

Independence and mental wellbeing (including social and emotional wellbeing) for older people

**Older people: independence and mental wellbeing –
Evidence Review of Cost Effectiveness**

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September 2014

Executive summary

Aims

To conduct a systematic review aiming to identify full, published economic evaluations of interventions to promote independence and/or mental wellbeing of older people in the UK.

Methods

A search of eight databases for relevant papers published from February 2007 to March 2014 was carried out. Papers examining public health interventions aimed at promoting the independence and mental wellbeing of older people were included. Studies with respect to interventions recommended in [Occupational therapy and physical activity interventions to promote the mental wellbeing of older people in primary care and residential care](#) (NICE public health guidance 16, 2008) were excluded.

Main findings

In total, 719 titles and abstracts were reviewed and screened by two reviewers for potential relevance. Of these, 34 were examined in more detail to determine whether they met inclusion criteria. In total, just three papers were selected for final inclusion; two of which have been published in peer-reviewed journals and one of which was supplied on request to the internal review team as 'academic in confidence' prior to publication.

One published paper presented a cost-utility analysis of a visiting service for older widowed individuals in the Netherlands and reported a median cost per QALY gained of €6827 (€4123 by data bootstrapping) (Onrust et al. 2008). It reported a 64% chance of the intervention being more acceptable than usual care at a willingness-to-pay threshold of £20,000 per QALY gained.

Another published paper presented a limited cost consequence analysis (Pitkala et al. 2009) of a psychosocial group rehabilitation intervention for older people suffering from loneliness in Finland which reported that subjective health at 1 year improved more often in the intervention group, that survival was improved at 2 years in the intervention group and that the intervention was cost saving.

The currently unpublished paper by Coulton et al. (In preparation) presents a cost-utility analysis of a community group singing intervention for older people in the UK. The intervention is reportedly cost-effective with a QALY gain of 0.015 at 6 months, a net cost per participant of £18.88 (over 14 sessions) as well as improved mental health-related quality of life (SF-12 mean difference 2.35). There is reportedly a 64% chance of the intervention being cost effective at a willingness-to-pay threshold of £30000 per QALY gained.

Conclusions

In conclusion, the evidence base with respect to cost-effectiveness of interventions to improve and promote mental wellbeing of older people is very limited. Estimates of cost effectiveness included cost saving, a cost per QALY of €4123 and €6827 and a suggestion of 'cost effective' QALY gains at a cost of £18.88 per participant. There is considerable heterogeneity in types of intervention examined and methodical limitations within the published literature. As a consequence, estimates of cost effectiveness and its applicability are uncertain.

Evidence statements

Three studies provided evidence on the cost effectiveness of interventions to promote the mental wellbeing of older people.

Onrust et al. (2008; RCT +) reported that a one-to-one visiting service for older widowed individuals is cost effective in the Netherlands with an incremental cost per QALY of €6827 (with bootstrapping €4123; 95% CI: - €627,530 to €668,056 per QALY). It reported a 70% chance of the intervention being more acceptable than usual care at a willingness-to-pay threshold of €20,000 per QALY gained. However, there is considerable uncertainty surrounding this estimate.

Pitkala et al. (2009; RCT -) reported that a psychosocial group rehabilitation for lonely older people was cost saving (by €62 per person at 1 year) compared with usual community care in Finland while also improving subjective health at 1 year ($p=0.07$) and improving survival at 2 years (97% (95% CI: 91-99) versus 90% (95% CI: 85-95); $p = 0.042$). However, this was conducted as part of a limited cost consequence analysis and there are considerable limitations.

The applicability of both of these studies (conducted within other European countries) to a UK population is uncertain.

Coulton et al. (In preparation; RCT +) provided moderate evidence of the cost effectiveness of a community singing intervention for older people aged 60 years and above with a QALY gain of 0.015 (95% CI: 0.014 to 0.016; $p < 0.01$) at 6 months, a net cost per participant (over 14 sessions) of £18.88 as well as improved mental health-related quality of life (SF-12 mean difference 2.35 (95% CI 0.06 to 4.76; $p=0.05$)). It reported a 64% chance of the intervention being cost effective at a willingness-to-pay threshold of £30000 per QALY gained. This study is arguably more applicable than the others, having been conducted in East Kent within a UK setting and investigating a community singing intervention currently being delivered by the third sector on the health-related quality of life of older people.

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Abbreviations

- **ASCOT:** Adult Social Care Outcomes Toolkit
- **CI:** Confidence Interval
- **DALY:** Disability-adjusted life year
- **DARE:** Database of Abstracts of Reviews of Effects
- **EQ-5D:** EuroQoL 5 Dimension scale
- **HEED:** Health Economic Evaluations Database
- **HUI:** Health Utilities Index
- **ICECAP-O:** ICEpop CAPability measure for Older people
- **ICER:** Incremental Cost Effectiveness Ratio
- **MINI:** Mini Interventional Neuropsychiatric Interview
- **MMSE:** Mini-Mental State Examination
- **OECD:** Organisation for Economic Co-operation and Development
- **QALY:** Quality-adjusted life year
- **NMB:** Net Monetary benefit
- **SCRLQoL:** Social care-related quality of life
- **SF-6:** 6 item Short Form Survey Instrument
- **SF-12:** 12 item Short Form Survey Instrument
- **SF-36:** 36 item Short Form Survey Instrument
- **TiC-P:** Trimbos and Institute of Medical technology Assessment Questionnaire on Costs Associated with Psychiatric Illness
- **WTP:** Willingness to Pay

Glossary

- **Adult Social Care Outcomes Toolkit:** a tool for measuring social care-related quality of life ([ASCOT \[Personal Social Services Research Unit\]](#))
- **Bootstrapping:** a non-parametric statistical technique involving repeated resampling of the sample which can be used to estimate a statistic's empirical distribution which can then be used to produce measures of uncertainty (e.g. confidence intervals) (Campbell and Torgerson, 1999)
- **Charlson Comorbidity Index:** a weighted index of comorbid conditions known to influence mortality (Charlson et al. 1987)
- **Confidence Interval:** a measure of uncertainty around an estimate.
- **Cost Benefit Analysis:** a type of economic evaluation where all costs and consequences are valued in monetary terms.
- **Cost Consequence Analysis:** a type of economic evaluation where all costs and benefits are considered but in a disaggregated format.
- **Cost Effectiveness Analysis:** a type of economic evaluation where costs are considered in monetary terms but benefits are measured in another type of unit.
- **Cost Minimisation Analysis:** a type of economic evaluation where the benefits are known to be the same but costs differ.
- **Cost Utility Analysis:** a type of economic evaluation where the costs are considered in monetary terms but benefits are measures in quality-adjusted life years.
- **Disability-adjusted life year:** a measurement of morbidity and mortality; one DALY is a year of healthy life lost.
- **Drummond et al. validated checklist:** a checklist for critical appraisal of economic evaluations (Drummond et al. 1997).
- **Economic evaluation:** a comparison of costs and consequences of two alternative interventions.
- **EuroQoL 5-dimension scale:** a 5 item tool for measuring health-related quality of life.
- **External validity:** the extent to which study findings are generalisable to the source population.

- **Generalisability:** the extent to which study findings can be applied to other settings
- **Hazard ratio:** ratio of the chance of an event occurring in one trial arm over time to the chance of an event occurring in the other arm.
- **Health Related Quality of Life (HRQOL):** subjective evaluation of aspects of life related to either physical or mental health.
- **Health Utilities Index:** a system for measuring health-related quality of life.
- **ICEpop CAPability measure for Older people:** measure of capability in older people based on wellbeing attributes (attachment, security, role, enjoyment, control) ([ICECAP-O \[University of Birmingham\]](#))
- **Incremental Cost Effectiveness Ratio:** the ratio of differences in costs to the differences in benefits in two alternative interventions.
- **Independence:** having the capacity to make choices and to exercise control over own lives. It also includes the ability to live independently, with or without support.
- **Loneliness Scale:** an 11 item tool for measuring loneliness (Jong-Gierveld et al. 1999)
- **Mental wellbeing:** feelings' (emotional and psychological wellbeing, including self-esteem) and the ability to 'function' socially (social wellbeing, including the ability to cope [be resilient] in the face of adversity).
- **M.I.N.I.:** a short interview used in the diagnosis of mental health disorder (Sheehan et al.1998).
- **Montgomery-Asberg Depression Scale:** a 10 item diagnostic questionnaire used to determine the severity of depression (Montgomery and Asberg et al. 1979)
- **Mini Mental® State Examination:** a screening tool for cognitive impairment ([MMSE \[Psychological Assessment Resources\]](#))
- **Net Monetary Benefit (NMB):** the net value when the difference in costs between two alternative interventions are subtracted from the difference in outcomes (valued according to the defined willingness to pay)
- **Quality-adjusted life year:** a measure of length of time adjusted for quality.

- **Short Form Survey Instruments (SF 6, 12 and 36):** tools for measuring quality of life ([RAND Health](#))
- **Social care-related quality of life:** quality of life in relation to domains including control over daily life, personal cleanliness and comfort, food and drink, personal safety, social participation and involvement, occupation, accommodation cleanliness & comfort and dignity ([ASCOT domains \[Personal Social Services Research Unit\]](#)).
- **Trimbos and Institute of Medical technology Assessment Questionnaire on Costs Associated with Psychiatric Illness:** this is a questionnaire used to assess usage of healthcare and productivity costs in patients with psychiatric disorder (Bouwman et al. 2013).
- **Willingness to Pay:** the maximum value attached to an outcome.

Introduction

NICE will publish guidance on public health interventions aimed at promoting the independence and mental wellbeing of older people in November 2015.

The guidance will provide recommendations for good practice, based on the best available evidence of effectiveness, including cost effectiveness as outlined in the scope: [Older people - Independence and Mental Wellbeing: Final Scope](#). The guidance will complement existing NICE guidance including [Occupational therapy and physical activity interventions to promote the mental wellbeing of older people in primary care and residential care](#) (NICE public health guidance 16, 2008).

Context

As part of the development of [Occupational therapy and physical activity interventions to promote the mental wellbeing of older people in primary care and residential care](#) (NICE public health guidance 16, 2008), an evidence review was produced on effectiveness and cost-effectiveness of public health interventions to promote well-being in people aged 65 and over (Windle et al. 2008)

A narrative summary of two published economic evaluations conducted alongside randomised controlled trials found by a review of the literature was presented. Munro et al. (2008) reported on a high-quality cluster randomised controlled trial of a community-based exercise programme for older adults which was found to be cost-effective (cost per QALY gained of £12,100) from a health service perspective. The other relevant study was Hay et al. (2002) on a preventive occupational therapy program involving weekly group sessions shown to be cost-effective in the USA (cost per QALY gained of \$10,700) from the perspective of a US payer perspective.

As part of the above review for PH16, an economic model from a Public Sector perspective was also developed. This examined the cost-effectiveness of four different interventions (a nursing health promotion intervention; a physical activity counselling programme; physical activity advice & three month exercise plan and a community walking programme) compared with their respective control groups. A community-based walking programme for sedentary older people was found to be cost-effective with a cost per QALY gained of £7372 at 6 months compared with education and information. Mixed results were observed for provision of advice about physical activity.

As part of the development of above guidance, relevant recommendations were made with respect to physical activity and occupational therapy.

Aim of review

The aim of this evidence review is to identify and summarise full, published economic evaluations of interventions to improve or protect the mental wellbeing and/or independence of older people (relevant to the UK).

Review questions

This review aimed to address 2 questions:

1. What are the most cost effective ways to improve or protect the mental wellbeing and/or independence of older people?
2. What is the cost effectiveness of interventions for different target groups (e.g. by age, gender, ethnicity, culture, socioeconomic status)?

Definitions

For the purposes of this guidance, mental wellbeing refers to 'feelings' (emotional and psychological wellbeing, including self-esteem) and the ability to 'function' socially (social wellbeing, including the ability to cope [be resilient] in the face of adversity). It also includes being able to develop potential, work productively and creatively, build strong and positive relationships with others and contribute to the community (Foresight 2008).

'Independence' in this guidance is defined as an older person having the capacity to make choices and to exercise control over their lives. It also includes the ability to live independently, with or without support.

Methods

Literature search

A systematic literature search was developed, carried out and quality assured by NICE Guidance Information Services. The following electronic databases were searched:

NHS Economic Evaluations Database; Health Economic Evaluations Database (HEED); Econlit (American Economic Association's Database); Medline; Medline In-Process; DARE (Database of Abstracts of Reviews of Effects); Social Care Online; PsycINFO.

Literature with a database entry date from 28 February 2007, or publication date from 2007 (if the search interface did not allow more specific limits) up to 1 March 2014 were included.

Given that there is potentially a very wide scope to the topic, the overall yield of citations was reduced by making judicious use of title searching and focused subject headings. The search thus had three concepts (*Older people AND mental wellbeing AND economics*) and it was specified that either older people or mental wellbeing should have featured in the titles of retrieved references or have been flagged as the major theme. The search was designed to maximise precision (i.e. to retrieve the highest proportion of potentially relevant material) within the number it would have been possible to sift given the resources available. It should therefore be viewed as an optimised search, rather than an exhaustive one.

In some cases the search was shortened due to the limitations of various databases, particularly HEED, which would not handle a more complex search.

The search strategy is outlined in Appendix A.

Inclusion criteria

This review is focussed on public health interventions aimed at promoting the independence and mental wellbeing of older people. Studies were included if conducted in OECD countries and if published after 28 February 2007 (since a review of evidence published up until this date was previously conducted to inform [Occupational therapy and physical activity interventions to promote the mental wellbeing of older people in primary care and residential care](#) [NICE public health guidance 16, 2008], as outlined above).

Population included:

People aged 65 or over

Interventions included:

- Commissioning of services by local government and other local providers (e.g. charities and faith organisations) to promote, support and protect older peoples' mental wellbeing or independence.
- Interventions to raise awareness of the importance of older people's mental wellbeing and independence among professionals, older people, their carers, family and the wider community.
- Assessment and identification of older people within a local community who have poor mental wellbeing or are at high risk of a decline in their mental wellbeing or who lack choice and control over the services they use or who are at high risk of losing their independence.
- Activities to improve or protect mental wellbeing or older people's independence. This could include interventions aimed at:

- All those working with older people. For example, training to:
 - improve awareness of older people's mental wellbeing or independence and to acknowledge the factors that older people consider important to maintaining wellbeing and independence
 - improve their knowledge of the services available to support older people's mental wellbeing and/or independence.
- Communities where older people live, for example:
 - activities to tackle ageism and encourage cross-generational participation and respect.
- Older people and, where appropriate, their carers and family, including:
 - information and support to access services (such as routine healthcare, housing advice and household supplies) or additional, possibly temporary support (for example, to help cope with a bereavement)
 - support to develop and maintain social networks, including the use of communication technologies (e.g. social media use or personal home based alarm systems use by older people for their mental wellbeing and independence, as well as looking at well-established technologies such as the telephone) and community-based volunteers
 - access to leisure, education, and community activities transportation (including collection and delivery) services and other mobility support

Study designs

Full economic evaluations or analyses presenting costs and consequences such as cost benefit analysis, cost effectiveness analysis, cost minimisation analysis and cost utility analysis

Outcomes

Reporting costs as well as one or more clearly identifiable outcomes in relation to mental wellbeing - using, but not limited to, objective measures and self-report such as:

- Quality of life/utility (including disability adjusted life years (DALYs), quality adjusted life years (QALYs), value of life & extra health status indicators including equivalent health utility, EuroQol (EQ-5D), HUI, quality of wellbeing,

SF6, SF12 & SF36, ICEpop CAPability measure for Older people (ICECAP-O), social care-related quality of life (SCRLQoL e.g. ASCOT (Adult Social Care Outcomes Toolkit)).

- Access, uptake, adherence to programmes and behaviours to improve mental wellbeing and/or independence.
- Change in mental health, including depressive symptoms.
- Change in physical health and health-related behaviours (such as moderate alcohol consumption, good diet, and physical activity).
- Change in mortality rates.
- Independence and capability using, but not limited to, objective measures and self-report.
- Mobility (physical).
- Socialising, loneliness or social isolation.
- Community activities (such as civil engagement, volunteering).
- Measures of social capital.
- Use of healthcare and social care services including those provided by the charitable sector
- Other social outcomes

Exclusion criteria

- Studies limited to older people who live in a care home or attend one on a day-only basis; have substantial health or social care needs (e.g. due to dementia or another pre-existing cognitive impairment); and/or are diagnosed with any form of mental disorder diagnosis (including depression). Studies including older people with existing co-morbidities not associated with substantial health or social care needs were not excluded on this basis.
- Studies of interventions concerning:
 - One-to-one interactions between health or care professionals and older people, other than those indicated above:
 - Management of a chronic medical condition or disability, including dementia or another mental health disorder.

- Procedures for, and eligibility criteria used in, assessments for social care support and other welfare benefits.
- Psychological interventions such as cognitive behavioural therapy.
- Planning for the built environment to meet older people's needs including 'age-friendly city' initiatives.
- Prevention of mental and physical health conditions (such as cognitive decline, obesity, diabetes, cardiovascular disease or falls), unless specific components of the intervention support or improve mental wellbeing or independence.
- Occupational therapy and physical activity interventions recommended in 'Occupational therapy and physical activity interventions to promote the mental wellbeing of older people in primary care and residential care' (NICE public health guidance 16).

Data management

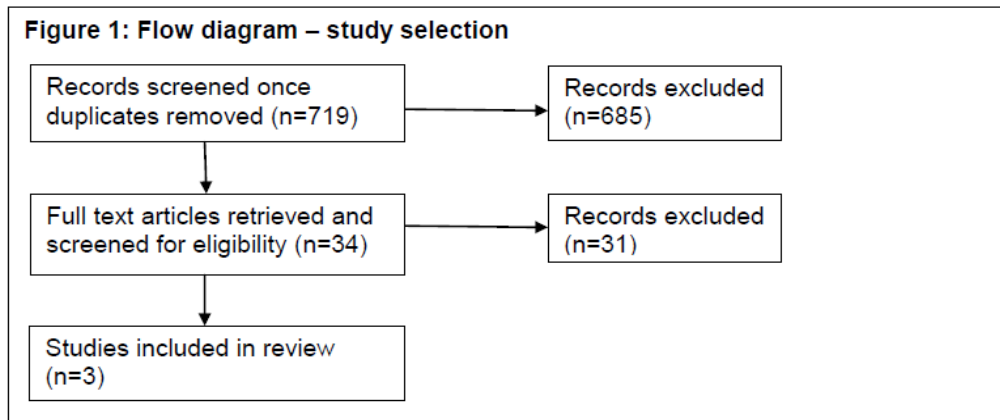
The bibliography of search results was exported from Reference Manager and imported into a Microsoft Excel file. Selection decisions were documented by all reviewers as needed within this file.

Selecting studies for inclusion

Titles/abstracts were initially screened independently by two reviewers in line with the inclusion/exclusion criteria. Where disagreement occurred, an attempt was made to resolve this by discussion and discussed with a third reviewer where needed. Full papers were then requested. Most papers excluded were excluded as they were not full economic evaluations.

Full-text copies of selected studies were assessed, using a full-paper screening tool. This was carried out independently by the same two reviewers to ensure consistency throughout the screening process. Any differences were resolved by discussion between the two reviewers or where needed by discussion with a third reviewer. Full text articles retrieved but excluded from the review are presented in Appendix B with a summary of the rationale for exclusion.

Once de-duplicated, 719 citations were retrieved. In total, three studies were selected as outlined in Figure 1 below.



Data extraction and quality assessment

Data from included papers were extracted according to example evidence tables for economic evaluations as highlighted in [Methods for the development of NICE public health guidance](#) (National Institute for Health and Clinical Excellence, 2012).

The review team assessed the quality of evidence selected for inclusion in the review including using the Drummond et al. (1997) validated checklist. The studies were given one of the following quality ratings:

- ++ (All or most of the checklist criteria have been fulfilled and the conclusions are unlikely to alter where the criteria has not been fulfilled);
- + (Some of the criteria have been fulfilled and the conclusions are unlikely to alter for the criteria that have not been fulfilled or not adequately described);
- - (Few or no criteria have been fulfilled and the conclusions are likely to alter).

Studies that received a ‘++’ quality rating were referred to as ‘good quality’, those receiving a ‘+’ rating were referred to as ‘moderate quality’ and those that received a ‘-’ rating were referred to as ‘weak quality’

Each full paper was assessed by one reviewer and checked for accuracy by another. Any differences in quality grading (as was the case in one paper) were resolved by discussion with a third reviewer

The review team assigned a quality rating to each paper and where a study was not assigned a ‘++’ quality rating, the review team recorded the key reasons why. The review team also assessed external validity and generalisability.

Results

Two published studies were identified for inclusion in this review, as well one paper made available to the review team by the authors prior to publication. All were economic evaluations conducted alongside randomised controlled trials.

One published study (Onrust et al. 2008; +) was a moderate quality study examining a visiting service for older widowed individuals in the Netherlands. The other study (Pitkala et al. 2009; -) examined a psychosocial group rehabilitation model for elderly people suffering from loneliness in Finland and provided only weak evidence that the intervention was cost saving. A paper currently in preparation (Coulton et al. in preparation; +) presented the results of a cost-utility analysis of a community group singing intervention for older individuals.

Visiting service for older widowed individuals in the Netherlands

Onrust et al. (2008) conducted a randomised controlled trial to investigate the cost effectiveness of a visiting service for individuals aged 55 and over who had been widowed in the past year and had moderate or strong feelings of loneliness. Letters were sent to all eligible residents in certain areas of the Netherlands and local media was used to promote the study. Those eligible for the intervention were invited to participate in the study. Randomisation of individuals was blocked (in pairs of individuals) and stratified (by age and region).

Individuals were assigned to either usual care (a brief brochure providing information and tips to improve wellbeing) or the intervention group. The intervention group received 10-12 one-to-one visits by widowed volunteers at home which aimed to provide participants with a chance to express feelings and receive information and practical help. Volunteers delivering the intervention had received 6 training sessions and were supervised by a coordinator who themselves had received training.

Main outcome measures were health-related quality of life (HRQOL) and Quality – Adjusted Life Years (QALYs).

Effectiveness

Those in the intervention group experienced an improvement in health-related quality of life whereas those in the control group did not. However, when results were adjusted for the fact that participants in the intervention group were more lonely (7.1 vs. 6.0 on Loneliness Scale (Jong-Gierveld et al. 1999); $p = 0.008$) and had a lower quality of life at baseline (0.76 vs. 0.83 on EQ-5D utility score; $p=0.030$) there were no differences in changes experienced in health-related quality of life (HRQOL) ($p=0.215$).

Table 1: Unadjusted effectiveness results (Onrust et al. 2008)

	Baseline (EQ-5D utility score)	At 12 months (EQ-5D utility score)	Change over time (QALY gained)	P value
Visiting service	0.76 (0.25)	0.80 (0.18)	0.04 (0.02)	0.025*
Usual care	0.83 (0.18)	0.81 (0.21)	-0.01 (0.02)	0.488*

Mean (s.d). *No significant differences in changes in HRQOL over time when adjusted for confounding ($p=0.215$)

Costs

The cost of the intervention was estimated at €533. These costs included organisation of the visiting service, training and supervision of the volunteers, intake by the coordinator, phone calls and overheads. However, costs varied according to whether the coordinator was a paid social worker or an unpaid volunteer and according to which source was used to estimate costs. As a result 4 different estimates were produced (with a narrow range of €213 to €343 reflecting the fact that volunteers' time was valued at €12.45 per visit) which the authors took the mean from. This figure was then added to costs for time of participants and volunteers to arrive at the final estimate.

Other considered costs included health care services (valued as standard cost price multiplied by number of units used), patient and informal caregiver costs and costs associated with being unable to carry out tasks within the home over the past 4 weeks to estimate annual costs (ascertained by questionnaire responses and valued at €8.30 per hour; the estimated price of domestic help). Overall, costs other than those relating to the intervention at 12 months compared with baseline were €163 lower in the intervention group and €180 higher in the usual care group. Medication use (including dispensing costs) was also considered.

Table 2: Annual costs in € (Onrust et al. 2008)

	Visiting service			Usual care		
	Baseline	12 months	Difference over time	Baseline	12 months	Difference over time
Intervention costs	0 (0)	553 (0)	553 (0)	0 (0)	0 (0)	(0)
Other costs	2829 (3837)	2666 (3333)	-163 (2938)	2209 (2757)	2389 (2988)	180 (2346)
Total costs	2829 (3837)	3220 (3333)	390 (2938)	2209 (2757)	2389 (2988)	180 (2346)

Mean (s.d)

Consequently, overall costs were higher in the intervention group by €210 but the difference was not statistically significant.

Cost effectiveness

Onrust et al. 2008 conducted a cost utility analysis and have produced incremental cost effectiveness ratios. Costs have been converted for the purposes of this review into £GBP based on the 2003 average reported by the Bank of England (2014): €1.4456 per £GBP.

Under base case assumptions, cost per QALY gained was €6827 (£4723) whereas the median cost per QALY gained when individuals' data were bootstrapped was €4123 (£2852) (95% CI: -€627 530 (-£434097) to €668056 (£462131)). The authors report a 59% chance that the intervention leads to improved outcomes at higher costs and a 28% chance that it leads to improved outcomes at lower costs. At a willingness to pay (WTP) of €20000 (£13835) for a gain of one QALY, there is a 70% chance that the intervention would be more acceptable from a cost-effectiveness point of view than usual care (i.e. the brochure on depressive symptoms) with a net monetary benefit (NMB) of €410 (£284).

In a sensitivity analysis which also considered costs attributable to productivity loss, cost per QALY gained was €11239 (£7775) whereas the median cost per QALY gained when individuals' data were bootstrapped was €6151 (£4255) (95% CI: -€205706 (-£142298) to €222067 (£153616)). The authors report a 63% chance that the intervention leads to improved outcomes at higher costs and a 24% chance that it leads to improved outcomes at lower costs. At a willingness to pay (WTP) €20000 (£13835) for a gain of one QALY, there is a 64% chance that the intervention would be more acceptable from a cost-effectiveness point of view than usual care.

Overall assessment

This was a fairly well-designed randomised controlled trial which made the likely cost effectiveness and the uncertainty around these estimates clear. However, notwithstanding the analysis by intention-to-treat, there was considerable loss to follow-up (14.4%) at one year with little explanation for this. Despite, the authors' assertions that completers did not differ from non-completers (no quantitative data is presented to support this) and that there were no significant differences between groups, the outcomes could clearly have differed between groups and could have included death (which in turn could impact upon QALYs gained and does not appear to have been considered).

It would also have been informative to consider alternative intervention cost scenarios under sensitivity analyses rather than using a cost average of different models of delivery. Furthermore, estimation of health care usage based on the preceding 4 weeks only is potentially quite limited.

Overall, the acceptability of the intervention to the target group and the representativeness of the population included are uncertain since only 11%

responded to the initial mail out and only 8% of those contacted participated in the trial.

Psychosocial group rehabilitation for lonely older individuals

Pitkala et al. (2009) conducted a randomised controlled trial to examine the effects of a psychosocial group rehabilitation intervention on subjective health, use and costs of health services, and mortality of older people with loneliness.

Postal questionnaires regarding loneliness were sent to a sample of 6786 people aged 75 and older in six Finnish communities. The response rate was over 71% amongst those living at home. People who identified that they sometimes, often or always experienced loneliness were sent a second questionnaire asking if they were willing to participate in group rehabilitation and their preferences for the content of this. Less than half of those responding to the initial questionnaire responded to this questionnaire. In total 224 people met the inclusion criteria for the trial. A further 11 individuals with loneliness who had sought the group psychotherapy centre were also entered into the trial.

The interventions were 12 weekly group meetings of 5-6 hours held at rehabilitation centres or group psychotherapy centres and consisted of a predetermined programme that could be modified. The intervention was free of charge to the 7-8 participants in each group including transportation, coffee and lunch. There were 2 professional group facilitators for each group and activities were as follows:

- Art and inspiring activities: including visits by artists to the group, group visits to cultural events and sights and art production within the group.
- Exercise and health-related discussions: including Nordic stick walking, strength training, swimming and dancing.
- Therapeutic writing and group psychotherapy: including writing about lives and loneliness and sharing with other members of the group.
- Control groups (x3) received usual care as well as 3 two-hour assessment sessions with study nurses.

Participants were assigned to groups based on their preferences and those in the same group were invited in the same cluster of 16 people. The study nurse then read the names of the participants from a paper list (in the order they had been assessed) to a person at a randomisation centre who randomly assigned them to the intervention or control group.

Main outcome measures were subjective health at 1 year, mortality at 2 years and use of health services and associated costs at 1 year (until end of 2004)

Effectiveness

The authors report that subjective health ('feels healthy or quite healthy') at 1 year improved more often in the intervention group than in the control group ($p = 0.007$) although this is presented in an illustrative figure without an exact figure.

Survival at 24 months was 97% (95% CI: 91 to 99) in the intervention group and 90% (95% CI: 83 to 95) in the control group ($p=0.042$; although note that this p value was reported as 0.047 in the abstract and on the Kaplan-Meier survival curve within the paper). Consequently, the hazard ratio for mortality (adjusted for age, gender, Charlson Comorbidity Index and cognition) in the intervention group was 0.39 (95% CI: 0.15 to 0.98).

Costs

The cost of the intervention (including group rehabilitation and programme costs, transportation, meals and education and tutoring of group facilitators) was €881 per person.

Costs of health service usage (including days in hospitals, physician visits and ambulatory visits to specialist hospitals) per person were €1522 (95% CI: €1144 to €2191) in the intervention group compared with €2465 (95% CI: €1826 to €3372) in the control group. This means that the costs of health service usage per person in the intervention group were €943 lower (95% CI: €1955 lower to €127 lower) with days in primary hospitals being responsible for most of this difference

Cost effectiveness

Reported results indicate that the intervention is both effective (at reducing mortality and improving subjective health) and cost saving (health service savings of €943 compared with €881 costs of intervention per person), indicating that this is a potentially cost effective intervention.

Overall assessment

This is a fairly limited cost consequence analysis conducted alongside a randomised controlled trial. The authors report positive results suggesting that the intervention is cost saving, improves subjective health and reduces mortality. In addition, promisingly the authors report that around half of the groups set up have continued to meet after official meetings have ceased which suggests longer term sustainability, and coupled with the low drop-out rate observed, acceptability of this intervention to those receiving it.

However, there are potentially quite serious limitations to this study. In particular, there seems to be considerable potential for bias arising from the fact that the authors report that they 'chose' participants based on interest in the group content available to them locally and recruited a small number of individuals that had already presented to a group psychotherapy centre with loneliness. Only 3.3% of those

initially contacted were entered into the study which raises questions about acceptability and feasibility of this intervention and representativeness of the sample in relation to the target group.

The perspective adopted is unclear from the article although it appears to be a healthcare perspective, considering only costs of hospital inpatient days and visits to a doctor's office with no consideration of other potentially relevant costs including social care costs and costs in relation to informal carers.

There is an inadequate consideration of uncertainty within the estimates as although confidence intervals are presented, there is an absence of sensitivity analyses.

Overall, whilst results are promising, the quality of this study is insufficient to draw robust conclusions about likely cost effectiveness.

A community group singing intervention for older adults in the UK

Coulton et al. (In preparation) conducted a randomised controlled trial to investigate the cost effectiveness of a community group singing intervention for adults aged 60 and over in the United Kingdom.

Participants were people who had expressed an interest in the study following the siting of advertisements in local media, general practices and community venues and the provision of information by researchers at day centres and other venues for older people. Participants were predominantly female (84%) and had a mean age of 69. Few exclusion criteria existed but 135/393 possible participants were excluded as they could not provide informed consent. Stratified randomisation was carried out by centre and gender.

The intervention consisted of 14 weekly group meetings where participants joined together along with a professional musician to participate in a developmental singing programme. At the end of the intervention, groups were disbanded. The control group received usual care (normal activities; participants were informed that they were welcome to join a singing group at the end of the study).

Primary outcome measure was mental health-related quality of life at 6 months (as measured by SF-12). Secondary outcomes include physical health-related quality of life, anxiety and depression (on the Hospital Anxiety and Depression Scale).

Effectiveness

At 3 months, compared to the control group mental health-related quality of life was significantly higher and anxiety and depression were significantly lower in the intervention group (as highlighted in Table 3). At 6 months, while lower than that observed at 3 months, mental-health related quality of life was still significantly higher in the intervention group. QALY gain in the intervention group was 0.015.

There were no significant differences between the groups in other outcomes at 6 months.

Table 3: Differences in outcomes adjusted for baseline values, age and gender (Coulton et al. In preparation)

	Baseline	3 months	6 months
Mental health-related quality of life (SF-12)	Control: 50.0 (47.9 to 52.2) Intervention: 48.8 (46.8 to 50.8)	4.77 (2.53 to 7.01; p<0.01)	2.35 (0.06 to 4.76; p = 0.05)
Physical health-related quality of life (SF-12)	Control: 39.8 (38.6 to 40.9) Intervention: 39.1 (37.9 to 40.3)	0.83 (-0.39 to 2.05; 0.18)	0.26 (-1.75 to 1.23; p = 0.23)
Anxiety (HADS)	Control: 6.41 (5.62 to 7.20) Intervention: 6.40 (5.62 to 7.18)	-1.78 (-2.50 to 1.06; p <0.01)	-0.57 (-1.31 to 0.16; p = 0.13)
Depression (HADS)	Control: 4.28 (3.67 to 4.89) Intervention: 4.95 (4.53 to 5.57)	-1.52 (-2.13 to 0.92; P<0.01)	-0.53 (-1.24 to 0.18; p = 0.14)
QALY gain	-	-	0.015 (0.014 to 0.016)

Mean (95% confidence interval)

Costs

The costs of the intervention were estimated to be £18.88 per participant. This figure included training costs, capital costs, group session costs and advertising and administration costs.

Service use costs included general practice visits, social care involvement, inpatient stays and outpatient attendance. These costs increased in both groups at 6 months and the increase was greater in intervention group (£315.72 vs. £273.01) although this was not statistically significant and the reasons for this are unclear. Consequently costs were £42.70 higher in the intervention group (95% CI: -£463.79 to 549.20; p=0.87).

Cost effectiveness

A base case estimate for cost per QALY is not presented in the paper. However, the authors state that assuming a willingness-to-pay of £30000 for a QALY gained, the intervention presented would be the preferred option in 64% of scenarios.

Overall assessment

This was a moderate quality cost-utility analysis which was conducted alongside a pragmatic randomised controlled trial. The authors report increased mental health-related quality of life at 6 months in the intervention with increased costs associated with the both the intervention and service usage. Whilst the results of a cost effectiveness acceptability curve are presented, no base case ICER is presented and no further sensitivity analyses are conducted which makes interpretation more challenging.

In addition, although some positive results are presented, there is a considerable loss to follow-up (despite a relatively short follow-up) with missing outcome data in 21% at 6 months. The reasons for this are unclear and it is worth noting that there is no evidence that any deaths that may have occurred were captured. No adjustments or imputation appear to have been made to mitigate against this issue.

With respect to the included population, a high prevalence of depression and anxiety was observed and the population was self-selecting, consisting of people who expressed an interest in the trial. However, the study is presented as a pragmatic trial and so it may be argued that participants included are highly representative of the target population for this intervention. Indeed, the intervention model appears to be currently delivered by the third sector in parts of the UK and the fact that 4/5 groups have continued to meet following cessation of the trial is indicative of the potential feasibility and acceptability of this intervention.

The authors report that improved mental health-related quality of life was observed at 3 and 6 months in the intervention (though this did not appear to reach 'clinically significant' levels) but differences in anxiety and depression observed at 3 months were not sustained at 6 months (once the trial was over).

Overall, this study provides moderate evidence of the cost-effectiveness of a community group singing intervention.

Discussion

A systematic search of eight databases was conducted to find evidence with respect to cost effectiveness of interventions to promote mental wellbeing and independence amongst older adults (from full economic evaluations, published after February 2007). The conclusion of this search is that there is very limited published evidence in this area.

Overall, 719 titles and abstracts were reviewed and screened for potential relevance. Of these, 34 were examined in more detail to determine whether they met inclusion criteria. In total, three articles were selected for final inclusion. These were economic analyses conducted alongside randomised controlled trials. The first was a fairly high-quality cost-utility analysis which found a visiting service for older widowed individuals in the Netherlands to be cost effective. Another was a limited cost consequence analysis which reported that psychosocial group rehabilitation for lonely older individuals was cost effective. In addition, an as yet unpublished cost utility analysis reported that a community group singing intervention in the UK was cost effective.

Limitations of this review

A possible limitation of this review is that only literature published after February 2007 was included. This was defensible given that guidance on mental wellbeing and older people has been published by NICE and was based on systematic review of economic evidence. While it is worth noting that the focus of these two pieces of guidance is quite different, the research questions posed in the evidence review used to inform the existing guidance were quite broad in scope, meaning that papers relevant to the guidance in development are likely to have been captured ([PH16: Mental wellbeing and older people: effectiveness and cost-effectiveness review, 2008](#)).

Limitations of the evidence

Considering the potential scope of this area, there are very few published economic evaluations concerning the promotion of mental wellbeing for older adults. Those that do exist are heterogeneous and have fairly short follow-up periods.

Much of the literature in this area concerns the use of physical activity and occupational therapy to promote mental wellbeing as covered in [Occupational therapy and physical activity interventions to promote the mental wellbeing of older people in primary care and residential care](#) (NICE public health guidance 16, 2008). Consequently, these papers were not further considered so as to avoid overlap with existing NICE guidance and ongoing NICE Published Guidance Review and Evidence Update processes.

Other potentially relevant papers concern the use of integrated care and inter-professional working. Similarly, a number of papers (e.g. Tappenden et al. 2012) report quality of life outcomes but concern populations acutely admitted to (and consequently discharged from hospital) and/or requiring care in relation to chronic medical conditions. Intermediate and respite care are also considered (e.g. Mason et al. 2007). These papers were excluded from further appraisal as they were considered beyond the scope of this review.

Additional papers concern interventions potentially relevant to the scope of this guidance but do not present relevant mental wellbeing outcomes. Conversely, some papers (e.g. van der Weele et al. 2012) describe interventions relevant to mental health and wellbeing but are based on individual counselling and therapy, more relevant to treatment of mental health conditions, and therefore excluded from consideration.

The evidence base in the area of mental wellbeing is however slowly expanding as evidenced by published study protocols found during this review with economic results yet to be published: physical activity intervention versus health education (Fielding et al. 2011), welfare rights advice versus usual care (Haighton et al. 2012), life review intervention versus usual care (Korte et al. 2009).

Conclusion

This systematic review concludes the evidence base with respect to cost-effectiveness of interventions to improve and promote mental wellbeing of older people is very limited.

Estimates of cost effectiveness included cost saving, cost per QALY of €4123 and €6827 and suggestion of 'cost effective' QALY gains at £18.88 per participant. The following evidence statements were derived from the available reports (2 published papers and a manuscript which has been prepared for publication).

There is considerable heterogeneity in types of intervention examined and methodical limitations in published literature. As a consequence, estimates of cost effectiveness and applicability are uncertain.

The evidence base in the area of mental wellbeing of older people may be expanding, but slowly, as evidenced by published study protocols found during this review.

Evidence statements

Three studies provided evidence on the cost effectiveness of interventions to promote the mental wellbeing of older people.

Onrust et al. (2008; RCT +) reported that a one-to-one visiting service for older widowed individuals is cost effective in the Netherlands with an incremental cost per QALY of €6827 (with bootstrapping €4123; 95% CI: - €627,530 to €668,056 per QALY). It reported a 70% chance of the intervention being more acceptable than usual care at a willingness-to-pay threshold of €20,000 per QALY gained. However, there is considerable uncertainty surrounding this estimate.

Pitkala et al. (2009; RCT -) reported that a psychosocial group rehabilitation for lonely older people was cost saving (by €62 per person at 1 year) compared with usual community care in Finland while also improving subjective health at 1 year ($p=0.07$) and improving survival at 2 years (97% (95% CI: 91 to 99) versus 90% (95% CI: 85 to 95); $p = 0.042$). However, this was conducted as part of a limited cost consequence analysis and there are considerable limitations.

The applicability of both of these studies (conducted within other European countries) to a UK population is uncertain.

Coulton et al. (In preparation; RCT +) provided moderate evidence of the cost effectiveness of a community singing intervention for older people aged 60 years and above with a QALY gain of 0.015 (95% CI: 0.014 to 0.016; $p < 0.01$) at 6 months, a net cost per participant (over 14 sessions) of £18.88 as well as improved mental health-related quality of life (SF-12 mean difference 2.35 (95% CI 0.06 to 4.76; $p=0.05$)). It reported a 64% chance of the intervention being cost effective at a willingness-to-pay threshold of £30000 per QALY gained. This study is arguably more applicable than the others, having been conducted in East Kent within a UK setting and investigating a community singing intervention currently being delivered by the third sector on the health-related quality of life of older people.

Appendix A: Search Strategies

NHS EED

NHS Economic Evaluations Database (via Ovid). Database: EBM Reviews – NHS Economic Evaluation Database <1st Quarter 2014>

- 1 aged/ or "aged, 80 and over"/ (5043)
- 2 Retirement/ (2)
- 3 elder*.ti,ab. (190)
- 4 geriatric*.ti,ab. (26)
- 5 seniors.ti,ab. (3)
- 6 senior citizen*.ti,ab. (0)
- 7 retire*.ti,ab. (0)
- 8 pensioner*.ti,ab. (0)
- 9 "later life".ti,ab. (0)
- 10 "late life".ti,ab. (3)
- 11 "old age".ti,ab. (0)
- 12 (older adj people*).ti,ab. (29)
- 13 (old adj people*).ti,ab. (0)
- 14 (older adj person*).ti,ab. (2)
- 15 (old adj person*).ti,ab. (0)
- 16 (older adj adult*).ti,ab. (29)
- 17 ("older man" or (older adj men*)).ti,ab. (3)
- 18 ("older woman" or (older adj women*)).ti,ab. (12)
- 19 (older adj male*).ti,ab. (0)
- 20 (older adj female*).ti,ab. (0)
- 21 "old old".ti,ab. (0)
- 22 "very old".ti,ab. (0)
- 23 "oldest old".ti,ab. (1)
- 24 or/1-23 (5055)
- 25 Resilience, Psychological/ (2)
- 26 Adaptation, Psychological/ (17)
- 27 Social Distance/ (1)
- 28 Community Networks/ (8)
- 29 Independent Living/ (3)
- 30 Social Identification/ (0)
- 31 Happiness/ (0)
- 32 "positive mental health".ti,ab. (0)
- 33 ((mental or social or emotional or psychological) adj3 ("well being" or wellbeing)).ti,ab. (1)
- 34 resilien*.ti,ab. (1)
- 35 ((social or family) adj3 relationship*).ti,ab. (0)
- 36 internal-external control/ or interpersonal relations/ or intergenerational relations/ (15)
- 37 ((sense or locus or event* or future or circumstance* or situation* or life) adj3 control).ti,ab. (0)

- 38 (independen* adj3 (live or living)).ti,ab. (4)
- 39 productiv*.ti,ab. (9)
- 40 ((achiev* or reach) adj3 potential).ti,ab. (0)
- 41 "make choices".ti,ab. (0)
- 42 "exercise choice".ti,ab. (0)
- 43 independence.ti,ab. (2)
- 44 Personal Satisfaction/ (5)
- 45 (emotional adj3 (health or capital)).ti,ab. (1)
- 46 mental capital.ti,ab. (0)
- 47 Loneliness/ (2)
- 48 empower*.ti,ab. (0)
- 49 ((community or social or family or civic) adj3 (participat* or isolat* or engag* or volunteer* or contact* or involv* or inclu* or exclu*)).ti,ab. (3)
- 50 dignity.ti,ab. (0)
- 51 Mental Health/ and pc.fs. (3)
- 52 or/25-51 (70)
- 53 (nursing adj home).ti. (22)
- 54 residential home*.ti. (1)
- 55 nursing home*.ti. (37)
- 56 residential care*.ti. (1)
- 57 care home*.ti. (5)
- 58 Alzheimer*.ti. (46)
- 59 dementia.ti. (34)
- 60 parkinson*.ti. (31)
- 61 53 or 54 or 55 or 56 or 57 or 58 or 59 or 60 (148)
- 62 24 and 52 and 61 (5)
- 63 (24 and 52) not 61 (23)
- 64 63 (23)
- 65 limit 64 to yr="2007 -Current" (14)

NHS Economic Evaluations Database (via Ovid)

Database: EBM Reviews - NHS Economic Evaluation Database <1st Quarter 2014>

Search Strategy:

-
- 1 aged/ or "aged, 80 and over"/ (5043)
 - 2 Retirement/ (2)
 - 3 elder*.ti,ab. (190)
 - 4 geriatric*.ti,ab. (26)
 - 5 seniors.ti,ab. (3)
 - 6 senior citizen*.ti,ab. (0)
 - 7 retire*.ti,ab. (0)
 - 8 pensioner*.ti,ab. (0)
 - 9 "later life".ti,ab. (0)
 - 10 "late life".ti,ab. (3)

- 11 "old age".ti,ab. (0)
- 12 (older adj people*).ti,ab. (29)
- 13 (old adj people*).ti,ab. (0)
- 14 (older adj person*).ti,ab. (2)
- 15 (old adj person*).ti,ab. (0)
- 16 (older adj adult*).ti,ab. (29)
- 17 ("older man" or (older adj men*)).ti,ab. (3)
- 18 ("older woman" or (older adj women*)).ti,ab. (12)
- 19 (older adj male*).ti,ab. (0)
- 20 (older adj female*).ti,ab. (0)
- 21 "old old".ti,ab. (0)
- 22 "very old".ti,ab. (0)
- 23 "oldest old".ti,ab. (1)
- 24 or/1-23 (5055)
- 25 Resilience, Psychological/ (2)
- 26 Adaptation, Psychological/ (17)
- 27 Social Distance/ (1)
- 28 Community Networks/ (8)
- 29 Independent Living/ (3)
- 30 Social Identification/ (0)
- 31 Happiness/ (0)
- 32 "positive mental health".ti,ab. (0)
- 33 ((mental or social or emotional or psychological) adj3 ("well being" or wellbeing)).ti,ab. (1)
- 34 resilien*.ti,ab. (1)
- 35 ((social or family) adj3 relationship*).ti,ab. (0)
- 36 internal-external control/ or interpersonal relations/ or intergenerational relations/ (15)
- 37 ((sense or locus or event* or future or circumstance* or situation* or life) adj3 control).ti,ab. (0)
- 38 (independen* adj3 (live or living)).ti,ab. (4)
- 39 productiv*.ti,ab. (9)
- 40 ((achiev* or reach) adj3 potential).ti,ab. (0)
- 41 "make choices".ti,ab. (0)
- 42 "exercise choice".ti,ab. (0)
- 43 independence.ti,ab. (2)
- 44 Personal Satisfaction/ (5)
- 45 (emotional adj3 (health or capital)).ti,ab. (1)
- 46 mental capital.ti,ab. (0)
- 47 Loneliness/ (2)
- 48 empower*.ti,ab. (0)
- 49 ((community or social or family or civic) adj3 (participat* or isolat* or engag* or volunteer* or contact* or involv* or inclu* or exclu*)).ti,ab. (3)
- 50 dignity.ti,ab. (0)

- 51 Mental Health/ and pc.fs. (3)
- 52 or/25-51 (70)
- 53 (nursing adj home).ti. (22)
- 54 residential home*.ti. (1)
- 55 nursing home*.ti. (37)
- 56 residential care*.ti. (1)
- 57 care home*.ti. (5)
- 58 Alzheimer*.ti. (46)
- 59 dementia.ti. (34)
- 60 parkinson*.ti. (31)
- 61 53 or 54 or 55 or 56 or 57 or 58 or 59 or 60 (148)
- 62 24 and 52 and 61 (5)
- 63 (24 and 52) not 61 (23)
- 64 63 (23)
- 65 limit 64 to yr="2007 -Current" (14)

Health Economic Evaluations Database (HEED)

(elder* OR geriatric* OR senior* OR retire* OR pensioner* OR (late* AND life) OR old*)

AND

(wellbeing OR (well AND being))

Econlit

Database: Econlit <1886 to February 2014>

Search Strategy:

-
- 1 elder*.ti. (1313)
 - 2 geriatric*.ti. (17)
 - 3 seniors.ti. (116)
 - 4 senior citizen*.ti. (15)
 - 5 retire*.ti. (3431)
 - 6 pensioner*.ti. (65)
 - 7 "later life".ti. (78)
 - 8 "late life".ti. (25)
 - 9 "old age".ti. (516)
 - 10 (older adj people*).ti. (100)
 - 11 (old adj people*).ti. (10)
 - 12 (older adj person*).ti. (32)
 - 13 (old adj person*).ti. (0)
 - 14 (older adj adult*).ti. (67)
 - 15 ("older man" or (older adj men*)).ti. (94)

16 ("older woman" or (older adj women*)).ti. (28)
 17 (older adj male*).ti. (21)
 18 (older adj female*).ti. (2)
 19 "old old".ti. (3)
 20 "very old".ti. (3)
 21 "oldest old".ti. (19)
 22 or/1-21 (5805)
 23 "positive mental health".ti. (0)
 24 ((mental or social or emotional or psychological) adj3 ("well being" or wellbeing)).ti. (155)
 25 resilien*.ti. (570)
 26 ((social or family) adj3 relationship*).ti. (102)
 27 ((sense or locus or event* or future or circumstance* or situation* or life) adj3 control).ti. (75)
 28 (independen* adj3 (live or living)).ti. (7)
 29 productiv*.ti. (14299)
 30 ((achiev* or reach) adj3 potential).ti. (15)
 31 "make choices".ti. (1)
 32 "exercise choice".ti. (0)
 33 independence.ti. (1675)
 34 (emotional adj3 (health or capital)).ti. (5)
 35 mental capital.ti. (1)
 36 empower*.ti. (791)
 37 ((community or social or family or civic) adj3 (participat* or isolat* or engag* or volunteer* or contact* or involv* or inclu* or exclu*)).ti. (981)
 38 dignity.ti. (68)
 39 or/23-38 (18724)
 40 elder*.ti,ab. (3251)
 41 geriatric*.ti,ab. (33)
 42 seniors.ti,ab. (385)
 43 senior citizen*.ti,ab. (57)
 44 retire*.ti,ab. (7955)
 45 pensioner*.ti,ab. (348)
 46 "later life".ti,ab. (204)
 47 "late life".ti,ab. (47)
 48 "old age".ti,ab. (1498)
 49 (older adj people*).ti,ab. (393)
 50 (old adj people*).ti,ab. (79)
 51 (older adj person*).ti,ab. (137)
 52 (old adj person*).ti,ab. (9)
 53 (older adj adult*).ti,ab. (212)
 54 ("older man" or (older adj men*)).ti,ab. (238)
 55 ("older woman" or (older adj women*)).ti,ab. (188)
 56 (older adj male*).ti,ab. (85)

57 (older adj female*).ti,ab. (33)
 58 "old old".ti,ab. (4)
 59 "very old".ti,ab. (66)
 60 "oldest old".ti,ab. (72)
 61 or/40-60 (13089)
 62 "positive mental health".ti,ab. (3)
 63 ((mental or social or emotional or psychological) adj3 ("well being" or wellbeing)).ti,ab. (563)
 64 resilien*.ti,ab. (1761)
 65 ((social or family) adj3 relationship*).ti,ab. (1079)
 66 ((sense or locus or event* or future or circumstance* or situation* or life) adj3 control).ti,ab. (402)
 67 (independen* adj3 (live or living)).ti,ab. (83)
 68 productiv*.ti,ab. (40617)
 69 ((achiev* or reach) adj3 potential).ti,ab. (217)
 70 "make choices".ti,ab. (174)
 71 "exercise choice".ti,ab. (5)
 72 independence.ti,ab. (6050)
 73 (emotional adj3 (health or capital)).ti,ab. (43)
 74 mental capital.ti,ab. (2)
 75 empower*.ti,ab. (2419)
 76 ((community or social or family or civic) adj3 (participat* or isolat* or engag* or volunteer* or contact* or involv* or inclu* or exclu*)).ti,ab. (4701)
 77 dignity.ti,ab. (267)
 78 or/62-77 (57278)
 79 (nursing adj home).ti. (179)
 80 residential home*.ti. (4)
 81 nursing home*.ti. (258)
 82 residential care*.ti. (10)
 83 care home*.ti. (7)
 84 Alzheimer*.ti. (45)
 85 dementia.ti. (31)
 86 parkinson*.ti. (28)
 87 79 or 80 or 81 or 82 or 83 or 84 or 85 or 86 (378)
 88 22 and 78 (262)
 89 39 and 61 (107)
 90 88 or 89 (323)
 91 90 (323)
 92 limit 91 to yr="2007 -Current" (135)
 93 92 not 87 (135)
 94 (Economic* or cost or costs or costly or costing or costed or price or prices or pricing or budget*).ti,ab. (410294)
 95 ((monte adj carlo) or markov or (decision adj2 (tree\$ or analys\$))).ti,ab. (11507)

- 96 (value adj2 (money or monetary)).ti,ab. (868)
- 97 (willingness to pay or standard gamble* or time trade off* or time tradeoff*).ti,ab. (3842)
- 98 (HTA or "technology assessment" or "technology appraisal").ti,ab. (156)
- 99 (CER or "comparative effectiveness research").ti,ab. (73)
- 100 94 or 95 or 96 or 97 or 98 or 99 (420316)
- 101 93 and 100 (47)

Medline

Database: Ovid MEDLINE(R) <1946 to February Week 3 2014>
 Search Strategy:

-
- 1 aged/ or "aged, 80 and over"/ (2277394)
 - 2 Retirement/ (7499)
 - 3 elder*.ti,ab. (164649)
 - 4 geriatric*.ti,ab. (30465)
 - 5 seniors.ti,ab. (4088)
 - 6 senior citizen*.ti,ab. (1050)
 - 7 retire*.ti,ab. (12208)
 - 8 pensioner*.ti,ab. (749)
 - 9 "later life".ti,ab. (5512)
 - 10 "late life".ti,ab. (3519)
 - 11 "old age".ti,ab. (17284)
 - 12 (older adj people*).ti,ab. (13214)
 - 13 (old adj people*).ti,ab. (3034)
 - 14 (older adj person*).ti,ab. (7120)
 - 15 (old adj person*).ti,ab. (872)
 - 16 (older adj adult*).ti,ab. (30589)
 - 17 ("older man" or (older adj men*)).ti,ab. (5580)
 - 18 ("older woman" or (older adj women*)).ti,ab. (9445)
 - 19 (older adj male*).ti,ab. (1454)
 - 20 (older adj female*).ti,ab. (1183)
 - 21 "old old".ti,ab. (666)
 - 22 "very old".ti,ab. (2848)
 - 23 "oldest old".ti,ab. (1249)
 - 24 or/1-23 (2340082)
 - 25 *aged/ or *"aged, 80 and over"/ (21164)
 - 26 *Retirement/ (4598)
 - 27 elder*.ti. (79098)
 - 28 geriatric*.ti. (16380)
 - 29 seniors.ti. (1468)

30 senior citizen*.ti. (378)
 31 retire*.ti. (4665)
 32 pensioner*.ti. (214)
 33 "later life".ti. (1077)
 34 "late life".ti. (1556)
 35 "old age".ti. (5662)
 36 (older adj people*).ti. (5216)
 37 (old adj people*).ti. (952)
 38 (older adj person*).ti. (2181)
 39 (old adj person*).ti. (210)
 40 (older adj adult*).ti. (14031)
 41 ("older man" or (older adj men*)).ti. (1652)
 42 ("older woman" or (older adj women*)).ti. (2915)
 43 (older adj male*).ti. (158)
 44 (older adj female*).ti. (112)
 45 "old old".ti. (179)
 46 "very old".ti. (769)
 47 "oldest old".ti. (575)
 48 or/25-47 (148198)
 49 *Resilience, Psychological/ (820)
 50 *Adaptation, Psychological/ (31805)
 51 *Social Distance/ (492)
 52 *Community Networks/ (3488)
 53 *Independent Living/ (436)
 54 *Social Identification/ (3495)
 55 *Happiness/ (1201)
 56 "positive mental health".ti. (43)
 57 ((mental or social or emotional or psychological) adj3 ("well being" or wellbeing)).ti. (1818)
 58 resilien*.ti. (2557)
 59 ((social or family) adj3 relationship*).ti. (1623)
 60 *internal-external control/ or *interpersonal relations/ or *intergenerational relations/ (28844)
 61 ((sense or locus or event* or future or circumstance* or situation* or life) adj3 control).ti. (2597)
 62 (independen* adj3 (live or living)).ti. (423)
 63 productiv*.ti. (7740)
 64 ((achiev* or reach) adj3 potential).ti. (75)
 65 "make choices".ti. (11)
 66 "exercise choice".ti. (2)
 67 independence.ti. (3827)
 68 *Personal Satisfaction/ (4191)
 69 (emotional adj3 (health or capital)).ti. (234)
 70 mental capital.ti. (0)

71 *Loneliness/ (1114)
 72 empower*.ti. (2772)
 73 ((community or social or family or civic) adj3 (participat* or isolat* or engag* or
 volunteer* or contact* or involv* or inclu* or exclu*)).ti. (5485)
 74 dignity.ti. (1477)
 75 *Mental Health/ and pc.fs. (857)
 76 or/49-75 (99696)
 77 Resilience, Psychological/ (1315)
 78 Adaptation, Psychological/ (72702)
 79 Social Distance/ (1364)
 80 Community Networks/ (5279)
 81 Independent Living/ (928)
 82 Social Identification/ (6611)
 83 Happiness/ (2542)
 84 "positive mental health".ti,ab. (203)
 85 ((mental or social or emotional or psychological) adj3 ("well being" or
 wellbeing)).ti,ab. (10767)
 86 resilien*.ti,ab. (8813)
 87 ((social or family) adj3 relationship*).ti,ab. (11269)
 88 internal-external control/ or interpersonal relations/ or intergenerational
 relations/ (70878)
 89 ((sense or locus or event* or future or circumstance* or situation* or life) adj3
 control).ti,ab. (13696)
 90 (independen* adj3 (live or living)).ti,ab. (3287)
 91 productiv*.ti,ab. (47951)
 92 ((achiev* or reach) adj3 potential).ti,ab. (2269)
 93 "make choices".ti,ab. (458)
 94 "exercise choice".ti,ab. (44)
 95 independence.ti,ab. (24174)
 96 Personal Satisfaction/ (10516)
 97 (emotional adj3 (health or capital)).ti,ab. (2519)
 98 mental capital.ti,ab. (2)
 99 Loneliness/ (2132)
 100 empower*.ti,ab. (11076)
 101 ((community or social or family or civic) adj3 (participat* or isolat* or engag*
 or volunteer* or contact* or involv* or inclu* or exclu*)).ti,ab. (53006)
 102 dignity.ti,ab. (4025)
 103 Mental Health/ and pc.fs. (1646)
 104 or/77-103 (325160)
 105 Economics/ or exp "Costs and Cost Analysis"/ or Budgets/ or exp Models,
 Economic/ or Markov Chains/ or Monte Carlo Method/ or Decision Trees/ (243156)
 106 (Economic* or cost or costs or costly or costing or costed or price or prices or
 pricing or budget*).ti,ab. (416252)

107 ((monte adj carlo) or markov or (decision adj2 (tree\$ or analys\$))).ti,ab.
(34226)

108 (value adj2 (money or monetary)).ti,ab. (1180)

109 (willingness to pay or standard gamble* or time trade off* or time
tradeoff*).ti,ab. (3155)

110 (HTA or "technology assessment" or "technology appraisal").ti,ab. (3756)

111 (CER or "comparative effectiveness research").ti,ab. (2666)

112 or/105-111 (558335)

113 *Economics/ or exp *"Costs and Cost Analysis"/ or *Budgets/ or exp *Models,
Economic/ or *Markov Chains/ or *Monte Carlo Method/ or *Decision Trees/ (65907)

114 (Economic* or cost or costs or costly or costing or costed or price or prices or
pricing or budget*).ti. (103379)

115 ((monte adj carlo) or markov or (decision adj2 (tree\$ or analys\$))).ti. (7891)

116 (value adj2 (money or monetary)).ti. (225)

117 (willingness to pay or standard gamble* or time trade off* or time tradeoff*).ti.
(669)

118 (HTA or "technology assessment" or "technology appraisal").ti. (1675)

119 (CER or "comparative effectiveness research").ti. (648)

120 or/113-119 (145975)

121 24 and 76 and 120 (307)

122 48 and 104 and 120 (163)

123 48 and 76 and 112 (265)

124 121 or 122 or 123 (635)

125 *Alzheimer Disease/ (51369)

126 *Parkinson Disease/ (37612)

127 *Dementia/ (27394)

128 *Bipolar Disorder/ (22710)

129 *Psychotic Disorders/ (22905)

130 *Obsessive-Compulsive Disorder/ (8499)

131 *Mental Disorders/ (88784)

132 *Palliative Care/ (20711)

133 *Nursing Homes/ (19359)

134 *Residential Facilities/ (2745)

135 *Long-Term Care/ (7437)

136 (nursing adj home).ti. (7580)

137 residential home*.ti. (231)

138 nursing home*.ti. (11678)

139 residential care*.ti. (690)

140 care home*.ti. (727)

141 or/125-140 (299007)

142 124 not 141 (549)

143 animals/ (5211520)

144 humans/ (13184976)

145 143 not 144 (3791956)

- 146 142 not 145 (548)
- 147 limit 146 to (comment or editorial or news) (4)
- 148 146 not 147 (544)
- 149 limit 148 to ed=20070201-20140228 (277)
- 150 limit 149 to english language (258)

Medline In-Process

Database: Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations <March 03, 2014>

Search Strategy:

-
- 1 aged/ or "aged, 80 and over"/ (6)
 - 2 Retirement/ (0)
 - 3 elder*.ti,ab. (11178)
 - 4 geriatric*.ti,ab. (1909)
 - 5 seniors.ti,ab. (355)
 - 6 senior citizen*.ti,ab. (39)
 - 7 retire*.ti,ab. (789)
 - 8 pensioner*.ti,ab. (35)
 - 9 "later life".ti,ab. (458)
 - 10 "late life".ti,ab. (315)
 - 11 "old age".ti,ab. (1063)
 - 12 (older adj people*).ti,ab. (1334)
 - 13 (old adj people*).ti,ab. (149)
 - 14 (older adj person*).ti,ab. (455)
 - 15 (old adj person*).ti,ab. (42)
 - 16 (older adj adult*).ti,ab. (3180)
 - 17 ("older man" or (older adj men*)).ti,ab. (356)
 - 18 ("older woman" or (older adj women*)).ti,ab. (530)
 - 19 (older adj male*).ti,ab. (135)
 - 20 (older adj female*).ti,ab. (97)
 - 21 "old old".ti,ab. (39)
 - 22 "very old".ti,ab. (180)
 - 23 "oldest old".ti,ab. (100)
 - 24 or/1-23 (18942)
 - 25 *aged/ or *"aged, 80 and over"/ (0)
 - 26 *Retirement/ (0)
 - 27 elder*.ti. (4720)
 - 28 geriatric*.ti. (660)
 - 29 seniors.ti. (85)
 - 30 senior citizen*.ti. (8)
 - 31 retire*.ti. (294)

32 pensioner*.ti. (7)
 33 "later life".ti. (72)
 34 "late life".ti. (136)
 35 "old age".ti. (222)
 36 (older adj people*).ti. (524)
 37 (old adj people*).ti. (32)
 38 (older adj person*).ti. (137)
 39 (old adj person*).ti. (8)
 40 (older adj adult*).ti. (1463)
 41 ("older man" or (older adj men*)).ti. (124)
 42 ("older woman" or (older adj women*)).ti. (178)
 43 (older adj male*).ti. (12)
 44 (older adj female*).ti. (13)
 45 "old old".ti. (4)
 46 "very old".ti. (53)
 47 "oldest old".ti. (51)
 48 or/25-47 (8641)
 49 *Resilience, Psychological/ (0)
 50 *Adaptation, Psychological/ (1)
 51 *Social Distance/ (0)
 52 *Community Networks/ (0)
 53 *Independent Living/ (0)
 54 *Social Identification/ (0)
 55 *Happiness/ (0)
 56 "positive mental health".ti. (11)
 57 ((mental or social or emotional or psychological) adj3 ("well being" or wellbeing)).ti. (190)
 58 resilien*.ti. (390)
 59 ((social or family) adj3 relationship*).ti. (114)
 60 *internal-external control/ or *interpersonal relations/ or *intergenerational relations/ (0)
 61 ((sense or locus or event* or future or circumstance* or situation* or life) adj3 control).ti. (160)
 62 (independen* adj3 (live or living)).ti. (27)
 63 productiv*.ti. (687)
 64 ((achiev* or reach) adj3 potential).ti. (4)
 65 "make choices".ti. (3)
 66 "exercise choice".ti. (0)
 67 independence.ti. (243)
 68 *Personal Satisfaction/ (0)
 69 (emotional adj3 (health or capital)).ti. (26)
 70 mental capital.ti. (0)
 71 *Loneliness/ (0)
 72 empower*.ti. (209)

73 ((community or social or family or civic) adj3 (participat* or isolat* or engag* or volunteer* or contact* or involv* or inclu* or exclu*)).ti. (442)

74 dignity.ti. (81)

75 *Mental Health/ and pc.fs. (0)

76 or/49-75 (2571)

77 Resilience, Psychological/ (0)

78 Adaptation, Psychological/ (1)

79 Social Distance/ (0)

80 Community Networks/ (0)

81 Independent Living/ (0)

82 Social Identification/ (0)

83 Happiness/ (0)

84 "positive mental health".ti,ab. (31)

85 ((mental or social or emotional or psychological) adj3 ("well being" or wellbeing)).ti,ab. (1122)

86 resilien*.ti,ab. (1410)

87 ((social or family) adj3 relationship*).ti,ab. (1006)

88 internal-external control/ or interpersonal relations/ or intergenerational relations/ (0)

89 ((sense or locus or event* or future or circumstance* or situation* or life) adj3 control).ti,ab. (976)

90 (independen* adj3 (live or living)).ti,ab. (285)

91 productiv*.ti,ab. (5419)

92 ((achiev* or reach) adj3 potential).ti,ab. (302)

93 "make choices".ti,ab. (40)

94 "exercise choice".ti,ab. (5)

95 independence.ti,ab. (2113)

96 Personal Satisfaction/ (0)

97 (emotional adj3 (health or capital)).ti,ab. (228)

98 mental capital.ti,ab. (3)

99 Loneliness/ (0)

100 empower*.ti,ab. (1128)

101 ((community or social or family or civic) adj3 (participat* or isolat* or engag* or volunteer* or contact* or involv* or inclu* or exclu*)).ti,ab. (4618)

102 dignity.ti,ab. (275)

103 Mental Health/ and pc.fs. (0)

104 or/77-103 (18081)

105 Economics/ or exp "Costs and Cost Analysis"/ or Budgets/ or exp Models, Economic/ or Markov Chains/ or Monte Carlo Method/ or Decision Trees/ (0)

106 (Economic* or cost or costs or costly or costing or costed or price or prices or pricing or budget*).ti,ab. (46058)

107 ((monte adj carlo) or markov or (decision adj2 (tree\$ or analys\$))).ti,ab. (10440)

108 (value adj2 (money or monetary)).ti,ab. (118)

109 (willingness to pay or standard gamble* or time trade off* or time tradeoff*).ti,ab. (313)

110 (HTA or "technology assessment" or "technology appraisal").ti,ab. (482)

111 (CER or "comparative effectiveness research").ti,ab. (328)

112 or/105-111 (56306)

113 *Economics/ or exp *"Costs and Cost Analysis"/ or *Budgets/ or exp *Models, Economic/ or *Markov Chains/ or *Monte Carlo Method/ or *Decision Trees/ (0)

114 (Economic* or cost or costs or costly or costing or costed or price or prices or pricing or budget*).ti. (8609)

115 ((monte adj carlo) or markov or (decision adj2 (tree\$ or analys\$))).ti. (2317)

116 (value adj2 (money or monetary)).ti. (17)

117 (willingness to pay or standard gamble* or time trade off* or time tradeoff*).ti. (60)

118 (HTA or "technology assessment" or "technology appraisal").ti. (105)

119 (CER or "comparative effectiveness research").ti. (127)

120 or/113-119 (11177)

121 24 and 76 and 120 (0)

122 48 and 104 and 120 (6)

123 48 and 76 and 112 (7)

124 121 or 122 or 123 (13)

125 *Alzheimer Disease/ (1)

126 *Parkinson Disease/ (1)

127 *Dementia/ (0)

128 *Bipolar Disorder/ (0)

129 *Psychotic Disorders/ (0)

130 *Obsessive-Compulsive Disorder/ (0)

131 *Mental Disorders/ (0)

132 *Palliative Care/ (0)

133 *Nursing Homes/ (0)

134 *Residential Facilities/ (0)

135 *Long-Term Care/ (0)

136 (nursing adj home).ti. (325)

137 residential home*.ti. (7)

138 nursing home*.ti. (494)

139 residential care*.ti. (50)

140 care home*.ti. (67)

141 or/125-140 (617)

142 124 not 141 (13)

143 animals/ (27)

144 humans/ (84)

145 143 not 144 (5)

146 142 not 145 (13)

147 limit 146 to (comment or editorial or news) (0)

148 146 not 147 (13)

149 148 (13)
150 limit 149 to english language (12)

DARE (1st quarter 2014, via Ovid)

1. (aged or "aged, 80 and over").kw.
2. Retirement.kw.
3. elder*.ti,ab.
4. geriatric*.ti,ab.
5. seniors.ti,ab.
6. senior citizen*.ti,ab.
7. retire*.ti,ab.
8. pensioner*.ti,ab.
9. "later life".ti,ab.
10. "late life".ti,ab.
11. "old age".ti,ab.
12. (older adj people*).ti,ab.
13. (old adj people*).ti,ab.
14. (older adj person*).ti,ab.
15. (old adj person*).ti,ab.
16. (older adj adult*).ti,ab.
17. ("older man" or (older adj men*)).ti,ab.
18. ("older woman" or (older adj women*)).ti,ab.
19. (older adj male*).ti,ab.
20. (older adj female*).ti,ab.
21. "old old".ti,ab.
22. "very old".ti,ab.
23. "oldest old".ti,ab.
24. or/1-23
25. "Resilience, Psychological".kw.
26. "Adaptation, Psychological".kw.
27. "Social Distance".kw.
28. "Community Networks".kw.
29. "Independent Living".kw.
30. "Social Identification".kw.
31. "Happiness".kw.
32. "positive mental health".ti,ab.
33. ((mental or social or emotional or psychological) adj3 ("well being" or wellbeing)).ti,ab.
34. resilien*.ti,ab.
35. ((social or family) adj3 relationship*).ti,ab.
36. ("internal-external control" or "interpersonal relations" or "intergenerational relations").kw.

37. ((sense or locus or event* or future or circumstance* or situation* or life) adj3 control).ti,ab.
38. (independen* adj3 (live or living)).ti,ab.
39. productiv*.ti,ab.
40. ((achiev* or reach) adj3 potential).ti,ab.
41. "make choices".ti,ab.
42. "exercise choice".ti,ab.
43. independence.ti,ab.
44. Personal Satisfaction.kw.
45. (emotional adj3 (health or capital)).ti,ab.
46. mental capital.ti,ab.
47. Loneliness.kw.
48. empower*.ti,ab.
49. ((community or social or family or civic) adj3 (participat* or isolat* or engag* or volunteer* or contact* or involv* or inclu* or exclu*)).ti,ab.
50. dignity.ti,ab.
51. ("Mental Health" and pc).kw.
52. or/25-51
53. (nursing adj home).ti.
54. residential home*.ti.
55. nursing home*.ti.
56. residential care*.ti.
57. care home*.ti.
58. Alzheimer*.ti.
59. dementia.ti.
60. parkinson*.ti.
61. 53 or 54 or 55 or 56 or 57 or 58 or 59 or 60
62. (24 and 52) not 61
63. ("2007" or "2008" or "2009" or "2010" or "2011" or "2012" or "2013" or "2014").sr.
64. 62 and 63
65. ("Economics" or "Costs and Cost Analysis" or "Budgets" or "Models, Economic" or "models, econometric" or "Cost Allocation" or "Cost-Benefit Analysis" or "Cost of Illness" or "Cost Sharing" or "Health Care Costs" or "Health Expenditures" or "Cost Control" or "Markov Chains" or "Monte Carlo Method" or "Decision Trees").kw.
66. (Economic* or cost or costs or costly or costing or costed or price or prices or pricing or budget*).ti,ab.
67. ((monte adj carlo) or markov or (decision adj2 (tree\$ or analys\$))).ti,ab.
68. (value adj2 (money or monetary)).ti,ab.
69. (willingness to pay or standard gamble* or time trade off* or time tradeoff*).ti,ab.
70. (HTA or "technology assessment" or "technology appraisal").ti,ab.
71. (CER or "comparative effectiveness research").ti,ab.
72. or/65-71
73. 64 and 72

0 references retrieved

Social Care Online

(elder* OR geriatric* OR senior* OR retire* OR pensioner* OR (late* AND life) OR old*)

AND

("well being" OR wellbeing OR "positive mental health" OR resilien* OR relationship* OR control OR independen* OR productiv* OR potential OR "make choices" OR "exercise choice" OR independence OR emotional OR "mental capital" OR empower* OR dignity OR loneliness OR community OR social OR family OR civic)

AND

(Economic* or cost* or price or prices or pricing or budget* or value or markov or pay or payer)

NOT

alzheimer* OR parkinson* OR dementia OR palliative OR "residential care" OR "care home" OR "nursing home" OR "long term care" [in title]

note: in the search it was specified that any 2 of the 3 clusters highlighted in green had to appear in the title of the record. This search retrieved 585 records in total before de-duplication.

PsychInfo

Database: PsycINFO <2002 to March Week 1 2014>

Search Strategy:

-
- 1 Retirement/ (1645)
 - 2 elder*.ti,ab. (25215)
 - 3 geriatric*.ti,ab. (6116)
 - 4 seniors.ti,ab. (2400)
 - 5 senior citizen*.ti,ab. (321)
 - 6 retire*.ti,ab. (5347)
 - 7 pensioner*.ti,ab. (123)
 - 8 "later life".ti,ab. (2918)
 - 9 "late life".ti,ab. (2825)
 - 10 "old age".ti,ab. (4571)
 - 11 (older adj people*).ti,ab. (6436)
 - 12 (old adj people*).ti,ab. (558)
 - 13 (older adj person*).ti,ab. (2737)

- 14 (old adj person*).ti,ab. (174)
- 15 (older adj adult*).ti,ab. (19550)
- 16 ("older man" or (older adj men*)).ti,ab. (1120)
- 17 ("older woman" or (older adj women*)).ti,ab. (2178)
- 18 (older adj male*).ti,ab. (488)
- 19 (older adj female*).ti,ab. (346)
- 20 "old old".ti,ab. (277)
- 21 "very old".ti,ab. (582)
- 22 "oldest old".ti,ab. (574)
- 23 or/1-22 (63145)
- 24 *Retirement/ (1350)
- 25 elder*.ti. (9593)
- 26 geriatric*.ti. (1841)
- 27 seniors.ti. (502)
- 28 senior citizen*.ti. (76)
- 29 retire*.ti. (1230)
- 30 pensioner*.ti. (22)
- 31 "later life".ti. (786)
- 32 "late life".ti. (1187)
- 33 "old age".ti. (1127)
- 34 (older adj people*).ti. (2213)
- 35 (old adj people*).ti. (113)
- 36 (older adj person*).ti. (714)
- 37 (old adj person*).ti. (21)
- 38 (older adj adult*).ti. (8200)
- 39 ("older man" or (older adj men*)).ti. (301)
- 40 ("older woman" or (older adj women*)).ti. (812)
- 41 (older adj male*).ti. (60)
- 42 (older adj female*).ti. (37)
- 43 "old old".ti. (65)
- 44 "very old".ti. (156)
- 45 "oldest old".ti. (235)
- 46 or/24-45 (28883)
- 47 *well being/ or *adaptation/ or *happiness/ or exp *Positive Psychology/ or
*"resilience (psychological)"/ or exp *interpersonal relationships/ or *Interpersonal
Control/ or *"Internal External Locus of Control"/ or *dignity/ or *Loneliness/ or *life
satisfaction/ or *productivity/ or *Social Capital/ or *empowerment/ (77837)
- 48 "positive mental health".ti. (46)
- 49 ((mental or social or emotional or psychological) adj3 ("well being" or
wellbeing)).ti. (2331)
- 50 resilien*.ti. (4405)
- 51 ((social or family) adj3 relationship*).ti. (1970)
- 52 ((sense or locus or event* or future or circumstance* or situation* or life) adj3
control).ti. (1084)

53 (independen* adj3 (live or living)).ti. (205)
 54 productiv*.ti. (1355)
 55 ((achiev* or reach) adj3 potential).ti. (28)
 56 "make choices".ti. (8)
 57 "exercise choice".ti. (0)
 58 independence.ti. (838)
 59 *Personal Satisfaction/ (0)
 60 (emotional adj3 (health or capital)).ti. (217)
 61 mental capital.ti. (13)
 62 empower*.ti. (2369)
 63 ((community or social or family or civic) adj3 (participat* or isolat* or engag* or
 volunteer* or contact* or involv* or inclu* or exclu*)).ti. (3876)
 64 dignity.ti. (314)
 65 or/47-64 (86664)
 66 well being/ or adaptation/ or happiness/ or exp Positive Psychology/ or
 "resilience (psychological)"/ or exp interpersonal relationships/ or Interpersonal
 Control/ or "Internal External Locus of Control"/ or dignity/ or Loneliness/ or life
 satisfaction/ or productivity/ or Social Capital/ or empowerment/ (98808)
 67 "positive mental health".ti,ab. (334)
 68 ((mental or social or emotional or psychological) adj3 ("well being" or
 wellbeing)).ti,ab. (11235)
 69 resilien*.ti,ab. (11769)
 70 ((social or family) adj3 relationship*).ti,ab. (15407)
 71 ((sense or locus or event* or future or circumstance* or situation* or life) adj3
 control).ti,ab. (5552)
 72 (independen* adj3 (live or living)).ti,ab. (1736)
 73 productiv*.ti,ab. (13283)
 74 ((achiev* or reach) adj3 potential).ti,ab. (820)
 75 "make choices".ti,ab. (542)
 76 "exercise choice".ti,ab. (39)
 77 independence.ti,ab. (8977)
 78 (emotional adj3 (health or capital)).ti,ab. (1910)
 79 mental capital.ti,ab. (28)
 80 empower*.ti,ab. (12111)
 81 ((community or social or family or civic) adj3 (participat* or isolat* or engag* or
 volunteer* or contact* or involv* or inclu* or exclu*)).ti,ab. (36319)
 82 dignity.ti,ab. (2025)
 83 or/66-82 (181353)
 84 economics/ or health care economics/ or budgets/ or exp "costs and cost
 analysis"/ or resource allocation/ or exp markov chains/ (24818)
 85 (Economic* or cost or costs or costly or costing or costed or price or prices or
 pricing or budget*).ti,ab. (94547)
 86 ((monte adj carlo) or markov or (decision adj2 (tree\$ or analys\$))).ti,ab. (4256)
 87 (value adj2 (money or monetary)).ti,ab. (461)

88 (willingness to pay or standard gamble* or time trade off* or time tradeoff*).ti,ab. (1155)

89 (HTA or "technology assessment" or "technology appraisal").ti,ab. (382)

90 (CER or "comparative effectiveness research").ti,ab. (230)

91 or/84-90 (102773)

92 *economics/ or *health care economics/ or *budgets/ or exp *"costs and cost analysis"/ or *resource allocation/ or exp *markov chains/ (19051)

93 (Economic* or cost or costs or costly or costing or costed or price or prices or pricing or budget*).ti. (13753)

94 ((monte adj carlo) or markov or (decision adj2 (tree\$ or analys\$))).ti. (760)

95 (value adj2 (money or monetary)).ti. (41)

96 (willingness to pay or standard gamble* or time trade off* or time tradeoff*).ti. (266)

97 (HTA or "technology assessment" or "technology appraisal").ti. (119)

98 (CER or "comparative effectiveness research").ti. (81)

99 or/92-98 (25184)

100 23 and 65 and 99 (65)

101 46 and 83 and 99 (61)

102 46 and 65 and 91 (202)

103 100 or 101 or 102 (272)

104 *alzheimer's disease/ or *parkinson's disease/ or exp *Dementia/ or *Bipolar Disorder/ or *Schizophrenia/ or *Psychosis/ or *Schizoaffective Disorder/ or *Obsessive Compulsive Disorder/ or exp *Mental Disorders/ or *palliative care/ or *nursing homes/ or *Long Term Care/ or *Residential Care Institutions/ (231546)

105 (nursing adj home).ti. (1429)

106 residential home*.ti. (54)

107 nursing home*.ti. (2136)

108 residential care*.ti. (477)

109 care home*.ti. (237)

110 104 or 105 or 106 or 107 or 108 or 109 (231758)

111 103 not 110 (255)

112 limit 111 to editorial (3)

113 111 not 112 (252)

114 limit 113 to (english language and yr="2007 -Current") (158)

Appendix B: Bibliography of included studies

- Coulton S, Clift S, Skingley A, Rodriguez J (In preparation). Effectiveness and cost effectiveness of community singing on the health-related quality of life of the older population: A randomized controlled trial.
- Onrust S, Smit F, Willemse G, van den Bout J and Cuijpers P (2008). Cost-utility of a visiting service for older widowed individuals: Randomised trial. BMC Health Services Research 8: 128.
- Onrust S, Willemse G, van Den Bout J and Cuijpers P (2010). Effects of a visiting service for older widowed individuals: a randomised clinical trial. Death Studies 34 (9): 777-803.
- Pitkala KH, Routasalo P, Kautiainen H and Tilvis RS (2009). Effects of psychosocial group rehabilitation on health, use of health care services, and mortality of older persons suffering from loneliness: a randomised, controlled trial. The Journals of Gerontology. Series A, Biological science and medical sciences 64 (7): 792-800.
- Skingley A, Clift SM, Coulton SP and Rodriguez J (2011). The effectiveness and cost-effectiveness of a participative community singing programme as a health promotion initiative for older people: protocol for a randomised controlled trial. BMC Public Health 11 (142).

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- Bouwmans C, De Jong K, Timman R, Zijlstra-Vlasveld M, Van der Feltz-Cornelis C, Tan SS and Hakkaart-van Roijen Leona (2013). Feasibility, reliability and validity of a questionnaire on healthcare consumption and productivity loss in patients with a psychiatric disorder (TiC-P). BMC Health Services Research 13: 217.
- Campbell MK and Torgerson DJ (1999). Bootstrapping: estimating confidence intervals for cost-effectiveness ratios. The Quaterly Journal of Medicine 92: 177-182.
- Charlson ME, Pompei P, Ales KL and MacKenzie CR (1987). A new method of classifying prognostic comorbidity in longitudinal studies: development and validation. Journal of Chronic Diseases 40 (5): 373-383.

- Drummond M et al. (1997) *Methods for the economic evaluation of health care programmes*. 2nd ed. Oxford. Oxford University Press.
- Fielding RA, Rejeski WJ, Blair S, Church T, Espeland MA, Gill TM, Guralnik JM, Hsu F-C, Katula J, King AC, Kritchevsky SB, McDermott MM, Miller ME, Nayfield S, Newman AB, Williamson JD, Bonds D, Romashkan S, Hadley E, and Pahor M for the LIFE Research Group (2011). The Lifestyles Interventions and Independence for Elders Study: Design and Methods. *The Journals of Gerontology, Series A, Biological Science and Medical Sciences* 66A (11): 1226-1237.
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Appendix C: Bibliography of excluded studies

Table 4: Bibliography of excluded studies – considered at full text

Reference	Summary of reason for exclusion
Aanesen M, Lotherington AT and Olsen F (2011). Smarter elder care? A cost-effectiveness analysis of implementing technology in elder care. Health Informatics Journal 17: 161.	This analysis models cost effectiveness of smart house technology (e.g. falls sensors) and video visits. However, there is a lack of data presented on mental wellbeing outcomes and it is instead focussed on care savings.
Becker H, McDougall Jr. GJ, Douglas NE and Arheart KL (2008). Comparing the efficiency of an eight-session versus four-session memory intervention for older adults. Archives of Psychiatric Nursing 22 (2): 87-94.	Some cost-effectiveness data presented but outcomes are focussed on improving memory (prevention of cognitive decline) with some functional outcomes (e.g. communication, shopping skills, dressing/grooming skills) presented.
Boniface G, Mason M, Macintyre J, Synan C, Jill Riley (2013) The effectiveness of local authority social services' occupational therapy for older people in Great Britain: a critical literature review. British Journal of Occupational Therapy, 76(12), 538–547.	This is a systematic review of occupational therapy (covered in PH16).
Bunck TJ and Iwata BA (1978). Increasing senior participation in a community-based nutritious meals program. Journal of Applied Behaviour Analysis 11: 75-86.	A study examining how to increase participation in a meals program for older people. This was published in 1978 and is thus not contemporary.
Cass Business School (2008). The economic, health and social benefits of care co-ordination for older people. The Integrated Care Co-ordination Service (ICCS). City Business School. City University London .	This describes an integrated care service for people who are likely to have care needs just below the threshold of 'substantial'.
Chen I-J, Chou C-L, Yu S and Cheng S-P (2008). Health services utilization and cost utility analysis of a walking program for residential community elderly. Nursing economics 26 (4): 263-269.	This is a cost-utility analysis of physical activity programme (covered in PH16).
Clark F, Jackson J, Carlson M,1 Chou C-P, Cherry BJ, Jordan-Marsh M, Knight BG, Mandel D, Blanchard J, Granger DA, Wilcox RR, Mei Lai MY, White B, Hay J,Lam C, Marterella A and Azen SP (2012). Effectiveness of a lifestyle intervention in promoting the well-being of independently living older people: results of the Well Elderly 2 Randomised	This concerns an occupational therapy intervention covered in PH16.

Controlled Trial. Journal of epidemiology and community health 66 ((): 782 – 790.	
Davis JC, Marra CA, Robertson MC, Khan KM, Najafzadeh M, Ashe MC and T. Liu-Ambrose T (2011). Economic evaluation of dose–response resistance training in older women: a cost-effectiveness and cost-utility analysis. Osteoporosis International 22: 1355 – 1366.	This is a study examining a physical activity (covered in PH16) intervention aimed at falls prevention.
Davis JC, Marra CA, Robertson MC, Najafzadeh M, Liu-Ambrose T (2011). Sustained Economic Benefits of Resistance Training in Community-Dwelling Senior Women. Journal of the American Geriatrics Society 59: 1232-1237.	This is a cost utility analysis of a physical activity programme (covered in PH 16).
DIMDI (2010). Fall prophylaxis for the elderly. German Agency for Health Technology Assessment at the German Institute for Medical Documentation and Information (DAHTA@ DIMDI).	This is a bibliographic record of a technology assessment of a falls prevention intervention.
Fabricotti IN, Janse B, Looman Wm, de Kuijper R, van Wijngaarden JDH and Reiffers A (2013). Integrated care for frail elderly compared to usual care: a study protocol of a quasi-experiment on the effects on the frail elderly, their caregivers, health professionals and health care costs. BMC Geriatrics 13: 31.	This is a study protocol only. The trial is completed but no outcome data appear to be published yet. It is a study examining the effects of integrated care with respect to frail elderly.
Fielding RA, Rejeski WJ, Blair S, Church T, Espeland MA, Gill TM, Guralnik JM, Hsu F-C, Katula J, King AC, Kritchevsky SB, McDermott MM, Miller ME, Nayfield S, Newman AB, Williamson JD, Bonds D, Romashkan S, Hadley E, and Pahor M for the LIFE Research Group (2011). The Lifestyles Interventions and Independence for Elders Study: Design and Methods. The Journals of Gerontology, Series A, Biological Science and Medical Sciences 66A (11): 1226-1237.	Protocol only – an ongoing trial comparing a physical activity intervention (covered in PH16) with a health education programme.
Frye B, Scheinthal S, Kemarskaya T, Pruchno R (2007). Tai Chi and Low Impact Exercise: Effects on the Physical Functioning and Psychological Well-being of Older People. Journal of Applied Gerontology 26: 433.	This is a study examining a physical activity intervention (economic data not included).

<p>Haighton C, Moffatt S, Howel D, Elaine McColl M, Milne E, Deverill M, Rubin G, Aspray T and White M (2012). The Do-Well study: protocol for a randomised controlled trial, economic and qualitative process evaluations of domiciliary welfare rights advice for socio-economically disadvantaged older people recruited via primary health care. BMC Public Health 12: 382.</p>	<p>Protocol only - ongoing trial. This is examining the impact of a welfare rights advice intervention.</p>
<p>Johansen I, Lindbak M, Stanghelle JK and Brekke M (2012). Independence, institutionalization, death and treatment costs 18 months after rehabilitation of older people in two different primary health care settings. BMC Health Service Research 12: 400.</p>	<p>This is a study examining inpatient versus nursing home rehabilitation of disabled older people.</p>
<p>Kaambwa B, Bryan S, Barton P, Parker H, Martin G, Hewitt G, Parker S and Wilson A (2008). Costs and health outcomes of intermediate care: results from five UK case study sites. Health and Social Care in the Community 16 (6): 573-581.</p>	<p>This analysis focusses on intermediate care provision.</p>
<p>Korte J, Bohlmeijer ET, Smit F (2009). Prevention of depression and anxiety in later life: design of a randomized controlled trial for the clinical and economic evaluation of a life-review intervention. BMC Public Health 9: 250.</p>	<p>Protocol only – examining impact of a life-review intervention. Unable to locate published economic data.</p>
<p>LaDue L (2009) Quantitative Study Comparing Tai Chi and Traditional Balance Exercises on Emotional Well-Being, Balance Control and Mobility Efficacy in Older Adults.</p>	<p>This is a study examining a physical activity intervention (covered in PH16).</p>
<p>Mason A, Weatherly H, Spilsbury K, Arksey H, Golder S, Adamson J, M Drummond M, and Glendinning C (2007). A systematic review of the effectiveness and cost-effectiveness of different models of community-based respite care for frail older people and their carers. Health Technology Assessment 11: 15.</p>	<p>Systematic review assessing cost-effectiveness of community-based respite care for frail older people and their carers</p>
<p>Medical Advisory Secretariat (2008) Social isolation in community-dwelling seniors: an evidence-based analysis. Ontario Health Technology Assessment Series 8 (5).</p>	<p>An economic analysis of a community exercise programme which is an intervention covered in PH16.</p>

<p>Melis RJF, Adang E, Teerenstra S, van Eijken MIJ, Wimo A, van Achterberg T, van de Lisdonk EH and Olde Rikkert MGM (2008). Cost-effectiveness of a multidisciplinary intervention model for community-dwelling frail older people. <i>Journal of Gerontology</i> 63A (3): 275-282.</p>	<p>This is a CEA examining an intervention for frail older people involving visits from a geriatric specialist nurse.</p>
<p>Murray M, Scharf T, Maslin-Protehr S, Beech R, Ziegler F (2013). Call-Me: Promoting independence and social engagement among older people in disadvantaged communities. New dynamics of ageing – a cross-council research programme.</p>	<p>Not economic evaluation/no economic data presented.</p>
<p>Pleace N (2011). The Costs and Benefits of Preventative Support Services for Older People. The Centre for Housing Policy. University of York.</p>	<p>Review of preventative support services that assist older people with care and support needs to remain in their own homes. Not an economic evaluation.</p>
<p>Ryburn B, Wells Y, Foreman P (2009). Enabling independence: restorative approaches to home care provision for frail older adults. <i>Health and Social Care in the Community</i> 17 (3): 225-234.</p>	<p>Review of restorative approaches towards home care for frail older adults -not full economic evaluation of relevant intervention reporting outcomes of interest.</p>
<p>Sacks D, Das D, Romanick R, Caron M, Morano C and Fahs MC (2009). The value of daily money management: an analysis of outcomes and costs. Brookdale Center for Healthy Aging & Longevity of Hunter College / CUNY.</p>	<p>An analysis of a community-based programme of Daily Money Management aimed at vulnerable population with a high prevalence of mental health disorder. The intervention provided some personal services but included increased care provision, referrals to mental health services and provision of financial entitlements.</p>
<p>Tappenden P, Campbell F, Rawdin A, Wong R and Kalita N (2012). The clinical effectiveness of home-based, nurse-led health promotion for older people: a systematic review. <i>Health Technology Assessment</i> 16 (20).</p>	<p>Systematic review of home-based nurse-led promotion including economic evaluations. Three papers were included in the review (1) an early discharge and integrated care protocol for patients admitted to hospital with acute exacerbations of COPD (2) community-based nursing (including counselling and education, options for respite or day hospital care etc.) for patients with Parkinsons Disease (3) early discharge and rehabilitation service for older patients admitted to hospital. Included papers concerned interventions for those on discharge from acute hospital admissions or for chronic medical condition management.</p>

	Therefore, it was considered beyond the scope of the review.
Trivedi D, Goodman C, Gage H, Baron N, Scheibl F, Iliffe S, Manthorpe, J, Bunn F, Drennan V (2013). The effectiveness of inter-professional working for older people living in the community: a systematic review. <i>Health and Social Care in the Community</i> 21 (2): 113-128.	This is a systematic review examining interprofessional working interventions
van Boxsel J A, van Beekum W T (eds) (1995). Possibilities of a technology assessment regarding extramural technology: technological products and services which contribute to independent living of (elderly, disabled and chronically ill) people. Centre for Reviews and Dissemination.	Abstract only of a proposed technology assessment of extramural technology. Published in 1995 and is thus not contemporary.
van der Weele GM, de Waal MWM, van den Hout WB, Craen AJM, Spinhoven P, Stitjen T, Assendelf WJJ, van der Mast RC (2012). Effects of a stepped-care intervention programme among older subjects who screened positive for depressive symptoms in general practice: the PROMODE randomised controlled trial. <i>Age and Ageing</i> 41: 482-488.	This is a study examining the impact of a stepped intervention of individual counselling, a cognitive behaviour therapy-based group course and referral back to GP to discuss further treatment aimed at those screening positive for depression.
Wales K , Clemson L, Lannin NA, Cameron ID, Salked G, Gitlin L, Rubenstein L, Barras S, Lynette Mackenzie L and Davies C (2012). Occupational therapy discharge planning for older adults: A protocol for a randomised trial and economic evaluation. <i>BMC Geriatrics</i> 12: 34.	Protocol only – recruitment complete but no outcome data appear to be published yet. Occupational therapy is an intervention covered in PH16.
Windle G, Hughes D, Linck P, Russell I and Bob Woods B (2010) Is exercise effective in promoting mental well-being in older age? A systematic review. <i>Aging and Mental Health</i> 14 (6): 652-669.	This is a systematic review examining physical activity interventions covered in PH16.

Appendix D: Evidence Tables

Table 5: Evidence Table – Onrust et al. (2008)

Study details	Population and setting	Intervention/ comparator	Outcomes and methods of analysis	Results	Notes
<p>Authors: Onrust S, Smit F, Willemse G, van den Bout J and Cuijpers P</p> <p>Year: Published 2008 (Recruitment: 2003-2004)</p> <p>Aim of study: To evaluate the cost effectiveness alongside a randomized clinical trial (RCT) of a visiting service for older widowed individuals by trained volunteers compared with care as usual.</p> <p>Type of</p>	<p>Source population: Residents aged 55+ who had lost their spouse 6-9 months before.</p> <p><i>Inclusion criteria:</i></p> <ul style="list-style-type: none"> - Widowed during previous year - Moderate or strong feelings of loneliness (on 'Loneliness Scale' –questionnaire in initial mail-out) - Absence of a 'full-blown mental disorder' (assessed via M.I.N.I Plus, standardised diagnostic interview) - Capable of 1 hour telephone interview <p><i>Participants:</i></p> <ul style="list-style-type: none"> - 63.8% female - Mean age 68.8 (range 50-92) - average 13 years education 	<p>Intervention description:</p> <p><i>Selective (aimed at high risk) bereavement intervention offering social support:</i></p> <p>One-to-one visiting service based on the Widow-to-Widow program: 10-12 volunteer home visits (widowed themselves for several years) to express feelings, understand grieving process and receive information & practical help. Average number of delivered sessions was 8.3 (range 0-30; reported in Onrust et al. 2010)</p> <p>Volunteers trained via 6</p>	<p>Outcomes:</p> <p>Costs per Quality-adjusted life years (QALYs; using EQ-5D) gained.</p> <p>Data collected at baseline, 6 months, 12 months and 24 months (+/-2 weeks)</p> <p>Costs:</p> <p><i>Resource use (number of units x cost price in 2003):</i></p> <p>Assessed via parts of TiC-P over past 4 weeks:</p> <ul style="list-style-type: none"> - Direct medical costs: all types of healthcare services including GP care, social care, mental health services care, home care, informal care from family and friends and antidepressant, anxiolytic and hypnotic medication (including dispensing costs). - Direct non-medical costs: patient costs (e.g. travelling and parking costs and patient time spent) - Other patient costs: from not being able to perform domestic tasks (based on price of 	<p>Primary analysis</p> <p>Outcomes</p> <p>Intervention group experienced significant increase in Health-related Quality of Life (HRQOL) (0.04; p=0.025) but control group did not (-0.01; p = 0.488). No significant differences in HRQOL changes when adjusted for confounding variables (p=0.215).</p> <p>No improvement of depression over that of usual care reported (and no other differences reported in RCT paper (Onrust et al. 2010)).</p> <p>Costs</p> <ul style="list-style-type: none"> - Costs increased over time in both groups but were not statistically significant. - Total intervention cost: €553 (€453 direct medical costs per person per year and €100 volunteer time costs per participant). - Mean difference of additional costs was €210 in favour of control group but not statistically significant (p=0.563). Costs of health care usage were lower in the in the intervention group. 	<p>Limitations identified by author:</p> <p><i>Initial non-response:</i> High so unclear representativeness and acceptability. 11.4% (n=308) of all contacted persons responded and 8.1% participated in the trial. Exclusions: 8.8% not reporting loneliness (n=27); 10.7% (n=33) not capable of participating due to confusion or not understanding study objectives; 9.7% (n=30) excluded due to depression or anxiety disorder). Average utility at baseline lower than general population (0.79 vs. 0.88) but unclear if most at-risk population selected.</p> <p><i>Missing data:</i> 14.4%. Follow-up 86% at 12 months (82.7% intervention group; 88.7% control group). Analysis conducted on intention-to-treat basis with missing values imputed (regression). No significant differences in loss to follow-up and completers did not differ from non-completers.</p> <p><i>Differences at baseline:</i> Intervention group more lonely (7.1 vs. 6.0; p = 0.008) and had worse HRQOL (0.76 vs. 0.83; p = 0.030) so adjustment via residualised QALYs used.</p> <p><i>Underpowered study:</i> To detect cost changes</p> <p><i>Likely oversimplification of health care cost estimates:</i> from preceding 4 week period</p>

<p>economic analysis:</p> <p>Cost-utility analysis</p> <p>Economic perspective:</p> <p>Societal perspective (excluding costs arising from productivity losses in base case).</p> <p>Quality score:</p> <p>+ (potentially serious limitations)</p> <p>Applicability:</p> <p>+ (partially applicable)</p>	<p>- Mean duration of widowhood 7.9 months (range 2-14 months)</p> <p>N.B. Some participants younger than 55 (n=5), < 6 months bereavement or delayed participation after initial invite sent due to media promotion (see below).</p> <p>Setting:</p> <p>18 municipalities in the Netherlands. 2708 letters sent to all eligible residents (from Registry Office data). Local media also used.</p> <p>Data sources:</p> <p>Primary research: RCT (Onrust et al. 2010)</p> <p>Selection and randomisation:</p> <p>Centrally: In blocks of 2 widowed individuals (and stratified for gender and region).</p>	<p>meetings in theory and practical skills and eligibility assessed based on course participation</p> <p>Volunteers supervised by coordinator (social worker or volunteer) who had attended a course of 6 meetings on organization and procedures.</p> <p>Comparator/ Controls description:</p> <p><i>Care as usual (CAU):</i></p> <p>A brief brochure on depressive symptoms providing information and tips to improve wellbeing.</p> <p>Sample sizes:</p> <p>Total N = 216</p> <p>Intervention: N = 110 Control: N = 106</p>	<p>domestic help)</p> <p><i>Intervention costs</i></p> <p>Based on average of 4 scenarios: annual costs per participant of two (1,2) participating visiting services; estimates of annual costs from a manual used to set up the visiting services – coordinated by either a social worker or volunteer– based on Health Care Index (3) and General Index (4)). Then added volunteer time costs.</p> <ul style="list-style-type: none"> - Organisation - Volunteer training - Volunteer and intake supervision (paid social worker or volunteer) - Phone calls to volunteers and participants - Overheads <p>Time Horizon: 12 months (when potential shifts in health care use thought most likely)</p> <p>Discount rates: N/A</p> <p>Measures of uncertainty:</p> <p><i>Non-parametric bootstrapping</i> (x2500); cost-utility plane and cost-utility acceptability curve presented.</p> <p><i>Sensitivity analyses:</i> productivity losses included (assessed by TiC-P):</p>	<p>Cost effectiveness</p> <p><i>Cost per QALY:</i> Intervention group ICUR: €6827 per QALY gained.</p> <p><i>Median ICUR (using bootstrapping):</i> €4123 (95% CI: - €627530 - €668056)</p> <p><i>Likely acceptability and net monetary benefit (NMB):</i></p> <ul style="list-style-type: none"> - 31% if WTP = €0 per QALY gained - 55% if WTP = €10000 per QALY gained - 70% if WTP = €20000 per QALY gained and NMB = €410 - at WTP = €80000: NMB = €2270 <p><i>Probabilities that intervention generated:</i></p> <ul style="list-style-type: none"> - Better outcomes at higher cost: 59% - Better outcomes at lower cost: 28% - Worse outcomes at higher costs: 5% - Worse outcomes at lower costs: 1% <p>Secondary analysis (cost effectiveness when productivity losses included):</p> <p><i>Cost per QALY:</i> Intervention group ICUR = €11239</p> <p><i>Median ICUR (using bootstrapping):</i> €6151 (95% CI: - €205706 - €222067)</p> <p><i>Probabilities that intervention generated:</i></p> <ul style="list-style-type: none"> - Better outcomes at higher cost: 	<p>(converted to annual costs) though would likely affect both groups.</p> <p>Limitations identified/comments by review team:</p> <p><i>Representativeness of control intervention:</i> Usual care as defined in this study – would consist of actively seeking out lonely widowed individuals and providing them with a brochure.</p> <p><i>Did not include productivity losses in base case</i> (only 14% employed at baseline and only 3% at baseline and 1% at follow-up reported work absence/reduced efficiency). However, losses were included in sensitivity analysis.</p> <p><i>Lack of longer term outcome data:</i> only one year follow-up presented (authors state that shifts in health care use most likely during this period).</p> <p><i>Averaging of intervention cost scenarios:</i> would potentially have been more useful to present estimates for each scenario within sensitivity analyses</p> <p><i>No data on mortality:</i> QALYs presented but mortality could potentially be a reason for loss to follow-up</p> <p><i>Unclear if mail out/recruitment included.</i></p> <p><i>Vast uncertainty around ICERs:</i> Wide confidence intervals presented.</p> <p>Evidence gaps and/or recommendations for future research:</p> <p>In-depth analyses to determine which subgroups associated with greatest benefit</p>
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			<p>- age- and gender-specific friction costs for work loss - productivity losses incurred through self-reported inefficiency scores.</p> <p>Modelling method: N/A</p>	<p>63%</p> <ul style="list-style-type: none"> - Better outcomes at lower costs: 24% - Worse outcomes at higher costs: 5% - Worse outcomes at lower costs: 1% <p><i>Likely acceptability and net monetary benefit (NMB):</i></p> <ul style="list-style-type: none"> - 27% if WTP = €0 per QALY gained - 49% if WTP = €10000 per QALY gained - 64% if WTP = €20000 per QALY gained 	<p>and cost effectiveness. Greater clinical benefits observed for those who were socially lonely, less educated or physically ill (Onrust et al. 2010)</p> <p>Source of funding:</p> <p>Netherlands Organisation for Health Research and Development (ZonMw) grant.</p>
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Table 6: Evidence Table – Pitkala et al. (2009)

Study details	Population and setting	Intervention/comparator	Outcomes and methods of analysis	Results	Notes
<p>Authors:</p> <p>Pitkala KH, Routasalo P, Kautiainen H and Tilvis RS.</p> <p>Year:</p> <p>2009 (Recruitment: 2002)</p> <p>Aim of study:</p> <p>To investigate the effects of a psychosocial group rehabilitation model on subjective health, use and costs of health services, and mortality of elderly people suffering from loneliness.</p> <p>Type of economic analysis:</p> <p>Cost</p>	<p>Source population:</p> <p>Older people aged 75+ in Finland who had subjective feelings of loneliness and lived at home.</p> <p>Exclusion criteria:</p> <p>Moderate/severe dementia (MMSE <19 points or Clinical Dementia Rating >1), permanently living in institutional care, 'blindness, deafness or inability to move independently without another person's aid'. Those of NYHA class 3 and 4 were excluded from exercise and discussion groups. Those excluded were older, more often female, had more disabilities and more often had dementia.</p> <p>Participants: Mean age 80; Females: 74.4% intervention and 72.9% control, >68% widowed; mean points in depression (Montgomery-Åsberg) scale 9.0 intervention and 10.0 control. Mean Charlson Comorbidity Index 2.1. Diastolic blood pressure lower in controls.</p> <p>Setting:</p> <p>Postal questionnaires sent to a random sample of the Finnish National Population Register in 6 communities (n=6786). Reminder: 1 month later.</p>	<p>Intervention description:</p> <p>15 closed groups aiming to empower participants and promote peer support and social integration. Three groups with a modifiable but predetermined and objective-orientated program:</p> <p><i>Art and inspiring activities</i> e.g. visits by artists, cultural events/sights and own art production.</p> <p><i>Exercise and health-related discussions</i> e.g. Nordic stick walking, strength training, swimming, dancing.</p> <p><i>Therapeutic writing and group psychotherapy</i> e.g. writing about life and feelings of loneliness, group sharing and past reminiscence.</p> <p>Intervention conducted at 6 rehabilitation centres for World War II veterans and one day care centre. 12 x</p>	<p>Outcomes:</p> <p>(Analysis by intention to treat)</p> <p><i>Change in subjective health at 1 year:</i> using a 4 point scale – participants characterised as either healthy (healthy or quite healthy) or unhealthy (unhealthy or very unhealthy).</p> <p><i>Survival at 2 years</i> – based on central register data (100% complete) at end of 2005, checked with medical records.</p> <p>Nurse assessment at baseline (including interview, blood pressure height, weight and BMI), 3 and 6 months</p> <p>Costs:</p> <p><i>Use of health care services during 2 years after start of intervention</i> (doctor's office visits and days spent in hospitals) – based on average unit costs in Finland in 2001 and official records including</p>	<p>Primary analysis:</p> <p>Outcomes</p> <p><i>Completion of course:</i> 97.5% in intervention group (1 did not start; 2 discontinued after several weeks and 1 after 3 months). Authors also report that around 6/15 groups continued to meet after the official course was complete.</p> <p><i>Subjective health improved</i> 'more often' in the intervention group than in the controls at 1 year (p=0.007) (Figure presented).</p> <p><i>Survival at 2 years:</i> 97% (95% CI: 91%-99%) intervention group vs. 90% control group (95% CI: 83%-95%) (p=0.042)</p> <p>16/118 deaths in controls vs. 7/117 intervention.</p> <p>Hazard ratio (adjusted for age, gender, Charlson comorbidity index and cognition = 0.39 (95% CI: 0.15 –</p>	<p>Limitations identified by author:</p> <p><i>Motivated participants:</i> volunteers motivated to change</p> <p><i>Sample size:</i> affected by feasibility though was large enough to demonstrate a difference</p> <p><i>District nurse home visiting not included</i> as could not be accurately assessed despite authors stating much greater usage amongst controls.</p> <p>Limitations identified/comments by review team:</p> <p><i>Representativeness of sample and acceptability of intervention:</i> Only 3.3% of those initially contacted (14.5% of those identified as lonely) were eligible and consented to take part in trial. In addition, authors state that it had been challenging to find people interested in therapeutic writing and psychotherapy groups. Participants included a small number of people self-presenting with loneliness.</p> <p><i>Potential selection bias:</i> Authors state that they 'chose' primarily those individuals who showed particular interest in the content available and that division into groups was based on preferences and interests.</p> <p><i>Validity of subjective health scale:</i> unclear</p> <p><i>Differential follow-up times:</i> for cost, mortality and subjective health.</p> <p><i>Lack of detail:</i> on cost breakdown</p> <p><i>Aggregated results:</i> Results presented for all groups but could be disaggregated to test conclusion that it is not activity types that are</p>

<p>consequence analysis</p> <p>Economic perspective: Not stated</p> <p>Quality score: - (very serious limitations)</p> <p>Applicability: + (Potentially serious limitations)</p>	<p>However, 5.1% deceased and 10.5% in permanent institutional care. 71.2% home-dwellers responded (n=4113), over 37% of which reported loneliness sometimes, often or always (n=1541).</p> <p><i>Second questionnaire</i> sent to these people asking about willingness to participate, interests and preferences for intervention content. Response rate 48.4%.</p> <p><i>Telephone call to potential participants:</i> 12.9% unable to be contacted. 295 (39.5%) refused intervention. 224 participants contacted (n=96 could not be contacted), met criteria and consented.</p> <p><i>Additional participants:</i> n=11 presented to group psychotherapy centre with loneliness.</p> <p>Data sources: Primary research – randomised controlled trial.</p> <p>Selection and randomisation: In 5 areas, only one type of intervention was available; participants showing particular interest in content were chosen.</p> <p>Participants with an interest in the same activity were invited to the same cluster of 16 participants. Within this cluster, participants were placed on a list in the order that they had</p>	<p>5-6 hour weekly group sessions involving 7-8 participants. Sessions were free for participants and transport, coffee and lunch included.</p> <p>Training The 2 group leaders for each group from each centre (specialized registered nurses, occupational therapists and physiotherapists) received training including 9 days of seminars (e.g. on loneliness in old age, group dynamics, peer support, content of intervention), keeping diaries of each meeting and continuous tutoring.</p> <p>Comparator/controls description: Usual community care (+2 hour assessment sessions with study nurse x3)</p> <p>Sample sizes: Total N = 235</p> <ul style="list-style-type: none"> Therapeutic writing and group psychotherapy: Intervention N = 24 Controls N = 24 	<p>patient medical records. Based on participant response and local health care registers at 3, 6 and 12 months. Measured until end of 2004.</p> <p>Costs of intervention (group rehabilitation, program costs, transportation, meals and education of group leaders)</p> <p>Time horizon: 2 years (1 year for subjective health)</p> <p>Discount rates: N/A</p> <p>Perspective: Not stated</p> <p>Measures of uncertainty: Confidence intervals for health care service costs (using bias-corrected bootstrapping x5000) and differences between groups</p> <p>Modelling method: N/A</p>	<p>0.98) in intervention group (p=0.044)</p> <p>Costs <i>Intervention costs:</i> €881 per person</p> <p><i>Health care usage - Intervention group:</i> €1522 per person per year (95% CI: €1144-€2191)</p> <p><i>Control group:</i> €2465 per person per year (95% CI: €1826 – €3372)</p> <p>Thus, difference in health care costs: -€943 per person per year (95% CI: -€1955 to -€127; p=0.039) Therefore, intervention was estimated to be cost saving.</p> <p>Secondary analysis: N/A</p>	<p>important,</p> <p>Evidence gaps and/or recommendations for future research: N/A</p> <p>Source of funding: Research grants received from Finnish Slot Machine Association. Study carried out as part of the Geriatric Rehabilitation Project.</p>
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	<p>been assessed by the study nurse, names read out to a person at a randomisation centre and then participants were randomly assigned to intervention or control for that group using a program.</p>	<ul style="list-style-type: none"> • Exercise and health related discussions: Intervention N = 46 Controls N = 46 • Art and inspiring activities: Intervention N = 47 Controls N = 48 			
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Table 7: Coulton et al. (2014)

Study details	Population and setting	Intervention/comparator	Outcomes and methods of analysis	Results	Notes
<p>Authors: Coulton S, Clift S, Skingley A and Rodriguez J</p> <p>Year: 2014 (currently unpublished)</p> <p>Aim of study: To evaluate the effectiveness (on mental and physical health related quality of life, depression and anxiety) and cost-effectiveness of a community singing group for a population of older people in England.</p> <p>Type of economic analysis: Cost-utility analysis</p> <p>Economic</p>	<p>Source population: Aged 60 years+ who expressed interest in study.</p> <p>Exclusion criteria: Unable to provide informed consent (criteria minimised to maximise generalizability).</p> <p>Participants: 258 participants: Mean age 69, 84% female, 98% white; 11% employed; 8% depression; 19% anxiety. No differences between groups at baseline.</p> <p>Setting: 5 centres in East Kent. Recruitment via publicity:</p> <p>Researchers provided information at day centres, and other venues for older people. Placing of advertisements in</p>	<p>Intervention description: Singing – the ‘Silver Song Club Project’ – meeting to sing (songs from different eras and a variety of genres) together with professional musicians. Established format.</p> <p>Facilitators under SFYL guidance compiled 14 week x 90 minute developmental programme including a songbook. Singing melody lines, harmonising, layering, singing in rounds, chime bars, participant requesting of songs included.</p> <p>‘Unification’ meetings held to ensure facilitators could access and deliver material consistently. Maintenance of an attendee register. Unannounced visits by programme manager to each club 5-6 times.</p> <p>Groups disbanded at end of trial.</p>	<p>Outcomes: Baseline questionnaire sent to participants. Postal follow-up at 3 and 6 months (3 months after intervention ended) –</p> <p>Primary outcome: Mental health-related quality of life (using York SF-12). Clinically important difference estimated as difference of 5 points between groups. (At baseline: Intervention group: 48.8 (46.8 – 50.8), Control group: 50.0 (47.9 – 52.2).</p> <p>Secondary outcomes: Physical health-related quality of life (using York SF12).</p> <p>Anxiety and depression using Hospital Anxiety and Depression Scale (if scoring 8+ - probable case)</p> <p>Health utility - using EQ-5D</p> <p>Process measures:</p> <ul style="list-style-type: none"> Attendance Delivery of groups 	<p>Primary analysis: Outcomes: (Analysis by intention-to-treat and by adjustment for age and gender)</p> <p>Mental health-related quality of life: At 3 months: significant differences of 4.77 (2.53 - 7.01)</p> <p>At 6 months: Intervention group 52.3 (95% CI: 50.7 – 54.0) and control group 49.9 (95% CI: 48.2 – 51.7). Mean difference: 2.35 (95% CI 0.06 to 4.76; p=0.05) in favour of group singing.</p> <p>Other outcomes: At 3 months: anxiety -1.78 (-2.50 to -1.06) and depression -1.52 (-2.13 to -0.92). No differences in physical health-related quality of life.</p> <p>At 6 months: No significant differences in between groups in physical health-related quality of life, anxiety or depression. QALY gain in controls of 0.008 and intervention group of 0.023 with a difference of 0.015 (95% CI: 0.014 - 0.016).</p> <p>4/5 groups continued to meet at</p>	<p>Limitations identified by author: <i>Potential lack of generalizability:</i> Conducted in one area where population is mostly White British</p> <p><i>Duration of intervention:</i> Only short time so longer term provision may confer additional benefit not captured in study. Of note is the observation that anxiety and depression were significantly better at 3 months suggesting most benefits during active participation.</p> <p><i>Underlying change processes:</i> not explored at end.</p> <p><i>Intervention made available to controls at end of study:</i> May have perceived delayed intervention - could have impacted upon outcomes (although authors report that this would have been under-estimate of true effect)</p> <p><i>Self-selecting participants</i></p> <p>Limitations identified by review team: <i>Ineligible participants:</i> may be useful to know how many participants were unable to consent versus did not wish to.</p> <p><i>Loss to follow-up:</i> follow-up was 86% at 3 months and 79% at 6 months (although authors state that no differences observed between intervention and control group). Service use costs only included for those followed up. Mortality does not appear to be considered. No adjustment/imputation made for this.</p> <p><i>Attendance:</i> 81% attended at least half of all sessions thus 19% did not.</p>

<p>perspective: Health and social care</p> <p>Quality score: +</p> <p>Applicability: ++</p>	<p>local media, general practices and community venues.</p> <p>393 people expressed initial interest. 135 (33%) were ineligible/did not consent</p> <p>Data sources:</p> <p>Primary research - pragmatic randomised controlled trial.</p> <p>Selection and randomisation:</p> <p>Randomisation was stratified by centre and gender and was conducted by an independent secure remote randomisation service. Random permuted blocks of variable length used.</p>	<p>Comparator/controls description:</p> <p>Usual activities; Informed would be welcome to join a singing group at study end (to mitigate against 'potential resentful demoralisation')</p> <p>Sample size:</p> <p>N = 258 Intervention: N = 127 (49%) Control: N = 131 (51%)</p>	<p>Costs:</p> <p>Singing groups including premises and managerial overheads (actual local costs). 12 month training costs based on facilitator delivering 80 sessions (2 per week)</p> <p>Health and social care service utilisation 6 months before and 6 months after – used questionnaire previously used for older people – included general practice visits, social care involvement, inpatient stays and outpatient attendance. Unit costs from national sources.</p> <p>Time Horizon: 6 months</p> <p>Discount rates: N/A</p> <p>Measure of uncertainty:</p> <p>Bootstrapping; cost-effectiveness acceptability curves produced. No further sensitivity analyses.</p> <p>Modelling method: N/A</p>	<p>the end of follow-up.</p> <p>Costs</p> <p><i>Intervention costs:</i></p> <ul style="list-style-type: none"> • Total cost per session = £176.84 • Total cost per participant over 14 sessions = £18.88 <p><i>Service use costs:</i></p> <p>Increased in both groups at 6 months (increase greater in intervention group but differences not significant (£315.72 vs. £273.01; difference – £42.70; 95% CI: --£463.79 - £549.20; p = 0.87)</p> <p>Cost effectiveness</p> <p>Intervention reportedly marginally more cost effective than usual activities. CEAC indicated that:</p> <ul style="list-style-type: none"> • At WTP: £0 =control group is preferred option • At WTP: £30000 = intervention preferred in 64% 	<p><i>Lack of consideration/discussion of other sources of uncertainty:</i> although a CEAC was produced.</p> <p><i>Change in mental health-related quality of life</i> did not appear to reach 'clinically significant' threshold as defined.</p> <p><i>Assumption that facilitator delivered 80 sessions per year:</i> unclear basis although authors chose this to avoid over-estimating costs. This may be a valid assumption.</p> <p><i>Breakdown of service use costs:</i> not presented.</p> <p>Evidence gaps and/or recommendations for future research:</p> <p>Effects of group singing versus other group-based activities</p> <p>Larger multi-centre trial with longer follow-up.</p> <p>Source of Funding:</p> <p>National Institute for Health Research (Research for Patient Benefit Programme). Note lead author is board member of Sing For Your Life Ltd,(SFYL) a third sector organisation, who developed and implemented intervention and which manages 40 such clubs.</p>
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Appendix E: Methodology checklists

Study identification: Onrust S, Smit F, Willemse G, van den Bout J and Cuijpers P (2008). Cost-utility of a visiting service for older widowed individuals: Randomised trial. BMC health Services Research 8: 128.		
Guidance topic: Independence and mental wellbeing (including social and emotional wellbeing) for older people		Question no: 1,2,3
Checklist completed by: Charlotte Simpson, Public Health Specialty Registrar Checked for accuracy by: Tracey Shield, Public Health Analyst, NICE		
Section 1: Applicability (relevance to specific topic review question(s) and the NICE reference case)	Yes/partly/no/unclear/not applicable	Comments
1.1 Is the study population appropriate for the topic being evaluated?	Partly	Older individuals age 55 or older (slightly younger than defined in initial scope) who were widowed 6-9 months earlier.
1.2 Are the interventions appropriate for the topic being evaluated?	Yes	10-12 home visits by trained widowed volunteers – allowed exchange of experiences and provided information and help.
1.3 Is the system in which the study was conducted sufficiently similar to the current UK context?	Partly	Non-UK. The Netherlands, European country.
1.4 Was/were the perspective(s) clearly stated and what were they?	Yes	Societal
1.5 Are all direct health effects on individuals included, and are all other effects included where they are material?	Yes	Considers QALYs
1.6 Are all future costs and outcomes discounted appropriately?	N/A	One year follow-up
1.7 Is the value of health effects expressed in terms of quality-adjusted life years (QALYs)?	Yes	Expressed as cost per QALY
1.8 Are costs and outcomes from other sectors fully and appropriately measured and valued?	Yes	Health and welfare sectors, including informal care.
Overall judgement: partially applicable		
Section 2: Study limitations (the level of methodological quality)	Yes/ partly/no/ unclear/ not applicable	Comments
2.1 Does the model structure adequately reflect the nature of the topic under evaluation?	Yes	Conducted alongside an appropriate trial
2.2 Is the time horizon	Partly	Longer term impact on wellbeing

sufficiently long to reflect all important differences in costs and outcomes?		unavailable. Unclear why only results for first year presented.
2.3 Are all important and relevant outcomes included?	Partly	Despite, the authors' assertions that completers did not differ from non-completers and that there were no significant differences between groups, the outcomes could clearly have differed between groups and could have included death (which in turn could impact upon QALYs gained and does not appear to have been considered).
2.4 Are the estimates of baseline outcomes from the best available source?	Partly	Based on one non-UK trial. Self-reported quality of life (EQ-5D)
2.5 Are the estimates of relative 'treatment' effects from the best available source?	Partly	Based on one non-UK trial. Self-reported quality of life (EQ-5D) at 12 months
2.6 Are all important and relevant costs included?	Partly	Healthcare usage based on a 4 week period which may not include all relevant costs. Non-UK setting
2.7 Are the estimates of resource use from the best available source?	Partly	Healthcare usage based on a 4 week period which may not include all relevant costs. Non-UK setting.
2.8 Are the unit costs of resources from the best available source?	Partly	Intervention costs based on 4 different assumptions and then averaged.
2.9 Is an appropriate incremental analysis presented or can it be calculated from the data?	Yes	Cost per QALY presented.
2.10 Are all important parameters whose values are uncertain subjected to appropriate sensitivity analysis?	Partly	Considers impact of productivity losses. CEAC presented. It would have been informative to consider alternative intervention cost scenarios under sensitivity analyses rather than using a cost average of different models of delivery.
2.11 Is there any potential conflict of interest?	No	None obvious.
<p>2.12 Overall assessment: potentially serious limitations - moderate evidence (+) Other comments: Data were collected at 6 months, 12 months and 24 months. It is not clear why data at 24 months is not presented. There was considerable loss to follow-up (14.4%) at one year with little explanation for this. Overall, the acceptability of the intervention to the target group and the representativeness of the population included are uncertain since only 11% responded to the initial mail out and only 8% of all those contacted participated in the trial.</p>		

Study identification: Pitkala KH, Routasalo P, Kautiainen H and Tilvis RS (2009) Effects of Psychosocial Group Rehabilitation on Health, Use of Health Care Services, and Mortality of Older Persons Suffering From Loneliness: A Randomized, Controlled Trial Effects of Psychosocial Group Rehabilitation on Health, Use of Health Care Services, and Mortality of Older Persons Suffering From Loneliness: A Randomized, Controlled Trial. Journal of Gerontology: Medical Sciences 64A (7): 792-800		
Guidance topic: Independence and mental wellbeing (including social and emotional wellbeing) for older people		Question no: 1, 2, 3
Checklist completed by: Charlotte Simpson, Public Health Specialty Registrar Checked for accuracy by: Tracey Shield, Public Health Analyst, NICE		
Section 1: Applicability (relevance to specific topic review question(s) and the NICE reference case)	Yes/partly/no/unclear/not applicable	Comments
1.1 Is the study population appropriate for the topic being evaluated?	Yes	Lonely older people living at home.
1.2 Are the interventions appropriate for the topic being evaluated?	Yes	Psychosocial group rehabilitation aimed at empowerment, promotion of peer support and social integration. Comparison with usual care.
1.3 Is the system in which the study was conducted sufficiently similar to the current UK context?	Partly	Conducted in Finland. No reason to suspect that cost effectiveness estimates would differ substantially in UK system.
1.4 Was/were the perspective(s) clearly stated and what were they?	No	Not stated. Appears to be healthcare.
1.5 Are all direct health effects on individuals included, and are all other effects included where they are material?	No	Limited health effects considered (mortality and subjective health only)
1.6 Are all future costs and outcomes discounted appropriately?	Not applicable	Costs for approximately 1 year only.
1.7 Is the value of health effects expressed in terms of quality-adjusted life years (QALYs)?	No	Limited cost consequence analysis only.
1.8 Are costs and outcomes from other sectors fully and appropriately measured and valued?	No	Social care/informal care impacts not considered.
Overall judgement: Partially applicable		

Section 2: Study limitations (the level of methodological quality)	Yes/ partly/no/ unclear/ not applicable	Comments
2.1 Does the model structure adequately reflect the nature of the topic under evaluation?	Yes	Conducted alongside randomised controlled trial.
2.2 Is the time horizon sufficiently long to reflect all important differences in costs and outcomes?	No	Relatively short follow-up. Time period for healthcare costs and impact on subjective health/mortality differ.
2.3 Are all important and relevant outcomes included?	Partly	Only mortality and subjective health measure considered.
2.4 Are the estimates of baseline outcomes from the best available source?	Partly	Self-reported health recorded using 4 point scale (validity of this unclear).
2.5 Are the estimates of relative 'treatment' effects from the best available source?	Partly	Robust ascertainment of mortality. Self-reported health recorded using 4 point scale.
2.6 Are all important and relevant costs included?	No	Impacts upon independence and social care excluded. Quality of life and QALYs gained could have been ascertained.
2.7 Are the estimates of resource use from the best available source?	Unclear	Self-report checked alongside medical record data but lack of detailed breakdown.
2.8 Are the unit costs of resources from the best available source?	Partly	Costs taken from 2001 data when costs incurred 2003-2004 (appears to reflect data available at the time).
2.9 Is an appropriate incremental analysis presented or can it be calculated from the data?	No	Not enough data presented to allow calculation of this.
2.10 Are all important parameters whose values are uncertain subjected to appropriate sensitivity analysis?	No	No sensitivity analysis performed.
2.11 Is there any potential conflict of interest?	No	Research grant from Finnish Slot Machine Association but no other role in research.
<p>2.12 Overall assessment: Very serious limitations: weak evidence (-) Other comments: Potential for selection bias and lack of representativeness of sample as small number self-presented with loneliness, participants were volunteers motivated to change and authors state that they 'chose' individuals showing particular interest in the intervention content locally available. There is a lack of detail on breakdown of costs for the intervention. Only 3.3% of those initially contacted (14.5% of those identified as lonely) were eligible and consented to take part which could indicate a lack of representativeness and acceptability.</p>		

Study identification: Coulton S, Clift S, Skingley A, Rodriguez J (In preparation). Effectiveness and cost-effectiveness of community singing on the health-related quality of life of the older population: A randomized controlled trial. (Decision on publication awaited)		
Guidance topic: Independence and mental wellbeing (including social and emotional wellbeing) for older people		Question no: 1, 2, 3
Checklist completed by: Charlotte Simpson, Public Health Specialty Registrar Checked for accuracy by: Tracey Shield, Public Health Analyst, NICE		
Section 1: Applicability (relevance to specific topic review question(s) and the NICE reference case)	Yes/partly/no/unclear/not applicable	Comments
1.1 Is the study population appropriate for the topic being evaluated?	Partly	People aged 60 or over. Very limited exclusion criteria. Includes people with depression and/or anxiety
1.2 Are the interventions appropriate for the topic being evaluated?	Yes	Community group singing intervention versus usual care.
1.3 Is the system in which the study was conducted sufficiently similar to the current UK context?	Yes	UK-based study.
1.4 Was/were the perspective(s) clearly stated and what were they?	Yes	Health and social care. Appropriate.
1.5 Are all direct health effects on individuals included, and are all other effects included where they are material?	Partly	Considers both mental and physical health –related quality of life, anxiety and depression as outcomes. Mortality not considered.
1.6 Are all future costs and outcomes discounted appropriately?	N/A	Follow-up of 6 months only
1.7 Is the value of health effects expressed in terms of quality-adjusted life years (QALYs)?	Yes	
1.8 Are costs and outcomes from other sectors fully and appropriately measured and valued?	Partly	Unclear what social care costs are included.
Overall judgement: Directly applicable		
Section 2: Study limitations (the level of methodological quality)	Yes/ partly/no/ unclear/ not applicable	Comments
2.1 Does the model structure adequately reflect the nature of the topic under evaluation?	Yes	Conducted alongside randomised controlled trial.
2.2 Is the time horizon sufficiently long to reflect all	Partly	Relatively short follow-up of 6 months

important differences in costs and outcomes?		
2.3 Are all important and relevant outcomes included?	Yes	See (2..2)
2.4 Are the estimates of baseline outcomes from the best available source?	Yes	Self-reported. Uses validated tools – SF-12, EQ-5D and HADS.
2.5 Are the estimates of relative 'treatment' effects from the best available source?	Yes	see 2.4
2.6 Are all important and relevant costs included?	Partly	Intervention costs comprehensively considered. Service usage costs include general practice visits, social care involvement, inpatient stays and outpatient attendance. ?Drug costs. Would be useful to have more comprehensive list.
2.7 Are the estimates of resource use from the best available source?	Unclear	Unclear as to what used as service usage breakdown not presented. Appears to be robust method though.
2.8 Are the unit costs of resources from the best available source?	Partly	Appropriate source - uses 2007 estimates
2.9 Is an appropriate incremental analysis presented or can it be calculated from the data?	Partly	Net costs per participants and gain in utility presented. CEAC presented but no base case scenario evident.
2.10 Are all important parameters whose values are uncertain subjected to appropriate sensitivity analysis?	Partly	CEAC included but further uncertainties not considered.
2.11 Is there any potential conflict of interest?	Yes	Corresponding author is board member of third sector organisation responsible for intervention.
<p>2.12 Overall assessment: Potentially serious limitations: moderate (+) Other comments: A pragmatic approach was taken so likely to reflect real world scenarios. It was unclear how the 135 potential participants who were ineligible/did not consent were divided (unable versus did not wish to consent). There was a high loss to follow-up and service costs were only included for those followed up: 86% at 3 months and 79% at 6 months (although authors do state that no differences were observed between the intervention and control group). 81% attended at least half of all sessions (attendance similar across all centres) so 19% did not. Validity of assumption that facilitator delivered 80 sessions per year (authors chose this to avoid over-estimating costs) is unclear.</p>		