

Review

Social isolation, loneliness and health in old age: a scoping review

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What is known about this topic

- Social isolation and loneliness are risk factors for poor mental and physical health.
- They are particularly problematic in old age due to reduced social networks, decreasing economic resources and changes in family structures.

What this paper adds

- Loneliness is more frequently researched than isolation; depression and cardiovascular health are the most researched health outcomes.
- Still little is known about interventions that would affect loneliness and health, about causal mechanisms or service use of isolated or lonely older people.
- Future research should link the evidence on risk factors for loneliness and social isolation and the evidence on their impact on different health domains, with longitudinal designs needed to understand associations.

Abstract

The health and well-being consequences of social isolation and loneliness in old age are increasingly being recognised. The purpose of this scoping review was to take stock of the available evidence and to highlight gaps and areas for future research. We searched nine databases for empirical papers investigating the impact of social isolation and/or loneliness on a range of health outcomes in old age. Our search, conducted between July and September 2013 yielded 11,736 articles, of which 128 items from 15 countries were included in the scoping review. Papers were reviewed, with a focus on the definitions and measurements of the two concepts, associations and causal mechanisms, differences across population groups and interventions. The evidence is largely US-focused, and loneliness is more researched than social isolation. A recent trend is the investigation of the comparative effects of social isolation and loneliness. Depression and cardiovascular health are the most often researched outcomes, followed by well-being. Almost all (but two) studies found a detrimental effect of isolation or loneliness on health. However, causal links and mechanisms are difficult to demonstrate, and further investigation is warranted. We found a paucity of research focusing on at-risk sub-groups and in the area of interventions. Future research should aim to better link the evidence on the risk factors for loneliness and social isolation and the evidence on their impact on health.

Keywords: health, loneliness, mental health, older people, scoping review, social isolation

Introduction

An increasing number of older people are living alone and are at risk of being socially isolated (Victor *et al.* 2002, Savikko *et al.* 2005, Sundström *et al.* 2009). Social isolation has been identified as a risk factor for poor health, reduced well-being, mortality (e.g. Patterson and Veenstra 2010, Steptoe *et al.* 2013), depression (Heikkinen and Kauppinen 2004) and cognitive decline (Wilson *et al.* 2007). It has been argued that health risks associated with isolation and loneliness are equivalent to the well-established detrimental effects of smoking and obesity (Holt-Lunstad *et al.* 2010). Social isolation and loneliness are particularly problematic in old age due to decreasing economic and social resources, functional limitations, the death of relatives and spouses, and changes in family structures and mobility.

New research in the area is accumulating. We therefore sought to review the evidence on social isolation and loneliness, and their impacts on health, well-being and service use.

Our review addresses two research questions: (i) What evidence exists on the relationships between isolation, loneliness and health? (ii) What are the limitations and gaps in the evidence base? We address these two questions by scoping the literature. We focus on recent findings about the associations between social isolation and poorer health and well-being outcomes, differential effects across population groups, as well as the methodological challenges associated with the design and evaluation of interventions aimed at reducing or addressing the consequences of isolation.

Methods

We followed the five-stage methodological framework for scoping studies suggested by Arksey and O'Malley (2005): (i) identify the research question; (ii) identify relevant studies; (iii) select studies; (iv) chart the data; and (v) collate, summarise and report the results. The stages of the review are detailed below, with steps 4 and 5 conflated together.

Identifying the research question

As stated above, this review is guided by two research questions: (i) What evidence exists on the relationships between isolation, loneliness and health? (ii) What are the limitations and gaps in the evidence base? Definitions of both social isolation and loneliness have been debated (Nummela *et al.* 2011, Giuli *et al.* 2012). For example, social isolation is often defined as the lack of integration of individuals in their social environment. However, recent research has distinguished specific components of isolation in old age (e.g. quality of relationships), with implications for measurement of social isolation (Cornwell and Waite 2009). We did not predefine social isolation or loneliness as we wanted to compare the definitions and associated measurements in the literature as part of our review. Given our purpose, a broad range of health outcomes was also included.

Identifying relevant studies

The scoping review identified, retrieved and evaluated information from empirical peer-reviewed articles that examined the impacts of isolation and/or loneliness on physical and mental health. We focused on studies published between 2000 and 2013. This timeframe was selected as it closely parallels that of recently published reviews of interventions aimed at reducing loneliness and isolation in old age (e.g. Hagan *et al.* 2014). Our study differs from previous reviews in that we focus on the impact of isolation and loneliness on health in old age in particular.

We searched nine databases between July and September 2013 (PubMed, SCOPUS, PsycINFO, Medline, International Bibliography of Social Sciences, Public Affairs Information Service, EconLit, and from the Thomson Reuters Web of Knowledge platform, Web of Science and Current contents connect).

We used a combination of search terms related to our population group of interest, social isolation and loneliness, and a broad range of physical and mental health outcomes (Table 1).

Selecting studies

Only empirical papers with an English language abstract were included. Because the aim of the scoping was to describe the breadth of relevant research, we did not exclude studies based on the same sample of respondents. We considered all types of research design.

We applied the following exclusion criteria at two stages of study selection (screening by title and abstract, and full text):

- Studies focusing on countries other than Western Europe and USA;
- Studies focusing on issues other than social isolation and loneliness;
- Studies not assessing physical or mental health outcome(s);
- Editorials, letters, book reviews;
- Studies covering population groups other than older people (defined here as people aged 50 and over).

Figure 1 summarises the selection process. The search yielded 11,736 articles (11,392 through the nine databases and 344 through a selection of websites). When duplicates were removed there were 5342 references, of which 94% were excluded based on screening of the title and abstract. Full texts of the remaining 288 papers were accessed. Of these papers, 156 articles (54%) were excluded. One hundred and twenty-eight articles were included in the scoping review.

Table 1 Keywords and search terms employed in the database searches

Population or target group	Issue	Health outcome
Aged	Loneliness	Health
Ageing	Isolation	Physical health
Ageing	Social isolation	Mental health
Senior	Solitude	Mental health problems
Elderly		Mental disorder
Elder people		Well-being
Old age		Well-being
Older people		Depression
Old people		

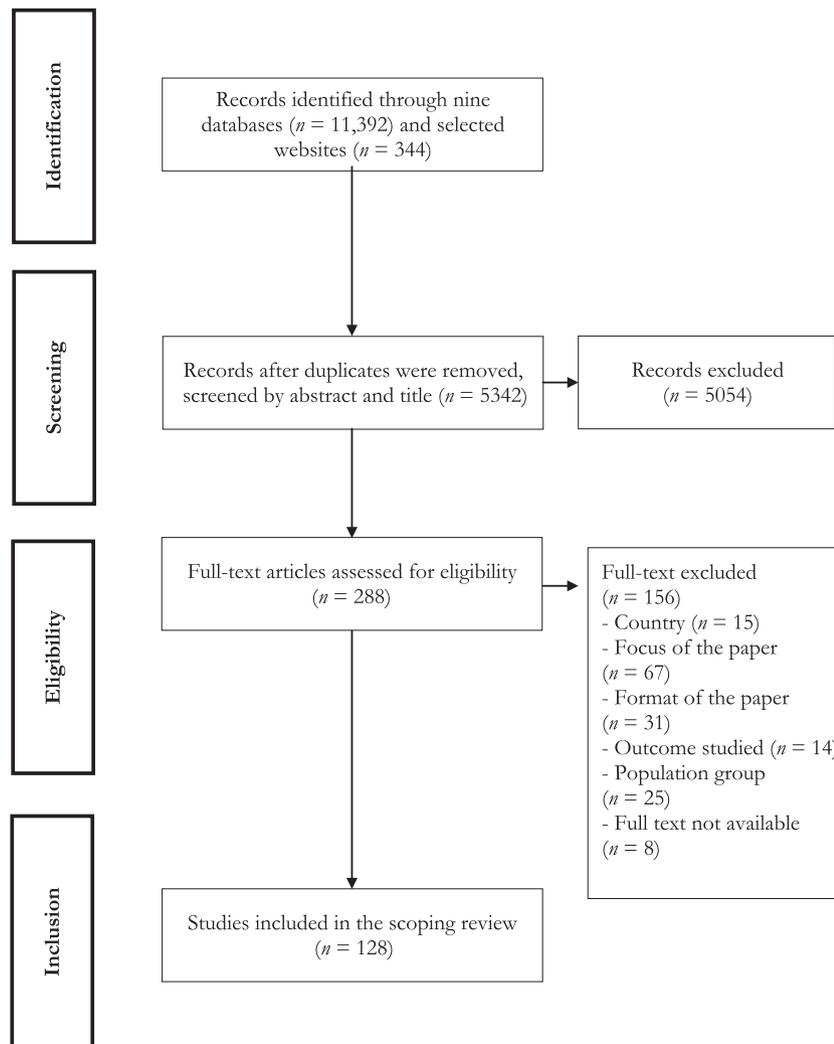


Figure 1 Flow chart of the search strategy and results.

Charting the data, summarising and reporting the findings

We used the 'narrative review' approach to collect similar information on all studies (Pawson 2002). We recorded information on first author, year of publication, study objectives, type of data and research design, study setting, sample size, issue studied, measurement of isolation or loneliness, health outcome, population group and main findings.

Results

Study context

Research on the impact of social isolation and loneliness on health constitutes a large and growing body of literature, with 54% of the included articles published between 2010 and 2013 (Figure 2).

Table 2 presents the main characteristics of the 128 studies. The papers spanned 15 countries. Half focused on the USA, followed by the UK and the Netherlands. Loneliness and social isolation attract multidisciplinary attention. First authors' disciplines included medicine, psychology, epidemiology, public health and nursing.

Study design

Half the studies collected primary data. The vast majority used a quantitative approach, with only 5% being qualitative and 3% using mixed methods. Over half of the studies used samples representative of the population.

Definitions and measurements

Just over half of the 128 studies included a formal definition of isolation or loneliness, mostly the latter.

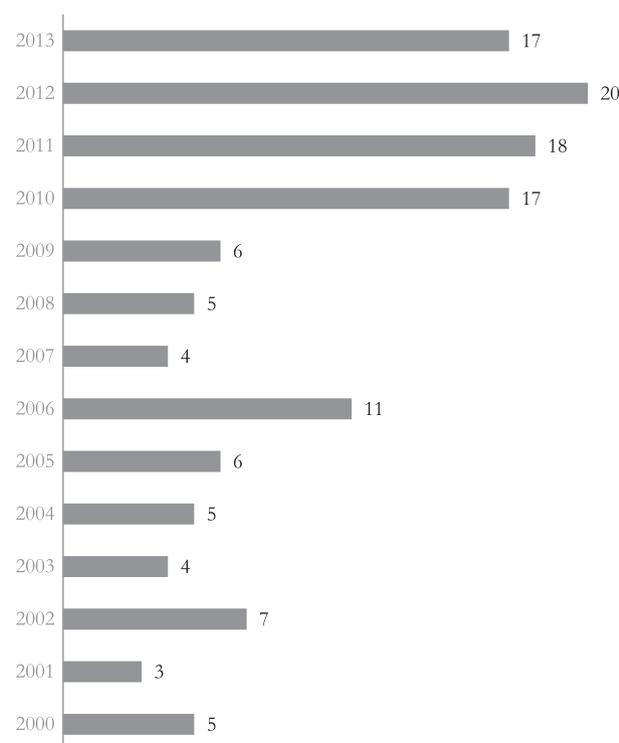


Figure 2 Number of studies included in the scoping review, by year of publication.

First, the concept of loneliness was usually defined as an undesirable subjective experience, related to 'unfulfilled intimate and social needs' (Peplau and Perlman 1982). The notion was often considered as unidimensional as only 23% of studies on loneliness contrasted different dimensions, such as sense of belonging or the nature of discrepancies between experienced and expected relationships (e.g. Martina and Stevens 2006); or between social and emotional loneliness (e.g. Dong *et al.* 2012, Drageset *et al.* 2013a, b). We found a variety of measures (Table 3). Seventeen studies used a single-item question on loneliness. More complex measures have also been introduced. Most studies (47%) used the UCLA Loneliness scale (Russell 1996) or its shorter revised version. Although most studies using this scale focused on the USA, it was also used by the studies based on the English Longitudinal Survey of Ageing (e.g. Shankar *et al.* 2011). Seven studies used the de Jong Gierveld scale (1987) – specifically designed to measure loneliness in old age.

Second, in the area of social isolation, most papers defined the notion as a unidimensional concept, i.e. an objective measure of the number of contacts with family and friends. Only a few studies considered isolation as a multidimensional concept, adding the

Table 2 Overview of the studies characteristics

Variable	Number of studies	Percentage of studies
Study context		
Country of the first author*		
USA	65	51
UK	10	8
Netherlands	9	7
Discipline of the first author†		
Medicine	24	18
Psychology	19	15
Public health	15	12
Epidemiology	15	12
Nursing	13	10
Study setting		
Community-based	114	90
Facility-based	14	10
Sample size		
Minimum	6	
Median	430	
Maximum	44,573	
Type of data		
Primary data	65	51
Secondary data	63	49
Study design		
Case-control	1	1
Controlled before and after	2	2
Cross-sectional	68	52
Longitudinal	42	33
Mixed methods	4	3
Other	1	1
Qualitative	6	5
Randomised control trial	4	3

*Only the first three countries with the highest number of publications are reported here.

†Only the first five disciplines with the highest number of publications are reported.

notion of quality of relationships (e.g. Cornwell and Waite 2009, Ha and Ingersoll-Dayton 2011). Measurement of social isolation was heterogeneous. Most studies used an *ad hoc* index composed of measures of marital status, household composition and number of friends and relatives (e.g. Coyle and Dugan 2012, Stafford *et al.* 2013), and counts of meetings with relatives (e.g. Tilvis *et al.* 2012). A few studies included a previously developed scale such as the Berkman-Syme Social Network Index (Michael *et al.* 2001, Eng *et al.* 2002, Rodriguez *et al.* 2011) or the Duke Social Support Index (Hastings *et al.* 2008, Parsons *et al.* 2013).

Focus of the studies

Half the studies included in the scoping review aimed at describing the association between isolation or loneliness and a health outcome. A quarter investi-

Table 3 Most commonly used measures of loneliness

Measure	Authors	Description	Examples of studies using this measure
UCLA Loneliness scale or its revised version	Russell (1996)	Twenty-item scale, with each item rated from 1 (never) to 4 (often). A number of studies use a shorter revised version (R-UCLA)	Beeson (2003); Cacioppo <i>et al.</i> (2002) Cacioppo <i>et al.</i> (2006, 2010); Grov <i>et al.</i> (2010); Hackett <i>et al.</i> (2012); Hawkey <i>et al.</i> (2006, 2010a,b); Kahlbaugh <i>et al.</i> (2011); Krause-Parello (2008, 2012); Luo <i>et al.</i> (2012); Nezlek <i>et al.</i> (2002); Ong <i>et al.</i> (2012); Perissinotto <i>et al.</i> (2012); Poulin <i>et al.</i> (2012); Routasalo <i>et al.</i> (2009); Shankar <i>et al.</i> (2011, 2013); Sorkin <i>et al.</i> (2002); Steptoe <i>et al.</i> (2004, 2013); Theeke <i>et al.</i> (2012); Theeke and Mallow (2013); VanderWeele <i>et al.</i> (2011, 2012); Zebhauser <i>et al.</i> (2013); Fessman and Lester (2000); Adams <i>et al.</i> (2004); Norman <i>et al.</i> (2013)
De Jong Gierveld scale	de Jong Gierveld (1987)	Eleven-item scale, combining emotional and social loneliness	Alma <i>et al.</i> (2011); Jongenelis <i>et al.</i> (2004); La Grow <i>et al.</i> (2012); Martina and Stevens (2006); Newall <i>et al.</i> (2013); Wilson <i>et al.</i> (2007); Han and Richardson (2010)
Single item		Item from the CES-D scale of depressive symptoms Item on the frequency of feelings of loneliness	Ayalon and Shiovitz-Ezra (2011); Beeson <i>et al.</i> (2000); O'Lunaigh <i>et al.</i> (2011, 2012); Tiikkainen and Heikkinen (2005); Kvaal <i>et al.</i> (2013); Theeke (2010b). Conroy <i>et al.</i> (2010); Holmen and Furukawa (2002); Losada <i>et al.</i> (2012); Nummela <i>et al.</i> (2011); Park <i>et al.</i> (2013); Patterson and Veenstra (2010); Paul <i>et al.</i> (2006); Stephens <i>et al.</i> (2010, 2011); Tilvis <i>et al.</i> (2011); Holwerda <i>et al.</i> (2012)

Adapted from O'Lunaigh and Lawlor (2008).

gated at-risk population groups and 15% looked at the mediating effects of isolation or loneliness between stress and health (Lefrançois *et al.* 2000, Paul *et al.* 2006, Aanes *et al.* 2010), between depression and health (Bisschop *et al.* 2004, Wang *et al.* 2006), or between alcohol consumption and all-cause mortality (Greenfield *et al.* 2002). Describing or evaluating an intervention was the aim of 7% of studies. The level of health service use of isolated older people was investigated in 2% of papers. A similar proportion of papers described the health of isolated older people. In terms of the issue studied, 53% of the 128 papers focused on loneliness and 21% on social isolation.

Associations with health outcomes

A wide range of health outcomes was examined (Table 4). Overall, we found a balance between mental health and physical health. Across the 128 studies, only two did not find a negative association between social isolation or loneliness and health (Wattanakit *et al.* 2005, Wilby 2011). It should be noted that a number of studies looked at the impact of isolation and loneliness on biomarkers such as cortisol levels or C-reactive protein (a marker of systemic infection) (10 studies in total; 80% published between 2010 and 2013).

The most commonly studied outcome was depression, followed by cardiovascular health. We report here findings for these two outcomes only (Table 5). We chose this focus because depression and cardio-

vascular are major contributors to the burden of disease in old age (Marengoni *et al.* 2008).

In our sample, 75% of studies on depression looked at loneliness, whereas 72% of studies on cardiovascular health investigated social isolation. Important variations were also found in terms of study design. Only 25% of papers investigating depression used longitudinal data, compared to almost half of the studies focused on cardiovascular health. Further details of these studies are provided in Appendix S1.

Out of the 32 papers on depression, 25 looked at its association with loneliness. A difficulty is that the two concepts are overlapping, and loneliness may be a symptom of depression. However, recent literature has found depression and loneliness to be separate entities (Stek *et al.* 2005). The evidence reviewed clearly shows that loneliness is an independent risk factor for depression in old age (Alpass and Neville 2003, Adams *et al.* 2004, Paul *et al.* 2006, Theeke *et al.* 2012). Longitudinal research has confirmed these findings: loneliness is an independent risk factor for depression, controlling for a number of covariates such as demographic characteristics, marital status, social isolation and psychosocial risk factors (Cacioppo *et al.* 2010). Gender differences were also consistently reported. For instance, the detrimental effect of living alone on depression was more often due to loneliness for men than for women (Park *et al.* 2013).

Table 4 Health outcomes studied*

Outcome	Number of studies	Percentage of studies
Depression	32	25
Cardiovascular health	15	13
Quality of life and well-being	15	13
General health and physical function	11	9
Biological measures	10	8
Health and mental health	9	7
Mortality	6	4
Cognitive function	5	4
Mental health	4	3
Dementia	3	3
Disability	2	2
Stress-related reactions	2	2
Substance abuse	2	2
Anxiety	1	1
Passive death wishes	1	1
Physiological processes	1	1
Diabetes	1	1
Unspecified	1	1
Total	121	100

*Seven studies on service use and at-risk groups are excluded from this table.

Only three studies investigated the impact of social isolation on depression. Sjöberg *et al.* (2013) found interesting differences between two Swedish cohorts of older people: frequency and perception of social contacts were related to depressive symptoms in the first cohort but not in the second. A mixed-method study of chronic depression in older British Pakistani women found that the persistence of depression was partly explained by social isolation (Gask *et al.* 2011). Interestingly, one of the two studies which did not find an association between isolation and health focused on depression: Wilby (2011) found that depressed older people were not socially isolated but were on the contrary more likely to report contacts than non-depressed respondents. To explain these findings, the authors emphasised the need to better understand the quality and meaning of different types of social relations in old age.

Cardiovascular health was the focus of 13% of the studies included in the review. Social isolation has been consistently found to be associated with coronary artery disease (Brummett *et al.* 2001), chronic heart failure (Friedmann *et al.* 2006), congestive heart failure (Murberg 2004) and hospitalisation due to heart failure (Cene *et al.* 2012). In addition, two studies researched the impact of loneliness on cardiovascular health. Both reported that loneliness was associated with cardiovascular risk factors (Sorkin *et al.* 2002, Kamiya *et al.* 2010). Differences across population groups have not been well-researched to

Table 5 Overview of the characteristics of the studies focused on depression and cardiovascular health

	Number of studies	Percentage of studies
Depression		
Study setting		
Community-based	27	84
Facility-based	5	16
Study design		
Cross-sectional	18	57
Longitudinal	8	25
Mixed methods	2	6
Other	2	6
Qualitative	1	3
Randomised control trial	1	3
Focus		
Loneliness	26	75
Social isolation	3	16
Other	2	9
Outcome measure		
CES-D scale or its revised version	20	62
Geriatric depression scale	8	26
Other scales*	2	6
DSM-IV medical diagnosis	2	6
Cardiovascular health		
Study setting		
Community-based	14	94
Facility-based	1	6
Study design		
Cross-sectional	7	47
Longitudinal	7	47
Mixed methods	1	6
Focus		
Loneliness	2	14
Social isolation	11	72
Other	2	14
Outcome measure		
Cardiovascular and urinary measures [†]	9	60
Medical diagnosis	4	27
Medical records [‡]	2	13

*Other depression scales found in the reviewed literature include for instance the Hamilton Rating Scale for Depression, the Psychiatric Symptom Index or the Zung Depression Scale.

[†]Including the measurement of hypertension and cardiovascular activity, heart failure survival score, cardiac index, arteriography and angiography.

[‡]Including reason for hospitalisation and cause of death.

date, but Wang *et al.* (2005, 2006) did find an association between social isolation and the progression of coronary artery disease, specifically among women.

Mechanisms and causal links

Potential mechanisms between isolation, loneliness and health were the focus of 15% of the studies. These depend on the outcome being studied, but a

number of studies have suggested that health behaviours (Cacioppo *et al.* 2002, Eng *et al.* 2002), poorer sleep quality (Cacioppo *et al.* 2002) and vital exhaustion (Eng *et al.* 2002) were potential mediators between loneliness and a range of physical health outcomes. Other studies have investigated the role of social mechanisms such as perceived togetherness (Tiikkainen and Heikkinen 2005).

A third of the studies investigated causal links between isolation, loneliness and health. The use of longitudinal data enabled the issue of reverse causality between loneliness, isolation and health to be (partially) addressed. The evidence is mixed. Green *et al.* (2008) found a cross-sectional association between social networks and cognition and functional status in old age, but not a longitudinal association. Out of 42 studies which used panel data, 23 provided a basis for inference about causal links by using, for instance, a cross-lagged panel analysis (e.g. Cacioppo *et al.* 2010, Hawkey *et al.* 2010b, Luo *et al.* 2012) or by adjusting for health status at baseline (e.g. Michael *et al.* 2001, Eng *et al.* 2002, Bisschop *et al.* 2003, Patterson and Veenstra 2010, Perissinotto, Stijacic Cenzer and Covinsky 2010, Ayalon and Shiovitz-Ezra 2011, Nummela *et al.* 2011, Holwerda *et al.* 2012, Udell *et al.* 2012, Shankar *et al.* 2013).

The issue of reverse causality was particularly salient in the case of depression. Out of the 32 studies which looked at depression, eight used longitudinal data and implemented appropriate analytical strategies to infer causal links. Again, the findings were mixed. Luo *et al.* (2012) found that loneliness both affected and was affected by depression and functional limitations over time. Cacioppo *et al.* (2006) also demonstrated that loneliness and depressive symptoms in old age have strong reciprocal impact. A similar effect has been found between loneliness and subjective well-being in old age (VanderWeele *et al.* 2012). In contrast, cross-lagged panel analysis showed that loneliness predicted subsequent changes in depression but not vice versa (Cacioppo *et al.* 2010).

Life course approaches also provided interesting evidence: the detrimental impacts of early trauma on pulse pressure were partially dependent on the level of perceived social isolation in old age, as older adults with low isolation levels did not display a significant association between early trauma and the health outcome (Norman *et al.* 2013).

Differential impact of isolation and loneliness

Eleven studies focused on the differential impact of isolation and loneliness, with 75% published since 2010. Among these studies, 54% used longitudinal

data. Although no clear pattern could be discerned due to the small number of studies, mortality and biological processes appeared to be the most commonly studied health outcomes in this area.

To date, results have been mixed. Tilvis *et al.* (2011, 2012) found that groups of older people who are isolated or lonely only partially overlap and that only loneliness (and not social isolation) was an independent mortality risk factor in old age. Similar findings were reported in the Netherlands: feelings of loneliness rather than social isolation were found to be a major risk factor for increased mortality in older men (Holwerda *et al.* 2012). Steptoe *et al.* (2013) reached the opposite conclusion using UK data, as the effects of loneliness in their study on mortality were not independent of the demographic characteristics and health status of the respondents, contrary to the effects of social isolation. Other studies have found that both isolation and loneliness were independent risk factors for a range of health outcomes (Shankar *et al.* 2011, 2013, Coyle and Dugan 2012).

Interventions

Associations between social isolation, loneliness and health have received relatively little attention in the intervention literature, and the results of studies were quite modest. There have been studies looking at other outcomes, including a reduction in loneliness itself. We found only nine studies (7%) that evaluated interventions.

The first type of intervention covered was befriending initiatives. One of these programmes – focused on older women – reported success in attracting lonely older people but not in improving the well-being of participants (Martina and Stevens 2006). Different results were found for a club targeting men in a care home, as participants reported a significant reduction in their depression and anxiety levels (Gleibs *et al.* 2011). A randomised control trial looking at the effects of psychosocial group rehabilitation on social functioning, loneliness and well-being of older people also had mixed results. Routasalo *et al.* (2009) reported that a large proportion of participants had found new friends via the programme and that their well-being levels increased significantly. However, their loneliness scores were not affected by taking part in the programme, suggesting that there are other mechanisms at play. Similar results were found for group activities. A randomised control trial of a model of restorative home care on physical health and social support showed significant improvements in physical function but no changes in perceived levels of social support (Parsons *et al.* 2013). Kahl-

baugh *et al.* (2011) measured the effects of playing console games on physical activities, loneliness and mood: older people who engaged in games reported lower levels of loneliness, but no difference was found with the control group in terms of life satisfaction or physical activity.

Another type of intervention was professionally-led support for isolated carers. Telephone-based support for female carers of people with dementia was found to be associated with lower isolation and depression after 6 months for older carers (Winter and Gitlin 2006).

Finally, a number of promising trials were underway at the time we conducted this review. The Senior Connection programme fosters peer companionship for older adults, with the aim of reducing suicide risk in later life: preliminary results from a randomised control trial suggest that socially disconnected older adults were at considerably higher risk of suicide (Van Orden *et al.* 2013).

Service use

We found only three studies that focused on the level of health service use of isolated or lonely older people, only one using longitudinal data. Social isolation was found by Mistry *et al.* (2001) to predict re-hospitalisation among isolated older American veterans. Burr and Lee (2013) examined the association between social relationships and dental care service use among older adults: older people who exhibit loneliness and are under financial strain were less likely to visit a dentist. Finally, gender differences were reported. Lower levels of isolation and a supportive environment were predictive of receiving preventive home visits for older Danish women but not for their male counterparts (Avlund *et al.* 2008).

At-risk groups

One third of the studies included in the scoping review explicitly explored differences across population groups. As reported previously, considerable gender differences are found in terms of the association between isolation, loneliness and health. Two-thirds of the papers which looked at differences across population groups focused on gender. The findings were mixed. For example, Zebhauser *et al.* (2013) found that, although levels of loneliness were equally distributed among men and women in their study, loneliness had a detrimental impact only on the mental health of men. In contrast, another study found that women were more sensitive to the impact of loneliness on biological responses (Hackett *et al.*

2012). A potential explanation is that men and women experience different types of loneliness, with different impacts on their physical and mental health (Nummela *et al.* 2011).

Differential effects across age groups were the focus of 16% of the studies. For instance, Ayalon and Shiovitz-Ezra (2011) found that loneliness is a major risk factor for passive death wishes for people aged 50 and over, but that the effect was not noticeable for respondents aged over 75.

In recent years, differences by socioeconomic or ethnic backgrounds have also started to be investigated. For example, a US study found that Hispanic respondents who were socially isolated had a greater risk of increased left ventricular mass compared to isolated older people from other ethnic backgrounds (Rodriguez *et al.* 2011). Poulin *et al.* (2012) also showed that the association between perceived support and depression was stronger for elderly American people than for elderly Chinese people.

Finally, a number of studies focused on groups at higher risk of isolation and loneliness and of associated negative health outcomes, including older people who are cancer survivors (Jaremka *et al.* 2013), unpaid carers (Jaremka *et al.* 2013), and substance users (Smith and Rosen 2009) who are HIV-positive (Groves *et al.* 2010) or who have a history of institutionalisation (Smith and Hirdes 2009).

Discussion

We set out to describe the available literature on the relationships between social isolation, loneliness and health outcomes. The research evidence on these associations has significantly expanded since 2000. We found that the majority of the available evidence comes from the USA and has focused on loneliness. It should be noted that a growing number of studies are concerned with the differential impacts of loneliness and isolation on health. The most researched outcomes are depression and cardiovascular health. Almost all studies included in our review found that social isolation and loneliness have detrimental effects on physical and mental health in old age. Although limited in number, longitudinal designs have allowed researchers to investigate potential mechanisms and causal pathways.

Our review highlights a number of gaps in the evidence base. First, a lack of consistency in the definition and measurement of isolation and loneliness considerably limits the comparisons that can be made between studies, and hence the broader conclusions that can be drawn. Isolation and loneliness are multidisciplinary concepts and to date there is no agreement across disci-

plines as to the best way to define or measure them. Loneliness and social isolation are also linked to other concepts such as the availability of social support or lack thereof (e.g. social capital or social network). As noted by Valtorta and Hanratty (2010), this has contributed to the richness of the research findings but potentially limits their usefulness to policy makers and practitioners. Differences in measurements are also problematic. Measures of loneliness, for instance, range from single-item questions to 20-item scales designed to measure different dimensions. Although previous studies have shown that a single-item measure correlates strongly with more sophisticated scales (Victor *et al.* 2005), recent research has emphasised the importance of contrasting different dimensions of loneliness (Coyle and Dugan 2012). The UCLA and de Jong Gierveld scales are the most commonly used measures of loneliness. A recent assessment of both scales has shown the relative superiority of the de Jong Gierveld scale for the study of middle-aged and older adults (Penning *et al.* 2013).

There are similar debates in relation to social isolation (Cornwell and Waite 2009). Fiori *et al.* (2006) stress the importance of combining structural (e.g. number of contacts) and functional (e.g. type and quality of support received) aspects of social isolation. There is at least one interesting way forward. As noted by O'Luanaigh and Lawlor (2008), integrating research on the drivers of loneliness and isolation with research on their impacts on health would allow researchers to understand better which dimensions are crucial to include in their studies. Indeed, very broad and general measures that fail to distinguish between isolation, feelings of loneliness and their different dimensions may not be able fully to detect the impacts on physical and mental health of older adults (Coyle and Dugan 2012), and therefore could ultimately hold back development of effective interventions.

Second, only a third of the studies included in the review used a longitudinal design. The fact that most studies are cross-sectional means that still relatively little is known about mechanisms and causal links. More longitudinal studies are needed to disentangle the independent or interacting effects of loneliness and isolation on health. A better understanding of these mechanisms is crucial for designing appropriate interventions. Indeed, results from longitudinal studies have shown that the experiences of loneliness and isolation are not uniform across the life course. On the contrary, older people may become lonelier or more isolated, be chronically isolated or become so because of trigger events such as retirement or bereavement (Ha and Ingersoll-Dayton 2011, Bekhet and Zauszniewski 2012). Studies adopting a life

course approach are also needed as they can provide very useful insights on potential triggers of loneliness (Savikko *et al.* 2005), which have to be considered for the design of interventions.

Health and social care service use by isolated older people is also under-researched. Available studies focusing on other population groups provide helpful insights for future research. A Dutch study found that general (medical) practitioners acknowledged the importance of patients' feelings of loneliness in their daily practice but that they had difficulty responding to these feelings and faced a lack of therapeutic options. The authors suggest that a distinction between chronic and transitory loneliness is helpful for general practitioners (van der Zwet *et al.* 2009). Another study suggests that more isolated people in the USA have lower access to adequate health information (Askeslon *et al.* 2011), while a Canadian study argued that front-line health professionals such as nurses have a role to play (Wilson *et al.* 2011).

Our review also identified a paucity of research on population sub-groups, despite evidence of ethnic and socioeconomic differences in the impact of loneliness and isolation on health. It should also be noted that the available evidence focuses almost exclusively on individual-level analyses. We suggest that to understand the scope and magnitude of the impact of loneliness and isolation on health, future research should further take into account ecological factors such as the characteristics of communities and neighbourhoods where older individuals live. 'Ageing-in-place' policies have become a key component of European strategies for older people, on the grounds of both concerns about public expenditure as the population ages and the desire of older people to remain autonomous (Means 2007, Wiles *et al.* 2012). In that context, thinking about isolation and loneliness together with access to transport, health, community and local social services is crucial.

Finally, we identified little published work on interventions which have been evaluated for their impacts on health outcomes, clearly indicating a gap for evidence-based practice. Since 1984, nine reviews of the loneliness intervention literature have been published (Rook 1984, McWhirter 1990, Cattan & White 1998, Findlay 2003, Cattan *et al.* 2005, Perese and Wolf 2005, Hawkley and Cacioppo 2010, Theeke 2010a, Hagan *et al.* 2014). Most of these reviews consider possible ways to reduce loneliness and isolation, and only one focuses explicitly on the impact on health outcomes (Cattan *et al.* 2005). It is not easy to draw out consistent messages on the most successful methods from these reviews. According to Cattan *et al.* (2005), only interventions with an educational

element succeeded in reducing loneliness among older people, whereas one-to-one interventions were less successful. In contrast, Findlay (2003) found a positive effect only for one-to-one interventions. More recently, Hagan *et al.* (2014) have identified 17 studies relating to loneliness interventions. Out of these, four studies (three on new technologies such as web-based communications, one on group interventions) identified significant reductions in loneliness.

It was equally difficult to draw a consistent message from the evaluations considered in the present review. This is likely to be due to the difficulty of adequately measuring concepts as complex as social isolation and loneliness in old age. As noted above, the lack of exploration of the societal and policy contexts within which these interventions are operating also renders it difficult to draw firm conclusions about these interventions.

As the findings of further longitudinal research are becoming available, potential causal mechanisms have to be considered in the design of these interventions. A clear conceptual model of loneliness or isolation is also needed as different target populations will potentially respond differently to interventions aimed at reducing social or emotional loneliness. As noted by Hawkey and Cacioppo (2010), a crucial question is whether modifying the feeling of loneliness can have an impact on health. To date, the available evidence is insufficient to provide an answer, and this should be a priority for future research.

Our scoping review has both strengths and weaknesses. It covered a broad range of health outcomes and included both loneliness and isolation as risk factors for poor health in old age. However, it has two main limitations, with implications for the scope of the evidence covered. First, we only included studies with English language abstracts and we limited our search to western countries. A number of relevant articles focused on South Asian countries, for example, have been excluded from this review as the limited research available points to important cultural differences in the meaning and experience of loneliness and isolation (Rokach *et al.* 2001). Also, we did not include 'grey literature' or doctoral theses. Second, we conducted a scoping review and not a systematic literature review. In that sense, we did not assess or exclude papers based on their quality.

Conclusion

Social isolation and loneliness are common among older people and can be both negatively associated with mental and physical health, although still relatively little is known about causal links. Our scoping

review has shown that a sizeable body of literature, coming from a variety of disciplines and making use of a range of methods, is focused on assessing the associations between isolation, loneliness and health. An important limitation to the development of the evidence base for both researchers and policy makers is the diversity of definitions and measurements. One way forward would be to pool the evidence from the literature on the drivers of isolation and loneliness in old age and the research on their impact on health, so that important domains and dimensions are measured. There is also a challenge in relation to interventions, as data are still very limited. To date, the evidence is not sufficient to determine whether modifying social isolation levels or feelings of loneliness will have an impact on subsequent health. Better understanding of the causal pathways through which loneliness and isolation affect health is needed to inform the development of appropriate interventions.

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An asterisk (*) indicates that the reference has been included in the scoping review.

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