focus group participants also referred to the

				Project Operations Manager carried out November 2015 and May 2017. ☐ Two interviews (one face to face, one by telephone) with the Community Development Worker (CDW), carried out February and December 2017.	importance of feeling safe, and being able to *be yourself*, with all agreeing that for this to happen, **a targeted project was necessary**: *I am not out yet, but here (Sage), we can be out…and we know, roughly, that we have all had difficulties in life (Female Volunteer)* *It's made me feel I have a place again…, and I am able to make a contribution … so I feel much more* **connected to the LGBT community** *(Female Volunteer)*
7. Care Connect, (2017c) Reducing the loneliness of vulnerable groups: A Case study of the Small Funds project	Reduce Social isolation for elderly people in Leeds	Carers, people living with dementia, and men.	8 projects: Carers project; Calling carers; Farnley friendly faces; Walk and talk; Men's breakfast club; Your warehouse project; Walking for Health; That Friday feeling goes gardening. The activities offered range from advice and physical activity, to healthy eating sessions, befriending services, practical skills and gardening.	Review of documents including: 28 case studies provided to the programme team, monitoring returns, and promotional material. ☐ Review of eight interim and five final reports provided by Small Funds projects ☐ Two focus groups: - Farnley Friendly Face, a befriending project aimed at older people with cognitive impairment, five attendees (including: the	***Meeting likeminded people can reduce loneliness through encouraging meaningful relationships*** One of the benefits of a project aimed at **specific subgroups** is the ability for people to **share experiences with likeminded people**, as a participant of the Carers Project put it: *Just by coming to the group, sitting with others [who] are also carers, having a chat, felt so much better and a relief … I feel more confident as my role as a carer, I feel that I'm not alone* Walk and talk referred to participants coming to terms with their memory loss through sharing experiences, with two members becoming good friends after meeting on the walk, looking out for each other outside of the activity. As one project worker says: *They feel they belong with their Friday walking friends and look forward to spending time together… Often [beneficiary] can't remember things she's done in the week but always remembers her Fridays.*

				project worker, two befrienders, and two participants) (carried out May 2017) - Men's Breakfast Club, a group based project aimed at older men, 10 attendees, including the project worker, and nine participants (carried out November 2017) ☐ A joint face to face interview with both the grants officer and the grants manager of Leeds Community Foundation (carried out June 2017)	As with Walking for Health, Walk and Talk found that the social aspect of the activity offered, such as stopping in a café for tea, was particularly valued by participants. The Farnley Friendly Faces befriending project facilitated friendships to develop between the befriender and befriended: *Our relationship has blossomed and I see my volunteer as a loving and caring friend* This may have been helped through the **matching process**, where the befriender and befriended **have things in common**: *We have shared interests through our jobs* To help support men to pursue their interests, some projects allowed them to choose what they would like to do. For example, the That Friday goes Gardening project allowed men to also get involved in woodwork. At the Breakfast Club, men can read, play games, talk about their previous jobs, or just observe. What worked was the shared comradeship, and being able to share experiences. Overall, participants across the projects appreciated socialising with likeminded people**, though with men, findings were more mixed**. **The findings suggest that offering targeted projects is a useful way of giving people the confidence to try something by offering a safe, comfortable space, but perhaps can also act as a springboard to get people socialising in different settings, which, of course, will contribute to sustainability at the individual level.** *Successful engagement can lead to reduced isolation by increasing confidence and independence* Farnley Friendly Faces: while a one to one befriending project, encouraged beneficiaries to socialise more; for one participant, this initial contact gave him the confidence he needed to do so: *I am talking and mixing with people more…it has built up my confidence, I used to be*

					nervous but I have completely changed…I wouldn't have been able to speak up at something like this [the focus group] before, but now I will Another beneficiary planned to use the opportunity to build confidence and get outside more in the future: *My long-term goal is get build up my confidence and eventually get out more, either to a café or social activities. I'm like a social butterfly, I enjoy meeting new people and making friends.*
8. Care Connect (2017d) Time to Shine Programme Evaluation: Summary of beneficiary outcomes	Aims to reduce social isolation and loneliness amongst older people in Leeds.	Older Adults	A range of support, with some projects running a range of initiatives for particular communities, whilst others offer specific activities, such as: events and trips (e.g. restaurants, pubs, stately homes, the seaside); physical exercise (such as walking); arts and craft; making food; singing, dancing, storytelling; hosting visiting speakers; or just simply meeting to have a drink and a chat.	A before and after questionnaire of 179 older people who have been using TTS services. ● Information provided by 626 older people who completed a before questionnaire only ● Five focus groups with older people ● Interviews with eight older people ● Five case studies of specific TTS projects ● Interviews with 14 stakeholders, including 11 delivery partners across nine projects	**Overall people feel less lonely and more socially connected** All one to one interviewees felt that by participating in TTS their social contact had increased and they were less lonely. The individual projects provided opportunities to meet new people, with examples of friendships developing outside of the activities run: *"I have more friends and connections; it has made a big difference."* The results of one loneliness scale used in the questionnaire showed similar findings, with older people less likely to feel lonely either some of the time or often, following their involvement in TTS. However, the results of a different loneliness scale showed no difference, except for those who live with someone else. **TTS can help at times when people feel particularly lonely.** Some of the interviewees said that TTS gave them something to do at the weekend. This is important as evenings, weekends and bank holidays are often times when older people feel particularly lonely. **People are better connected and feel more involved** As people engage with TTS their levels of social contact increase, with 69 per cent reporting either the same, or increased levels. Being involved in TTS is also helping some people to feel more involved in their community, with 78% of

					questionnaire respondents recording the same, or an improved perception of involvement compared to others of the same age: *"I have lived in the same village for 40 years, I knew nobody, everything I did was outside of my village, but now I am a complete part of the community…It [the project] opened the door and let me into the village, it makes me feel welcome.*
9. Care Connect, (2017e) Extending the Hand of Friendship': Exploring loneliness among the older Irish community in Leeds through an exploration of the Cara Project	Reduce Social isolation for elderly Irish people in Leeds.	Those who are isolated due to complex issues, as well as male members of the Irish community. Most lived alone (77.3%), over two fifths were men and most identified as having a disability or health condition (82.6%).	Befriending. Through the use of volunteer befrienders, Cara supported older Irish people to re-engage with their local communities. Alongside befriending support, a range of activities were also offered, generally through working with other organisations, or directly through LIHH.	Five case studies provided to the programme team, press releases, monitoring returns, promotional material (including a TV clip, blog posts and newsletter bulletins that feature either the Cara project or Cara participants). ☐ _Analysis of baseline survey data collected in November 2016. ☐ _A focus group involving the project and volunteer coordinator, two volunteers, and a beneficiary. ☐ _Two face-to-face interviews with the Project Coordinator, including an interview carried out at the outset (December 2015), and a follow up interview (February 2017	*It is really difficult to get through to somebody but you have to keep trying... You have to get to know them, and know what will be suitable for them, take it from there; it is a slow process (Volunteer)* *It is incremental changes, one of the women would keep her curtains closed, she now opens her curtains, she has since left the house to come and watch a film (Project Coordinator)* While offering an activity that appealed, and ensuring it is accessible was viewed as important, participants felt that encouraging reluctant people to engage in the first place needed consideration. The project team referred to the importance of using positive language in promotional marketing to avoid barriers to engagement based on stigma and/or pride (this was viewed as an issue for men in particular): *There is a stigma as loneliness is associated with failure, some do not ask for help due to pride; you need to use positive language…we try to promote 'positives' i.e. friendship networks (Project Coordinator)* Once someone's attention was gained, it was necessary to provide ongoing, one to one, support to allow a trusting relationship to build. The befriender would then encourage the person to take part in activities outside of the home: *You have to build up a rapport, and they have to trust you, they have to feel comfortable enough to want to go out with you. [the befriended] was quite happy at home, but you just needed a bit of encouragement, didn't you? [The befriended, who is in attendance, nods] to come out, (Volunteer)* Cara participants (both befrienders and the befriended), referred to developing lasting friendships. One way in which this took place was through sharing

					experiences, such as bereavement: *I have met a good friend in [the befriended], what I give, I get back 100 fold. I have … got very friendly with one of the other volunteers; we both lost our husbands around the same time (Volunteer)* Loneliness was reportedly alleviated to some extent when people took part in activities that **reconnected them with their Irish heritage**. This included group led activities, such as watching an Irish film but also lone activities, such as listening to an Irish voice on the radio, or reading an Irish newspaper: *A lot of older people, again, mostly men, say that listening to the radio is their main activity, they listen to it to hear sport, but they listen to it to hear an Irish voice (Volunteer)* *It's that Irish connection, although Leeds is my home, I will always have a soft spot for Ireland... I love Irish music, I go to the Irish centre, it's the connection (Volunteer)*
10. Centre for Performance Science (a partnership of Royal College of Music| Imperial College London) (2018) 'Inquiry into the effectiveness of interventions to alleviate loneliness'	Aim of informing arts and healthcare policy, research and practice.	Older adults living (i) in a community and (ii) in a nursing home setting, mental health service users, and mothers suffering from post-natal depression	4 projects: 1. Rhythm for Life: facilitated creative music opportunities – including 1-to-1 instrumental lessons, small group lessons and creative workshops 2. Art for Ages: exploring the function of music in the lives of nursing home residents in Switzerland and the benefits of group	Short Warwick Edinburgh Mental Wellbeing Scale Connor-Davidson Resilience Scale [CDRISC] Qualitative data were collected via semi-structured interviews and focus groups.	"Our research broadly suggests that engaging with music, often a social activity in itself, can enhance social wellbeing and facilitate creation and maintenance of social connections, and therefore may lead to a decrease in loneliness and social isolation." Project 1. Rhythm for Life: **Learning music in older adulthood can enhance social interactions** both in and beyond the session, not only providing opportunities to meet and socialise with new people but also **enabling new forms of interaction with existing family members and friends.** Project 2. Art for Ages: Music is important in the lives and wellbeing of older adults in nursing homes. When reflecting on the benefits of music, **79.3% reported that it helped them to feel less lonely**, There was also a significant increase in self-reported vitality for older adults in nursing homes taking part in 10 week music programmes, compared with a decrease in vitality among older adults in non-music groups. Vitality is an important health construct

			music making on their health and wellbeing. 3. Making Music for Mental Health: drumming 4. Music and Motherhood: creative interventions, including singing and play		which has been shown to correlate with lower levels of loneliness and depression. Project 3. Making Music for Mental Health: Group drumming can increase social resilience, and provide a space of connection in and through the music. It also facilitates **feelings of belonging**, acceptance, safety and care, and **new social interactions** Project 4. Music and Motherhood: In an experimental study, singing, over and above chatting, enhanced perceived mother-infant emotional closeness. Improved perceived mother-infant bond associated with singing to babies was also confirmed in a cohort study of over 2,000 women and in a qualitative study – *this could be relevant…*
11. Hotham, Sarah (2018) EVALUATION OF AGELESS THANET: WELLBEING WORKSTREAM	Assess the impact of the wellbeing activities on individuals' loneliness, social isolation, quality of life and mental wellbeing,	N = 1064 Mostly female (n=820, 77.1%). Ages ranged from 50-95 years, with an average of 65.8 years. 92.9% (n=975) of participants identify themselves as 'white British. Just over half of participants report they	'Wellbeing activities'	1. Loneliness as measured by the De Jong Gierveld 6-item loneliness scale 2. Social Isolation as measured by the UCLA 3-item loneliness scale 3. Current level of social activity 4. Current level of contact with friends and family	**Impact on loneliness** Overall a statistically significant improvement was observed between loneliness at the start of the wellbeing activities compared to the end. Breaking down the result by loneliness sub-group, participants classified at baseline as 'moderately lonely' reported a statistically significant reduction in loneliness from an average of 3.55 at baseline to 3.00 at follow-up. This pattern is replicated in those who were categorised as 'intensely lonely', with levels of loneliness decreasing from a baseline average of 5.56 to 4.74 at follow-up. Taken together, this pattern of results suggests that the wellbeing activities are having a positive impact on those most at risk or already experiencing feelings of loneliness. **The largest proportion of participants -39.0% (n=168) - reported no change in levels of loneliness.** A decrease in loneliness was noted by 35.7% (n=154) **and an increase in 25.3% (n=109).** **Impact on Social Isolation**

					Overall a statistically significant improvement was observed between social isolation at the start of the wellbeing activities compared to the end. In the 'lonely' group levels of social isolation decreased from a baseline average of 7.01 to 6.26 at follow-up. This suggests the wellbeing activities are having a positive impact on those already experiencing feelings of loneliness. A change score was also calculated to summarise the type of change in social isolation (i.e., increase, decrease or no change). The largest proportion -49.1% (n=213)-reported no change in levels of social isolation. A decrease in social isolation was noted by 30.6% (n=133) and an **increase in 20.3% (n=88).**
have a disability- 54.5% (n=562).					
12. Ageing Well Torbay (2017) Interim Findings Year Two Key Learning's Report	To re-connect older people with friends, their communities and where they live through an increased sense of 'neighbourliness' and engagement in a broader range of accessible and affordable activities	Older adults N =2282	Neighbourhood level activities and Raising aspirations and stimulating service redesign through guided conversations	participant survey data; findings from interviews with stakeholders; themes emerging from a focus group with community builders; and case studies developed by Citizen Evaluators. Collection of the survey data at entry, follow up and exit. At the time of analysis across all projects there was a total of 419 entry surveys, 129 follow-up surveys, and 40 exit surveys.	The work taking place within the Neighbourhoods strand, Circles of Support and Wellbeing Coordination was identified as responsible for much of the improvement in **reconnecting older people within their communities** to date. Data from the participant surveys indicated that levels of social contact on a weekly basis with family, friends, neighbours and general acquaintances has increased since participants entered the programme. Participation in social activities has slightly improved over time. A higher proportion of participants felt on a par with people their age in terms of engaging in social activities, compared to when they entered the programme. Moreover, a higher proportion felt that activities met their needs and that the quality of activities has got better since entering the programme. **Loneliness amongst participants has decreased** and participants' sense of belonging has improved since being involved in the programme. 1. Neighbourhoods Project Reconnecting people was considered to be the most visible change brought about by the project so far. **Social groups and activities were identified as the primary successful mechanisms** in assisting isolated older people in making new connections. Participant survey data indicates that **loneliness is decreasing amongst participants since they have become involved in the project.**

					2. Circles of Support Impact One of the key perceived successes of the project is its ability to **reconnect the carers it supports with the local community** and establish new relationships. Data indicates that Circles has had a positive impact on participants loneliness, with levels of loneliness decreasing since being involved in the project. 3. Growing Older Together Impact (small numbers = caution when interpreting findings) The project is perceived to have successfully **reconnected participants with their community**. This is facilitated through activities such as monthly tea and cakes meetings, family events and ad-hoc social events such as Christmas lunch and bowling. Participant data reflects the positive change in reconnection, with participants' frequency of contact with people other than family increasing since they engaged in the project. Furthermore the proportion of participants meeting up with friends and family at least 3 times a week also increased slightly over time. 4. Wellbeing Coordination Impact Participant survey data indicates that perceptions of relative levels of participation in social activities compared to other people of a similar age had changed slightly since engaging in the project, shifting slightly from feeling they engage in social activities 'less than most' to 'about the same'. The proportion of participants meeting up with friends and family at least weekly has increased since engaging with the Wellbeing Coordination project, as has the proportion who speak on the phone at least weekly.
13. Tarran Macmillan, Melissa Ronca, Tim Bidey, Perla Rembiszewski	The programme sought to test what works and what the challenges are in	Those with low income, seeking companionship	The Homeshare pilots initiative brings together older people and others who need	To measure loneliness, they used the UCLA loneliness scale and interviews with	Matches identified **companionship as one of the main benefits of participating** in Homeshare. From enquiries data held within the independent monitoring tool, 58% of householders, and 40% of homesharers had come to Homeshare for companionship.

(2018) Evaluation of the Homeshare pilots. Final Report. Social Care Institute for Excellence (SCIE)	developing a sustainable Homeshare scheme	, need support with daily living. The average age of householders was 81, and of homesharers 34	support to stay in their homes (known as householders), with young people and others (known as homesharers), who provide companionship and ten hours per week of low level practical support in return for an affordable place to live.	participants. Interviews were conducted with 13 matched pairs at endline, building on baseline interviews. Of individuals interviewed, 19 were female and 7 male. UCLA measures were taken at baseline and at the end of the project.	UCLA – **no hard data presented.** Despite the low numbers, there was an indicative reduction in perception of loneliness reported by householders (n=7) and homesharers (n=7) after home sharing. Householders identified the benefits of having a homesharer as simply having someone to talk to on a regular basis, reducing loneliness and isolation previously faced: *"I value the company the most, because I was on my own, had no one to talk to and you get bored when you're on your own. Now that I've got Lauren [homesharer], I've got someone to talk to."* Householder, PossAbilities Several homesharers identified companionship as one of the benefits of being involved in Homeshare, noting how they enjoyed and valued the company of their householder, something which they would not get in other forms of shared accommodation: *"It's been so interesting and enjoyable full stop, her company and intellect is great [and] her family is lovely"* Homesharer, Novus
14. Leicester Ageing Together (2017) A snap shot of comparisons between group and one to one interventions.	Make older people less isolated; actively involved in their communities with their views and participation valued more highly; more engaged in the design and delivery of services that help	Older people	Leicester Ageing Together programme: 23 projects delivered by 16 delivery partners. Include Singing for the Brain, Befriending & Mentoring, Men in Sheds, Social Prescribing and Inter-	Analysis concentrated on the self-reported completion of three themes of loneliness, isolation and wellbeing. A sample of data was selected at random from n=151 beneficiaries who had been through either	One to One intervention The one to one intervention showed that there has **yet to be a significant effect on items related to the concept of loneliness**, although there was up to a 15% positive change in response to item e) I miss having people around. All items recorded a slight positive difference in the follow up of 1% and 10%. Three out of four items related to isolation showed a significant effect (p=<.05), in a positive direction with the effect ranging from 10-16%. The specific items associated to this were: How often do you feel that you lack companionship?; How often do you feel left out?; How often do you feel isolated from others? The fourth item d) How often do you feel in tune with people

	reduce their isolation; that services are better planned, coordinated and delivered; and that better evidence is available to influence the services that help reduce isolation for older people in the future.		generational projects, among others.	a one to one intervention (n=85) or a group intervention (n=66). Baseline questionnaire when first signed on to the programme with a follow up completed 6 months later	around you? showed a negative difference of 11%. Group interventions A significant difference was seen on the loneliness scale item c) There are many people I can trust completely, with this recording a 16% positive change (p=<.05). Item f) I often feel rejected showed a slight negative difference (9%). **All other items showed a positive difference**. All items relating to isolation showed a positive movement with item b) how often do you feel left out showing a 10% change which was significant (p=<.05). The difference of other items were between 4-7%

Appendix 5 – Assessment of quality by review authors of included studies

Review	Study Quality Tool used	Individual study	Quality score
Abdi et al 2017	NR		
Brimelow et al 2017	NR		
Chen & Schulz 2016	Effective Public Health Practice Project (EPHPP) tool	Cotten et al. (2013)	Moderate
		Kahlbaugh et al. (2011)	Strong
		Slegers et al. (2008)	Strong
		Tsai et al. (2010)	Strong
		White et al. (2002)	Strong
Cohen-Mansfield & Perach 2013	NR		
Coll-Planas et al 2017	Adapted the Cochrane risk of bias tool	Routasalo (2008)	Low risk
		Andersson (1985)	High risk
		Charlesworth (2008)	High risk
		Heller (1991)	High risk
		Hind (2014)	High risk
		Robinson (2013)	High risk
		Saito (2012)	High risk
		Dodge (2014)	Unclear risk
Dickens et al 2011	Cochrane risk of bias tool (RCTs) and the Newcastle-Ottawa Scale	Kremers et al (2006); Lokk (1990);	Risk of bias: high (n= 6)
		Fukui et al 92003); Ollonqvist et al (2008); Routasalo et al (2009); Savelkoul & de Witte (2004); White et al, (2002); Slegers et al (2008)	Risk of bias: moderate (n= 10)
Gardiner et al 2018	Evidence for Policy and Practice Information and Co-ordinating Centre (EPPI) guidelines	Routasalo (2008)	9/9
		Banks & Banks (2002)	7/9
		Saito et al (2012)	9/9
		Creswell et al (2012)	9/9

		Ollonqvist et al (2008)	9/9
		Banks et al (2008)	8/9
Gilbey & Tani 2015	Jadad scores	Banks & Banks (2002)	Jadad score = 2 (low quality)
		Banks, Willoughby & Banks (2008)	Jadad score = 1 (low quality)
		Jessen Cardiello & Baun (1996)	Jadad score = 1 (low quality)
Hagan et al 2014	NR		
Poscia et al 2018	EPHPP tool		
		Robinson et al (2013)	Weak
		Saito et al (2012)	Weak
Shvedko et al 2018	12 criteria Cochrane Review Book risk of bias	Chan (2017); Mutrie et al., (2012); Ollonquist (2008	Low risk of bias
Siette et al 2017	Cochrane Collaboration's Risk of Bias Tool	Charlesworth et al (2008)	High
		Heller et al (1991)	Low
		Mountain et al (2014)	High
		Sheridan et al (2015)	Medium
		Walshe et al (2016)	High
Sims-Gould et al 2017	Cochrane Collaboration's Risk of Bias Tool	Melis et al (2008)	Met 5/6 criteria (Adequate sequence generation; Blinding; addressed incomplete outcome data; free from selective reporting; Free of other bias)
Virués-Ortega et al 2012	100-point scale using an adapted version of the criteria developed by Downs and Black (1998) for randomised and non-randomised studies of heath care	Jessen, Cardiello, and Baun (1996)	68/100
		Banks, Willoughby, and Banks (2008)	61/100

	interventions. Range: 0 (lowest quality) – 100 (highest quality)		