

Review Article

The Association of Loneliness With Health and Social Care Utilization in Older Adults in the General Population: A Systematic Review

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Abstract

Background and Objectives: Loneliness is proposed to be linked with increased service use. This review examined the association of loneliness and health and social care utilization (HSCU) in older adults from the general population.

Research Design and Methods: Four databases were screened for studies that examined the association of loneliness (predictor) with HSCU (outcome) in older adults (defined as the majority of sample 60 or older). Study quality was assessed with the National Institutes for Health scale for observational cohorts and cross-sectional studies.

Results: We identified 32 studies, of which 9 prospective studies were evaluated as being good or good–fair quality. Two good–fair quality studies found that loneliness at baseline was associated with subsequent admission to a residential care home. There was emerging evidence that loneliness was associated with emergency department use ($n = 1$) and cardiovascular disease-specific hospitalization ($n = 1$). Once adjusted for confounders, the highest quality studies found no association of baseline loneliness with physician utilization, outpatient service utilization, skilled nursing facility use, and planned or unplanned hospital admissions. The remaining studies were cross-sectional, or of fair to poor quality, and inadequate to reliably determine whether loneliness was associated with a subsequent change in HSCU.

Discussion and implications: There was heterogeneity in study design, measurement, and study quality. This generated an inconsistent evidence base where we cannot determine clear inferences about the relationship between loneliness and HSCU. Only one consistent finding was observed between 2 good–fair quality studies regarding care home admission. To determine clinical implications and make reliable inferences, additional good quality longitudinal research is needed.

Keywords: Health care, Lonely, Service use

Loneliness is a negative subjective state that arises from a perception that one does not have the social relationships or companionship that one desires (Victor et al., 2000). Loneliness is increasingly framed as a public health issue (Cacioppo & Cacioppo, 2018), in large part due to evidence linking loneliness with an increased risk of experiencing a range of negative health outcomes such as cardiovascular

disease (CVD; Valtorta et al., 2016), dementia (Lara et al., 2019), depression (Martin-Maria et al., 2021), and mortality (Holt-Lunstad et al., 2015). An additional health-related outcome that is often referred to when defining loneliness as a public health issue is increased health and social care utilization (HSCU; Cacioppo & Cacioppo, 2018; Gerst-Emerson & Jayawardhana, 2015).

HSCU is a term used to define the point at which a person uses any health or social care service including primary, secondary, and community-based services as well as specific services such as dentistry. HSCU is linked to a range of sociodemographic factors including older age, gender, ethnicity, socioeconomic status, as well as preexisting health problems and health care financing (Organisation for Economic Co-operation and Development, 2020). There is also some evidence suggesting that loneliness may also be linked with increased HSCU among older adults (Ellaway et al., 1999; Gerst-Emerson & Jayawardhana, 2015). This evidence has been used to promote the importance of signposting older adults to community services to help alleviate their loneliness and the development of new ways of working (e.g., social prescribing) that guides lonely people toward community resources rather than relying on resources such as primary care (Reinhardt et al., 2021). However, while this evidence can be used to help improve provision for issues of loneliness, there is the potential it could also have a broader negative impact. Victor (2021) suggested that the representation of lonely older adults as a “burden” on health and social care services forms part of an ageist societal narrative termed a “modern moral panic.” In addition, two facets of ageism identified in previous work include attitudes and beliefs that older adults place an excess burden on health care, and that all older adults are lonely and socially isolated (Swift et al., 2016). This is despite research indicating that older adults often have high levels of unmet health and social care needs (Age UK, 2019), and loneliness is a common experience across the life course (Barreto et al., 2021; Victor & Yang, 2012). Given the potentially negative implications in terms of attitudes and stigmatization, we need to determine systematically whether existing evidence supports this proposition that lonely older adults utilize health and social care services disproportionately.

Previous syntheses do not unequivocally indicate whether loneliness is associated with HSCU among older adults. Owens and Sirois (2019) conducted a review and meta-analysis suggesting that loneliness was associated with increased physician visits. We cannot extrapolate their findings to older populations as the meta-analysis synthesized both cross-sectional and longitudinal studies and included studies in people across all ages. Valtorta et al. (2018), in their review of older adults, suggested there was no evidence to support the assumption that older adults with lower levels of social support place an extra burden on health care services but did not specifically examine whether loneliness was associated with HSCU. Among the issues that can be identified in individual studies that have been included within these syntheses are cross-sectional study design (Cheng, 1992; Ellaway et al., 1999) or the sampling of existing service users or nonrepresentative populations (Geller et al., 1999). These studies would not be sufficient to allow us to reliably determine whether

loneliness is linked to subsequent HSCU in the general population.

Therefore, the goal of this study was to provide the first comprehensive systematic assessment of existing research examining loneliness and HSCU in older adults. Our objective was to determine whether loneliness was associated with increased HSCU in older adults sampled from the general population and critically evaluating the quality of the evidence base.

Method

Search Strategy

The initial search was undertaken in December 2020, with update searches completed in June 2021 and August 2021. Search terms were created for the core topics of “HSCU” and “loneliness” (Supplementary Material Section 1). We searched four databases: PubMed (United States National Library of Medicine, Bethesda, MD), ISI Web of Science (Thomson Reuters, New York, NY), Scopus (Elsevier, Amsterdam, the Netherlands), and EBSCOHost (EBSCO Industries, Ipswich, MA). In addition, we hand-searched the reference lists (and citation lists) of existing systematic and narrative reviews on health care utilization and social relationships (Owens & Sirois, 2019; Valtorta et al., 2018), and all papers identified for full-text screening to identify any additional papers. No time or geographical limitations were imposed, but only studies published in English were included. The study protocol was registered on PROSPERO (ID CRD42017065986). The initial screening of studies was completed by K. J. Smith, and full-text articles were reviewed by both K. J. Smith and C. Victor to determine which studies should be included in the review, any disagreements were resolved by consensus.

Study Selection

We used PICOS criteria to define our study question: Do observational quantitative (Study design) studies find that loneliness (Intervention/Comparison) is associated with HSCU (Outcome) in older adults sampled from the general population (Population). For the sake of this research general population was defined as a study that sampled a representative sample of older adults from the general population including those living in the community. This could include studies that used representative community-based samples or insurance databases. However, we excluded studies from the specific clinical population (e.g., those with a specific diagnosis) or studies that exclusively sampled existing service users (e.g., surveys of attenders at emergency departments or primary care samples). Studies were also eligible if more than 50% of the sample (or a subgroup sample if age-stratified analyses were provided) was older than 60 or the mean age of the sample was older than 60 in line with previous work (Valtorta et al., 2018).

Studies were required to measure loneliness with either an established loneliness scale or a single-item measure. HSCU could use any measure indicative of health and social care use including primary care and secondary care, social care, tertiary care, and nursing/care home use. Additional inclusion criteria stipulated that articles be published in peer-reviewed journals.

Data Extraction and Quality Assessment

Data extraction was performed using a standardized form that included population studied (age, sex, country), study design (design, length of follow-up), loneliness measurement (loneliness measurement, timeframe assessed), HSCU measurement (health or social care use, timeframe assessed), statistical analysis, confounders adjusted for, and results (crude association and fully adjusted association). Data extraction was completed by K. J. Smith and verified by C. Victor ([Supplementary Material Section 2](#)).

Study quality was assessed using the National Institutes for Health (NIH) scale for observational cohorts and cross-sectional studies as recommended by Cochrane ([NIH, 2014](#)). This assesses study quality across 14 questions related to sampling, methodology, and measurement and generates an evaluative judgment of quality as good, fair, or poor rather than a numerical score. These were agreed upon by consensus discussion between the authors, using four key study parameters ([Supplementary Material Section 3](#) provides more information).

Measurement of loneliness

Good quality evidence uses a validated way of measuring loneliness: either a single-item question or multidimensional scale reported by severity to facilitate examination of dose-response associations.

Measurement of health service utilization

Good quality evidence measures health care utilization in an objective way (i.e., linked medical or social care records) and has a period of follow-up long enough to capture the outcome of interest (defined as 1 year). Furthermore, studies should have an analytical strategy that accounts for the nature of this kind of data (i.e., accounts for a zero-inflated distribution).

Causal inference

Good quality evidence is able to demonstrate temporality by using a longitudinal study design that assesses the exposure (loneliness) at baseline and the outcome (HSCU) at follow-up. Good-fair quality evidence will examine how the predictor and outcome covary over time. Any study using a cross-sectional design will not be able to demonstrate temporality as the outcome measure would be assessed retrospectively from baseline.

Confounder control

Good quality studies control for confounders associated with both loneliness and health care utilization that could potentially explain the relationship. Important confounders identified by established research are age, sex, marital status, household composition, physical health (e.g., chronic conditions and/or physical functioning), mental health (e.g., depressive symptoms, psychological distress), cognition (e.g., presence of dementia), and health behaviors (e.g., smoking status, physical activity, diet, sleep). To be considered good quality, we required studies to have controlled for at least 75% (six of the eight) important confounders.

Results

Search Strategy

After removing duplicates, the titles and abstracts of 3,283 papers were screened and 3,125 were removed (reasons included studies conducted in the younger population, no measurement of loneliness or HSCU, noncommunity sample, and intervention or randomized controlled trial studies). Full-text screening was conducted with 156 papers, with 128 excluded (reasons for exclusion are listed in [Figure 1](#)). An additional four papers were identified through additional sources, giving us 32 eligible published studies.

Study Summary

The 32 studies were published between 1981 and 2021 and used 25 data sets. The two most commonly used data sets were the English Longitudinal Study of Ageing (ELSA; $n = 4$) and the US Health and Retirement Study ($n = 4$; [Supplementary Material Section 2](#)). Sample sizes ranged from 162 ([Wang et al., 2019](#)) to 18,557 ([Mosen et al., 2021](#)). Included studies were from 10 countries (Denmark, Germany, United Kingdom, United States of America, Ireland, China, Singapore, Sweden, Switzerland, and Canada; [Supplementary Material Section 2](#)). Ages ranged from 40 or older ([Bock et al., 2018](#)) to 85 and older ([Nägga et al., 2012](#)) with the majority of studies sampling those aged 60 to 65 and older ([Supplementary Material Section 2](#)).

Included studies assessed a range of indicators of HSCU including contact with physicians, outpatient service use, planned and unplanned hospital use, inpatient service use, accident and emergency use, moving to a residential care home, use of skilled nursing facilities, dental services, and use of community services ([Tables 1–3](#)). HSCU was measured through linked medical, residential, or health care records in 11 studies, with the remaining studies relying on self-report ([Tables 1–3](#)). Loneliness was measured with single-item questions, a 3, 4, 5, or 10-item version of the UCLA loneliness scale, the DeJong Gierveld Scale, or both multidimensional and single-item measures ([Tables 1–3](#)). Some studies using

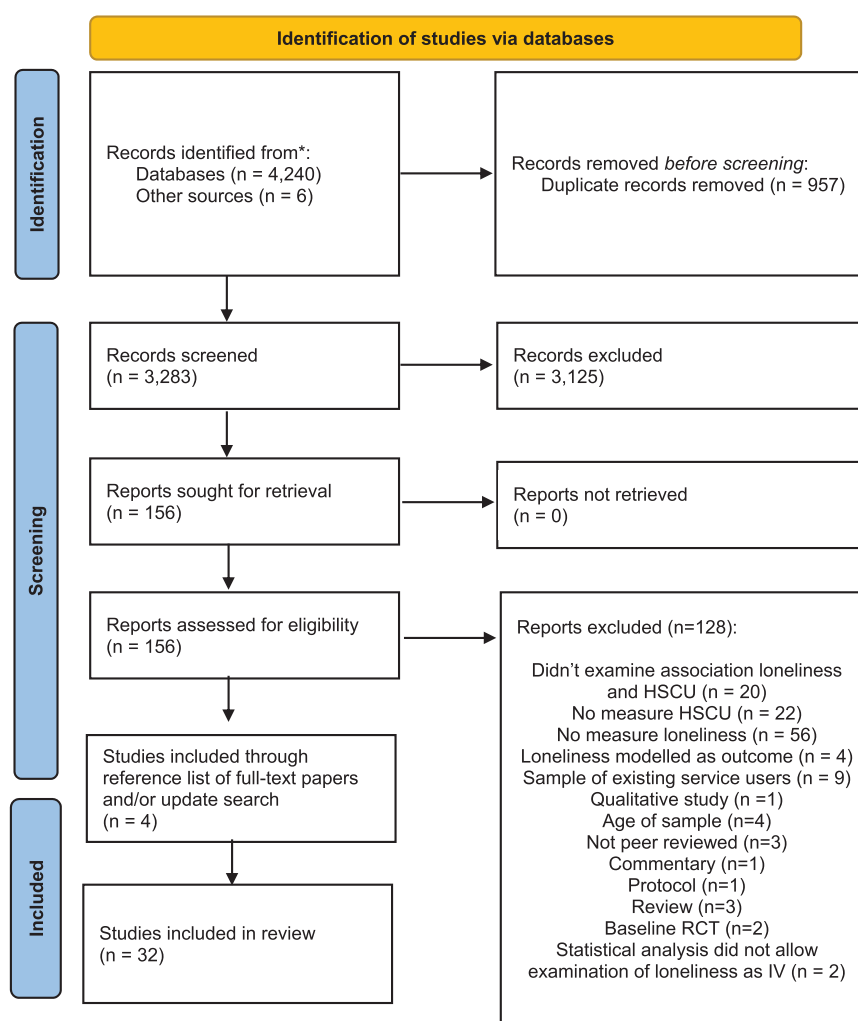


Figure 1. PRISMA flow diagram. *Note:* HSCU = health and social care utilization; IV = independent variable; PRISMA = Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

a cutoff to define loneliness and others treated loneliness as a continuous predictor (Tables 1–3). No studies provided estimates that adjusted for all important confounders, but 21 studies adjusted for a minimum of six of the eight important confounders, and five provided only unadjusted estimates (Supplementary Material Section 3).

Study Quality

The highest quality studies were those that employed a sampling technique that recruited a representative sample and employed appropriate methodological and statistical designs (Supplementary Material Section 3 and Tables 1–3). Six studies were evaluated as good quality (Bu, Abell et al., 2020; Bu, Philip et al., 2020; Bu, Zaninotto et al., 2020; Dahlberg et al., 2018; Newall et al., 2015; Shaw et al., 2017) and these longitudinal studies utilized loneliness data from national or provincial aging cohorts, accounted for the majority of important health and sociodemographic confounders in their analysis and measured HSCU through linked medical

records (Supplementary Material Section 3). An additional three studies were rated as good–fair quality due to limited sampling (Hanratty et al., 2018), inadequate confounder adjustment (Mosen et al., 2021), and use of the UCLA scale in a nonvalidated way (Russell et al., 1997). Two longitudinal studies were rated as fair as they had nonrepresentative sampling methods and measured self-reported indicators of HSCU retrospectively over multiple waves rather than prospectively (Bock et al., 2018; Wang et al., 2019), with the remaining longitudinal study being rated fair–poor as in addition to the aforementioned issues they also had inadequate confounder adjustment (Spinler et al., 2019).

The remaining studies were evaluated as fair to poor quality, and inferences were limited by the employment of cross-sectional designs (Tables 1–3 and Supplementary Material Section 3). These studies were not adequate to determine that loneliness as an exposure variable caused a difference in HSCU as an outcome variable because either they measure loneliness retrospectively and HSCU at the time of data collection (or vice versa) or both factors contemporaneously.

Table 1. Papers That Examined the Association of Loneliness With Physician Use

Study design	N of studies	Health care utilization measure	Loneliness measure	Population	Statistical analysis	Quality rating	Relationship between loneliness and health care utilization
Type of health or social care utilization: Family physician/GP utilization/primary care							
Number of visits: panel data	1	Self-report—visits previous 12 months over three waves (Bock et al., 2018)	Multidimensional (Bock et al., 2018)	Community sample—representative sampling (Bock et al., 2018)	Appropriate analysis (zero-inflated binomial distribution), and adequate confounder adjustment (Bock et al., 2018)	Fair—good (Bock et al., 2018)	One study found no association of changes in loneliness with number of visits in the previous year over three waves (Bock et al., 2018)
Number of visits: cross-sectional	4	Self-report—visits previous 12 months (Burns et al., 2020; Ellaway et al., 1999; Houle et al., 2001) Self-report—home visit from GP previous 12 months (Ellaway et al., 1999)	Single item (Ellaway et al., 1999; Houle et al., 2001) Single item and multidimensional at one (Burns et al., 2021) or multiple timepoints (Burns et al., 2020)	Community sample—representative sampling (Burns et al., 2020, 2021; Houle et al., 2001) unrepresentative sampling (Ellaway et al., 1999)	Appropriate analysis (zero-inflated binomial distribution), and adequate confounder adjustment (Burns et al., 2020, 2021) Inadequate analysis (did not account for data distribution), with adequate confounder adjustment (Ellaway et al., 1999; Houle et al., 2001)	Fair (Burns et al., 2020, 2021; Ellaway et al., 1999; Houle et al., 2001) Poor (Mosen et al., 2021)	Three studies found loneliness associated with increased visits in the previous year (Burns et al., 2020; Ellaway et al., 1999; Houle et al., 2001), one study also found this association for chronic loneliness (Burns et al., 2020) One study found no association of loneliness with number of visits in the previous year (Burns et al., 2021) One study found no association of loneliness with the number of home visits from a GP in the previous 12 months (Ellaway et al., 1999)
Whether service used at all: cross-sectional	1	Self-report—previous 12 months (Mosen et al., 2021)	Single item (Mosen et al., 2021)	General population sample (Medicaid database)—representative sampling (Mosen et al., 2021)	Inadequate analysis (unadjusted chi-square analysis; Mosen et al., 2021)	Poor (Mosen et al., 2021)	One study found that those people who were sometimes or often/always lonely were more likely to have visited primary care once or more in the previous year than those who were never lonely (Mosen et al., 2021)
Last reported contact: longitudinal	1	Self-report—when had last contact with physician (Wang et al., 2019)	Single item (Wang et al., 2019)	Community sample—unrepresentative sampling (Wang et al., 2019)	Appropriate analysis with adequate confounder control—but baseline HSCU included with follow-up HSCU so not fully prospective study (Wang et al., 2019)	Fair (Wang et al., 2019)	One study found evidence for shorter time since last contact for slightly lonely group when compared with never lonely group. No difference for often lonely group (Wang et al., 2019)
Last reported contact: cross-sectional	1	Self-report—when had last contact with physician (Almind et al., 1991)	Not specified (likely single item; Almind et al., 1991)	Community sample—representative sampling (Almind et al., 1991)	Inadequate analysis (unadjusted chi-square analysis; Almind et al., 1991)	Poor (Almind et al., 1991)	One study found people who were sometimes or often lonely more likely to have seen a family physician in the past month than people who were never lonely (Almind et al., 1991)

Table 1. Continued

Study design	N of studies	Health care utilization measure	Loneliness measure	Population	Statistical analysis	Quality rating	Relationship between loneliness and health care utilization
Type of health or social care utilization: Any physician utilization							
Number of visits: cross-sectional*	3	Self-report—previous 24 months (Gerst-Emerson & Jaywartha, 2015), 12 months (Cheng, 1992), 1 month (Lim & Chan, 2017)	Multidimensional at one timepoint (Cheng et al., 1992) or multiple timepoints (Gerst-Emerson & Jaywartha, 2015; Lim & Chan, 2017)	Community sample—representative sampling (Gerst-Emerson & Jaywartha, 2015; Lim & Chan, 2017) Community sample—unrepresentative sampling (Cheng, 1992)	Appropriate analysis (negative binomial regression) with adequate confounder adjustment (Gerst-Emerson & Jaywartha, 2015), or inadequate confounder adjustment (Lim & Chan, 2017) Inadequate analysis (did not account for data distribution), with minimal confounder adjustment (Cheng, 1992)	Fair (Gerst-Emerson & Jaywartha, 2015) Fair-poor (Lim & Chan, 2017)	One study found loneliness at one timepoint linked with an increased number of visits (Cheng, 1992) One study found that chronic loneliness was associated with an increased number of visits in the previous 24 months (Gerst-Emerson & Jaywartha, 2015), whereas a second study found no association over the previous month (Lim & Chan, 2017) One study found that people who were no longer lonely reported significantly fewer visits in the previous month than people who were never lonely (Lim & Chan, 2017), whereas a second study found no association over 24 months (Gerst-Emerson & Jaywartha, 2015) Two studies found no association of becoming lonely and physician visits in the previous 1–24 months when compared to people who were never lonely (Gerst-Emerson & Jaywartha, 2015; Lim & Chan, 2017) One study found no association between baseline loneliness and the likelihood of seeing a physician over 2.5 years (Newall et al., 2015)
Whether service used at all: longitudinal	1	Linked medical records 2.5 years (Newall et al., 2015)	Single item (Newall et al., 2015)	Community sample—representative sampling (Newall et al., 2015)	Appropriate categorical statistical model (regression) with adequate confounder adjustment (Newall et al., 2015)	Good (Newall et al., 2015)	One study found no association between baseline loneliness and the likelihood of seeing a physician over 2.5 years (Newall et al., 2015)
Whether service used at all: cross-sectional	3	Self-report whether used service at all over 1 year (Richard et al., 2017), 1 month (Lim & Chan, 2017), or 2 weeks (Zhang et al., 2018)	Multidimensional at multiple time points (Lim & Chan, 2017) Single item (Richard et al., 2017; Zhang et al., 2018)	Community sample—representative sampling (all studies)	Appropriate categorical statistical model (regression) with adequate confounder adjustment (Zhang et al., 2018), or inadequate confounder adjustment (Lim & Chan, 2017; Richard et al., 2017)	Fair-poor (Lim & Chan, 2017; Richard et al., 2017; Zhang et al., 2018)	Two studies found those people who were lonely were more likely to have seen a physician in the previous 2 weeks (Zhang et al., 2018) or 1 year (Richard et al., 2017) when compared to those who were not lonely One study found that those people who became lonely or were chronically lonely were less likely to have seen a physician in the previous month than people who were never lonely (Lim & Chan, 2017)

Notes: GP = general physician; HSCU = health and social care utilization. *An additional study also examined the link between loneliness and physician visits (Theeke, 2010), but as that used the same data as a higher quality paper (Gerst-Emerson & Jaywartha, 2015) we only extracted data from the higher quality paper. Findings between both papers pointed to the same direction of association (i.e., loneliness associated with more visits). Important confounders: Sociodemographics (age, sex, marital status, household composition), health (physical health status as indicated by chronic conditions and/or functioning, mental health [e.g., depressive symptoms], cognition and health behaviors). Appropriate analysis: For studies that examined the number of visits to health care settings these should account for the data distribution (i.e., there would be a very high proportion of people who do not visit health care settings/visit less often so it is important that analyses account for this by using an analysis that allows for this kind of distribution such as zero-inflated model or negative binomial model. Some studies could also use Poisson regression as that analyses count data—however, this would be adequate unless the authors can justify why they did not need to account for potentially skewed data distribution. Furthermore, for studies that examine loneliness as a categorical variable, using an appropriate statistical model would be a model that allowed for confounder adjustment (e.g., a logistic regression model). Across both kinds of analyses, the best statistical model would also adjust for a range of health-related and sociodemographic confounders (we have set this to a minimum of six/eight important confounders as listed above).

Table 2. Papers That Examined the Association of Loneliness With Outpatient, Inpatient, and Emergency Department Utilization

Study design	N of studies	Health care utilization measure	Loneliness measure	Population	Statistical analysis	Quality rating	Relationship between loneliness and health care utilization
Type of health or social care utilization: Outpatient service utilization/outpatient specialists							
Number of visits: longitudinal	2	Linked medical records 4.5 years (Shaw et al., 2017) Self-report—number of specialist visits (Bock et al., 2018) over previous 12 months	Multidimensional (Bock et al., 2018; Shaw et al., 2017)	Community sample—representative sampling (Shaw et al., 2017) and unrepresentative sampling (Bock et al., 2018)	Appropriate analysis (loneliness modeled categorical due to nonnormal distribution) with adequate confounder adjustment (Shaw et al., 2017) Adequate analysis (Poisson regression) but did not account for binomial/zero-inflated distribution (Bock et al., 2018)	Good (Shaw et al., 2017) Fair (Bock et al., 2018)	One study found loneliness was not associated with any difference in the number of visits made to outpatient facilities when compared with those who were not lonely (Shaw et al., 2017), and a second found that changes in loneliness were not associated with changes in the number of visits to a specialist over time (Bock et al., 2018)
Number of visits: cross-sectional	1	Self-report—number of outpatient physician contacts (Denkinger et al., 2012) over previous 12 months	Single item (Denkinger et al., 2012)	Community sample—unrepresentative sampling (Denkinger et al., 2012)	Appropriate analysis (negative binomial regression), adequate confounder adjustment (Denkinger et al., 2012)	Fair—poor (Denkinger et al., 2012)	One study found as loneliness increased that there was a small but significant increase in the number of visits made to an outpatient physician in the previous year (Denkinger et al., 2012)
Whether service used at all: cross-sectional	1	Self-report—previous 2 weeks (Jiang et al., 2018)	Single item (Jiang et al., 2018)	Community sample—representative sampling (Jiang et al., 2018)	Inadequate statistical model (unadjusted chi-square analysis) (Jiang et al., 2018)	Poor (Jiang et al., 2018)	One study found that those people who were lonely were more likely to have used outpatient facilities in the previous 2 weeks (Jiang et al., 2018)
Number of visits: longitudinal*	2	Linked medical records 4.5 years (Shaw et al., 2017) Self-report visits over previous 12 months across three waves (one baseline, two follow-up waves; Wang et al., 2019)	Multidimensional (Shaw et al., 2017) Single item (Wang et al., 2019)	Community sample—representative sampling (Shaw et al., 2017), unrepresentative sampling (Wang et al., 2019)	Appropriate analysis (loneliness modeled categorical due to nonnormal distribution) with adequate confounder adjustment (Shaw et al., 2017) Appropriate analysis (negative binomial modeling) with adequate confounder control—but baseline HSCU included with follow-up HSCU so not fully prospective study (Wang et al., 2019)	Good (Shaw et al., 2017) Good—fair (Wang et al., 2019)	One study found that those people who were lonely had significantly fewer hospitalizations than those who were not lonely (Shaw et al., 2017) One study found no association of loneliness with the number of hospital visits (Wang et al., 2019)

Table 2. Continued

Study design	N of studies	Health care utilization measure	Loneliness measure	Population	Statistical analysis	Quality rating	Relationship between loneliness and health care utilization
Whether hospitalized at all: longitudinal	2	Linked medical records 2.5 years for both any hospitalization or multiple hospitalizations (Newall et al., 2015), and over 1 year (Mosen et al., 2021)	Single item (Mosen et al., 2021; Newall et al., 2015)	Community sample—representative sampling (Newall et al., 2015) General population sample (Medicaid database)—representative sampling (Mosen et al., 2021)	Appropriate categorical statistical model (regression) with adequate confounder adjustment (Newall et al., 2015) Adequate categorical statistical model (logistic regression), but inadequate confounder adjustment (Mosen et al., 2021)	Good (Newall et al., 2015) Good-fair (Mosen et al., 2021)	One study found that those people who were lonely were no more likely to be hospitalized over 2.5 years, but were more likely to be rehospitalized (if they were hospitalized the first time during follow-up; Newall et al., 2015) One study found that those people who reported being sometimes lonely were more likely to be hospitalized over 1 year than those who were never lonely (Mosen et al., 2021). This association was not observed for people who were often lonely
Whether hospitalized at all: cross-sectional	4	Self-report—previous 12 months (Barnes et al., 2021; Jiang et al., 2018; Zhang et al., 2018) Health care utilization database, previous 12 months (Nagga et al., 2012)	Single item (Jiang et al., 2018; Nagga et al., 2012; Zhang et al., 2018) Multidimensional (Barnes et al., 2021)	Community sample—representative sampling (Jiang et al., 2018; Nagga et al., 2012; Zhang et al., 2018) General population sample (Medicaid database)—unrepresentative sampling (Barnes et al., 2021)	Inadequate statistical model (unadjusted chi-square analysis; Nagga et al., 2012) or appropriate model with minimal confounder adjustment (Barnes et al., 2021) Appropriate categorical statistical model with adequate confounder adjustment (Jiang et al., 2018; Zhang et al., 2018)	Fair (Zhang et al., 2018) Fair-poor (Jiang et al., 2018) Poor (Nagga et al., 2012)	Two studies found that those people who were lonely were more likely to have been hospitalized or used in-patient services in the previous 12 months than people who were not lonely (Nagga et al., 2012; Zhang et al., 2018) One study found that those people who reported being sometimes or often lonely had no difference in the likelihood of being hospitalized in the previous year when compared with people who were never lonely (Jiang et al., 2018) One study found no difference in the likelihood of being hospitalized in the previous 12 months for groups who were lonely, or lonely and socially isolated when compared to people who were neither lonely nor isolated (Barnes et al., 2021)
Length of stay in hospital: longitudinal	1	Linked medical records 2.5 years, whether hospital stay was 2 days or longer (Newall et al., 2015)	Single item (Newall et al., 2015)	Community sample—representative sampling (Newall et al., 2015)	Appropriate categorical statistical model (regression) with adequate confounder adjustment (Newall et al., 2015)	Good (Newall et al., 2015)	One study found that those people who were lonely were no more likely to have stayed in the hospital for 2 days or more than people who were not lonely (Newall et al., 2015)
Length of stay in hospital: cross-sectional	1	Self-report—total length of stay in hospital in previous 12 months (Denkinger et al., 2012)	Single item (Denkinger et al., 2012)	Community sample—unrepresentative sampling (Denkinger et al., 2012)	Appropriate analysis (negative binomial regression) with adequate confounder adjustment (Denkinger et al., 2012)	Fair-poor (Denkinger et al., 2012)	One study found no association between loneliness and the number of days spent in a hospital over the previous 12 months (Denkinger et al., 2012)

Table 2. Continued

Study design	N of studies	Health care utilization measure	Loneliness measure	Population	Statistical analysis	Quality rating	Relationship between loneliness and health care utilization
Type of health or social care utilization: Specific hospitalization							
Whether had any planned or unplanned hospital admissions: longitudinal	1	Linked medical records—any planned or unplanned visit over 1–2 years (inclusive of both outpatient and inpatient care; Dahlberg et al., 2018)	Single item (Dahlberg et al., 2018)	General population sample—representative sampling (Dahlberg et al., 2018)	Appropriate categorical risk analysis (Cox proportional hazards) with adequate confounder control (Dahlberg et al., 2018)	Good (Dahlberg et al., 2018)	One study found no association of loneliness with the risk of planned or unplanned hospital admissions over follow-up (Dahlberg et al., 2018)
Whether had any planned or unplanned hospital admissions: cross-sectional	1	Self-report—whether had planned or emergency inpatient admission in previous 12 months (Molloy et al., 2010)	Single item (Molloy et al., 2010)	Community sample—representative sampling (Molloy et al., 2010)	Appropriate categorical analysis (regression) with inadequate confounder adjustment (Molloy et al., 2010)	Fair–poor (Molloy et al., 2010)	One study found people who were lonely were more likely to have an emergency (unplanned) hospital admission in the previous 12 months than people who were not lonely. This association was not observed for planned hospital admissions. (Molloy et al., 2010)
Whether hospitalized for a specific condition: longitudinal	3	Linked medical records—any hospitalization over 9 years for CVD (Bu, Zaninotto et al., 2020), falls (Bu, Abell et al., 2020), or respiratory disease (Bu, Philip et al., 2020)	Multidimensional (Bu, Abell et al., 2020 ; Bu, Philip et al., 2020 ; Bu, Zaninotto et al., 2020)	Community sample (all ELISA)—representative sampling (Bu, Abell et al., 2020 ; Bu, Philip et al., 2020 ; Bu, Zaninotto et al., 2020)	Appropriate categorical risk analysis (Cox proportional hazards) with adequate confounder control (Bu, Abell et al., 2020 ; Bu, Philip et al., 2020 ; Bu, Zaninotto et al., 2020)	Good (Bu, Abell et al., 2020 ; Bu, Philip et al., 2020 ; Bu, Zaninotto et al., 2020)	One study found increasing levels of loneliness predicted an increased confounder-adjusted risk of being hospitalized for CVD over follow-up (Bu, Zaninotto et al., 2020) One study found increasing levels of loneliness predicted an increased risk of being hospitalized due to falls, though this association was attenuated after adjustment for confounders (Bu, Abell et al., 2020) One study found that increasing levels of loneliness were not associated with the risk of hospitalization due to respiratory disease over a median of 9 years (Bu, Philip et al., 2020)
Type of health or social care utilization: Accident and emergency utilization							
Number of visits: cross-sectional	2	Self-report—previous 12 months (Burns et al., 2020 ; Burns et al., 2021)	Multidimensional and single item at a single time point (Burns et al., 2020 ; Burns et al., 2021) and chronic over three waves (Burns et al., 2020)	Community sample—representative sampling (Burns et al., 2020), unrepresentative sampling (Burns et al., 2021)	Appropriate analysis (zero-inflated binomial distribution), and adequate confounder adjustment (Burns et al., 2020 ; Burns et al., 2021)	Fair (Burns et al., 2020) Fair–poor (Burns et al., 2021)	Two studies found nonsignificant adjusted associations (there were some significant unadjusted associations) between loneliness and emergency department visits over the previous 12 months robust to how loneliness was measured and gender stratification (Burns et al., 2020 ; Burns et al., 2021).

Table 2. Continued

Study design	N of studies	Health care utilization measure	Loneliness measure	Population	Statistical analysis	Quality rating	Relationship between loneliness and health care utilization
Whether service used at all: longitudinal	1	Linked medical records over 1 year (Mosen et al., 2021)	Single item (Mosen et al., 2021)	General population sample (Medicaid database)—representative sampling (Mosen et al., 2021)	Adequate categorical statistical model (logistic regression), but inadequate confounder adjustment (Mosen et al., 2021)	Good—fair (Mosen et al., 2021)	One study found that those people who were sometimes lonely or often/always lonely were more likely to use emergency department services over 1 year than people who were never lonely (Mosen et al., 2021)
Whether service used at all: cross-sectional	3	Self-report—previous 12 months (Barnes et al., 2021; Burns et al., 2020; Burns et al., 2021)	Multidimensional (Barnes et al., 2021), multidimensional and single item at a single time point (Burns et al., 2020; Burns et al., 2021) and chronic over three waves (Burns et al., 2020)	Community sample—representative sampling (Burns et al., 2020), unrepresentative sampling (Barnes et al., 2021; Burns et al., 2021) General population sample (Medicaid database)—unrepresentative sampling (Barnes et al., 2021)	Appropriate categorical analysis (regression), and adequate confounder adjustment (Burns et al., 2020; Burns et al., 2021) Appropriate categorical analysis (regression), and inadequate confounder adjustment (Barnes et al., 2021)	Fair (Burns et al., 2020) Fair—poor (Barnes, 2021; Burns et al., 2021)	Two studies found mostly nonsignificant adjusted associations between loneliness and emergency department use in the previous 12 months (Burns et al., 2020; Burns et al., 2021). However, one study uncovered two significant associations; in females (a) multidimensional measure score at one time point and (b) chronic loneliness as measured with a single item associated with increased likelihood of visiting the emergency department in previous 12 months (Burns et al., 2020) One study found that those people who were lonely and isolated had a higher likelihood of having visited an emergency department in the previous 12 months than people who were neither lonely nor isolated (Barnes et al., 2021). There was no association observed for people who were lonely but not isolated

Notes: CVD = cardiovascular disease; HSCU = health and social care utilization. There was one cross-sectional study that also explored this association (Gerst-Emerson & Jaywartha, 2015), but as this kind of hospitalization was covered in a better quality longitudinal paper (Shaw et al., 2017) data were not extracted here. Findings between both papers were not consistent (i.e., Shaw et al. (2017) indicated loneliness predicted decreased utilization whereas Gerst-Emerson and Jaywartha (2015) found no association). Important confounders: sociodemographics (age, sex, marital status, household composition), health (physical health status as indicated by chronic conditions and/or functioning, mental health [e.g., depressive symptoms], cognition and health behaviors). Appropriate analysis: For studies that examined the number of visits to health care settings these should account for the data distribution (i.e., there would be a very high proportion of people who do not visit health care settings/visit less often) so it is important that analyses account for this by using an analysis that allows for this kind of distribution such as zero-inflated model or negative binomial model. Some studies could also use Poisson regression as that analyses count data—however, this would be adequate unless the authors can justify why they did not need to account for potentially skewed data distribution. Furthermore, for studies that examine loneliness as a categorical variable, using an appropriate statistical model would be a model that allowed for confounder adjustment (e.g., a logistic regression model). Across both kinds of analyses, the best statistical model would also adjust for a range of health-related and sociodemographic confounders (we have set this to a minimum of six/eight important confounders as listed above).

Table 3. Papers That Examined the Association of Loneliness With Residential Care, Social Care, Community Care, and General Medical Use

Study design	N of studies	Health care utilization measure	Loneliness measure	Population	Statistical analysis	Quality rating	Relationship between loneliness and health care utilization
Type of health or social care utilization: Care home admission							
Whether admitted to care home: longitudinal	2	Linked medical/residential records—4 years (Russell et al., 1997) or 2–10 years (Hanratty et al., 2018)	Multidimensional (Hanratty et al., 2018; Russell et al., 1997) and single item (Hanratty et al., 2018)	Community sample—retrospective matched sampling (Hanratty et al., 2018)	Appropriate categorical analysis (regression) with adequate confounder adjustment (Hanratty et al., 2018; Russell et al., 1997)	Good—fair (Hanratty et al., 2018; Russell et al., 1997)	Two studies found that loneliness at baseline predicted an increased likelihood of later care home admission (Hanratty et al., 2018; Russell et al., 1997)
Whether service used at all: longitudinal	1	Linked medical records (skilled nursing facilities) 4.5 years (Shaw et al., 2017)	Multidimensional (Shaw et al., 2017)	Community sample—representative sampling (Shaw et al., 2017)	Appropriate categorical statistical model with adequate confounder adjustment (Shaw et al., 2017)	Good (Shaw et al., 2017)	One study found loneliness was not associated with use of skilled nursing facilities over follow-up (Shaw et al., 2017)
Type of health or social care utilization: Dental service utilization							
Number of visits: panel data	1	Self-report previous 1 year, over three waves (Spinler et al., 2019)	Multidimensional (Spinler et al., 2019)	Community sample—unrepresentative sampling (Spinler et al., 2019)	Appropriate analysis (fixed-effects regression), with no confounder control (Spinler et al., 2019)	Fair—poor (Spinler et al., 2019)	One study found that changes in loneliness had no association with dental service utilization over time (Spinler et al., 2019).
Whether service used at all: cross-sectional	2	Self-report—previous 2 years (Burr & Lee, 2013) or time not specified (Lundgren et al., 1995)	Multidimensional (Burr & Lee, 2013) Not specified (Lundgren et al., 1995)	Community sample—representative sampling (Burr & Lee, 2013) General population—unrepresentative sampling (Lundgren et al., 1995)	Appropriate categorical analysis (regression) with adequate confounder adjustment (Burr & Lee, 2013) Adequate categorical analysis (stepwise regression, only significant variables entered) with inadequate confounder adjustment (Lundgren et al., 1995)	Fair (Burr & Lee, 2013) Poor (Lundgren et al., 1995)	Two studies found that after minimal/no confounder adjustment that loneliness was associated with decreased dental service utilization (Burr & Lee, 2013; Lundgren et al., 1995). However, after health and sociodemographic confounder adjustment, there was no longer an association for the one study that accounted for these confounders (Burr & Lee, 2013)
Type of health or social care utilization: Community services							
General community care whether used at all: cross-sectional	1	Self-report—past month (Dahlberg & McKee, 2014)	Multidimensional (Dahlberg & McKee, 2014)	Community sample—representative sampling (Dahlberg & McKee, 2014)	Inadequate analysis with no confounder adjustment (correlation; Dahlberg & McKee, 2014)	Poor (Dahlberg & McKee, 2014)	One study found a significant positive correlation of both social and emotional loneliness with receipt of community care in the previous month (Dahlberg & McKee, 2014)

Table 3. Continued

Study design	N of studies	Health care utilization measure	Loneliness measure	Population	Statistical analysis	Quality rating	Relationship between loneliness and health care utilization
Use of specific services: longitudinal	1	Self-report (past week)—home help, community nurse, meals on wheels, and/or day center (Wang et al., 2019)	Single item (Wang et al., 2019)	Community sample—unrepresentative sampling (Wang et al., 2019)	Appropriate analysis with adequate confounder control—baseline HSCU included with follow-up so not fully prospective (Wang et al., 2019)	Fair (Wang et al., 2019)	One study found no association of loneliness with use of a range of community services in the past week (Wang et al., 2019)
Use of specific services: cross-sectional	1	Self-report—use of homecare past 2 years (Theeke, 2009)	Single item (Theeke, 2009)	Community sample—representative sampling (Theeke, 2009)	Inadequate categorical analysis with no confounder adjustment (Theeke, 2009)	Poor (Theeke, 2009)	One study found those people who were lonely were more likely to have used homecare in the past 2 years than people who were not lonely (Theeke, 2009)
Type of health or social care utilization: General medical care							
Seeking general medical care: cross-sectional	1	Self-report—past month (Dahlberg & McKee, 2014)	Multidimensional (Dahlberg & McKee, 2014)	Community sample—representative sampling (Dahlberg & McKee, 2014)	Inadequate analysis with no confounder adjustment (correlation; Dahlberg & McKee, 2014)	Poor (Dahlberg & McKee, 2014)	One study found no correlation between either social or emotional loneliness with receipt of any medical care in the previous month (Dahlberg & McKee, 2014)
Seeking medical advice: cross-sectional	1	Self-report—frequency (timeframe not defined; Berg et al., 1981)	Single item (Berg et al., 1981)	Community sample—representative sampling (Berg et al., 1981)	Inadequate categorical analysis with no confounder adjustment (Berg et al., 1981)	Poor (Berg et al., 1981)	One study found those people who were lonely reported a higher frequency of seeking medical advice than people who were not lonely. Gender-stratified analyses indicated this association was only observed in females (Berg et al., 1981)

Notes: HSCU = health or social care utilization. Important confounders: Sociodemographics (age, sex, marital status, household composition), health (physical health status as indicated by chronic conditions and/or functioning, mental health [e.g., depressive symptoms], cognition and health behaviors). Appropriate analysis: For studies that examined the number of visits to health care settings these should account for the data distribution (i.e., there would be a very high proportion of people who do not visit health care settings/visit less often) so it is important that analyses account for this by using an analysis that allows for this kind of distribution such as zero-inflated model or negative binomial model. Some studies could also use Poisson regression as that analyses count data—however, this would be adequate unless the authors can justify why they did not need to account for potentially skewed data distribution. Furthermore, for studies that examine loneliness as a categorical variable, using an appropriate statistical model would be a model that allowed for confounder adjustment (e.g., a logistic regression model). Across both kinds of analyses, the best statistical model would also adjust for a range of health-related and sociodemographic confounders (we have set this to a minimum of six/eight important confounders as listed above).

Loneliness and Health Care Utilization: Qualitative Synthesis

Summary of Key Results From Highest Quality Studies

Of the nine good or good-fair quality studies, there was no evidence of a confounder-adjusted association of loneliness with subsequent utilization of physicians (Newall et al., 2015; Wang et al., 2019), skilled nursing facilities (Shaw et al., 2017), or outpatient services (Shaw et al., 2017). Evidence for an association of loneliness with subsequent inpatient service use or hospitalization was inconclusive (Bu, Abell et al., 2020; Bu, Philip et al., 2020; Bu, Zaninotto et al., 2020; Dahlberg et al., 2018; Mosen et al., 2021; Newall et al., 2015). Two studies reported that that baseline loneliness was associated with an increased likelihood of moving to a residential care home (Hanratty et al., 2018; Russell et al., 1997) and one that it was associated with subsequent emergency department utilization (Mosen et al., 2021).

The remaining studies were all cross-sectional or fair to poor quality, limiting the extent to which we can reliably infer whether loneliness causes a subsequent change in HSCU. Findings from all studies are synthesized by commonalities in the type of HSCU below and results are discussed in more detail. We retain cross-sectional designs in this synthesis to highlight the limitations inherent in these designs when assessing the health outcomes of loneliness and to demonstrate the lack of robust longitudinal studies required to be able to assess these relationships.

Loneliness and Contact With Physicians

We identified 14 studies that examined the relationship between loneliness and physician visits of which only three were longitudinal and only one of sufficient quality to determine whether loneliness was associated with subsequent HSCU (Table 1 and Supplementary Material Section 2).

The one good quality longitudinal study found an unadjusted, but not confounder-adjusted, association of baseline loneliness with making one or more visits to any physician over 2.5 years (Newall et al., 2015).

The remaining 13 studies were of fair to poor quality. There were two longitudinal studies that assessed physician visits in different ways. Wang et al. (2019) found those who were slightly lonely at baseline (not often lonely at baseline) reported significantly shorter times since seeing their general physician (GP) over three waves than people who were not lonely at baseline. Bock et al. (2018) indicated that over time changes in loneliness were not associated with the number of visits made to the GP over three waves.

Eight cross-sectional studies indicated that loneliness (single timepoint and/or chronic) was associated with an increased number of physician visits (Burns et al., 2020; Cheng, 1992; Ellaway et al., 1999; Gerst-Emerson & Jaywarha, 2015; Houle et al., 2001) or an increased

likelihood of having seen a physician (Mosen et al., 2021; Richard et al., 2017; Zhang et al., 2018). One study found no association of loneliness with home visits from a physician in the previous year (Ellaway et al., 1999), and another that people who were sometimes or often lonely were more likely to have seen a physician in the previous month (Almind et al., 1991). Two studies indicated no association between loneliness and physician visits (Burns et al., 2021; Lim & Chan, 2017).

Overall, there is no existing evidence to suggest that loneliness in older adults causes a subsequent increase in the number of physician visits.

Loneliness and Outpatient Service Use/Use of Specialist Services

Four studies assessed loneliness and outpatient/specialist service use of which two were longitudinal and two cross-sectional (Table 2 and Supplementary Material Section 2). The one good quality longitudinal study found no confounder-adjusted association of baseline loneliness with outpatient visits over a median of 4.5 years (Shaw et al., 2017).

A fair quality longitudinal study found that over time changes in loneliness were not associated with changes in the use of specialist services (Bock et al., 2018). Two fair-poor quality cross-sectional studies found a confounder-adjusted association of loneliness and outpatient service use (Denkinger et al., 2012; Jiang et al., 2018). However, these studies are not adequate to infer temporality.

Taken together there is no evidence to suggest that loneliness is associated with a subsequent difference in the use of general outpatient or specialist facilities among older adults.

Loneliness and Hospitalization

We identified 13 studies addressing loneliness and hospitalization (which were general, planned, unplanned, or for specific conditions), of which eight were longitudinal and five cross-sectional (Table 2 and Supplementary Material Section 2).

Seven good to good/fair quality longitudinal studies examined the association of loneliness with hospitalization measured using linked medical records (Table 2). Three examined general hospitalization, but the findings were inconsistent. One good-fair quality study indicated that people who were sometimes lonely at baseline (but not often lonely) were more likely to be hospitalized during a 1-year follow-up (Mosen et al., 2021). A second good quality study from Newall et al. (2015) found no association with any hospitalization or the length of stay in hospital over 2.5 years, but evidence for an increased likelihood of re-hospitalization over time. Running contrary to both of these, Shaw et al. (2017) found that loneliness was associated with significantly fewer all-cause hospitalizations.

One good quality study from [Dahlberg et al. \(2018\)](#) examined planned and unplanned hospitalizations over 1–2 years of follow-up and found no confounder-adjusted association. Three good quality studies examined cause-specific hospitalization using baseline data from the ELSA and linked medical records and after adjusting for confounders found that loneliness at baseline was associated with an increased risk of hospitalization over a median of 9 years due to incident CVD ([Bu, Zaninotto et al., 2020](#)), but not falls ([Bu, Abell et al., 2020](#)) or respiratory-disease-related hospitalization ([Bu, Philip et al., 2020](#)).

Six fair to poor quality studies examined the association of loneliness with hospitalization. Of these six studies, five examined general hospitalization. One fair quality longitudinal study indicated no association of loneliness with general hospitalization ([Wang et al., 2019](#)), with one other cross-sectional study also finding no association of loneliness with hospitalization in the previous year ([Jiang et al., 2018](#)). Two cross-sectional studies found that people who were lonely were more likely to have been hospitalized in the previous year ([Nagga et al., 2012](#); [Zhang et al., 2018](#)). One additional fair–poor quality cross-sectional study found no association of loneliness with length of stay in hospital in the previous 12 months ([Denkinger et al., 2012](#)).

One cross-sectional study examined planned and unplanned (emergency) hospitalization in the previous 12 months and found that loneliness was associated with unplanned but not planned hospitalization ([Molloy et al., 2010](#)).

Taken together there is no consistent evidence to suggest that loneliness is associated with subsequent in-patient hospitalization in older adults. Some studies indicated decreased utilization, some increased utilization, and others no difference ([Table 2](#)).

Loneliness and Accident and Emergency Admission

Four studies addressed loneliness and accident and emergency admissions of which one was longitudinal and three cross-sectional ([Table 2](#) and [Supplementary Material Section 2](#)). The one good–fair quality longitudinal study from [Mosen et al. \(2021\)](#) found that being either sometimes or often/always lonely at baseline was associated with a greater adjusted odds of emergency department utilization in the year following loneliness assessment.

Two fair/fair–poor quality cross-sectional studies examined the association of both a multidimensional and single-item measure of loneliness with accident and emergency service utilization and found mostly nonsignificant associations after adjusting for confounders ([Burns et al., 2020, 2021](#)). A third fair–poor quality study found that people who were lonely and socially isolated had a higher likelihood of having visited an emergency department in the previous 12 months than people who were neither lonely nor isolated ([Barnes et al., 2021](#)).

Taken together the one longitudinal study provides some evidence to suggest that loneliness might be associated with subsequent accident and emergency use, but this finding is not consistently replicated in cross-sectional studies. There is a need for further research to confirm or refute before reliable conclusions can be drawn.

Loneliness and Dental Service Use

Three studies addressed loneliness and dental service use; however, these were all of fair to poor quality limiting inferences ([Table 3](#) and [Supplementary Material Section 2](#)).

One poor quality longitudinal study indicated no association of changes in loneliness with dental visits in the previous year over 3 waves ([Spinler et al., 2019](#)). One unadjusted poor quality cross-sectional found that loneliness was associated with a decreased likelihood of being a regular dentist user ([Lundgren et al., 1995](#)) while the second fair quality cross-sectional study found an unadjusted association of loneliness and dental service utilization which was attenuated after adjustment for confounders ([Burr & Lee, 2013](#)). The evidence gathered from this review is not of sufficient quality to determine whether loneliness is associated with later dental service use in older adults.

Loneliness and Residential Care or Skilled Nursing Facilities

Three good/good–fair quality studies examined the association of loneliness with subsequent admission to residential care or use of skilled nursing facilities ([Table 3](#) and [Supplementary Material Section 2](#)). Two good–fair quality longitudinal studies found that older adults who were identified as being lonely at baseline had an increased likelihood of being admitted to a residential care home at follow-up when compared with older adults who were not lonely ([Hanratty et al., 2018](#); [Russell et al., 1997](#)). One good quality longitudinal study examined the use of skilled nursing facilities (any specialist nursing and therapy care for specific issues) over a median of 4.5 years and found no adjusted association of baseline loneliness with these facilities ([Shaw et al., 2017](#)).

There is some evidence from this review to suggest that loneliness at baseline could be associated with residential care home admission during follow-up. This finding was consistent across two studies, both studies were able to demonstrate temporality, and the one study that examined different levels of loneliness found a dose–response relationship ([Russell et al., 1997](#)). However, one of these studies identified people who had been admitted to a residential care home during follow-up and then compared them to age- and sex-matched participants at baseline for loneliness ([Hanratty et al., 2018](#)), and the second used a loneliness scale in an unorthodox way ([Russell et al., 1997](#)). Additional good quality prospective research is needed to confirm or refute these findings before reliable conclusions can be made. There is not sufficient evidence to indicate

that loneliness is associated with the subsequent use of skilled nursing facilities.

Loneliness and Use of Community Services

Three studies assessed loneliness and use of community services; however, these were all of fair to poor quality limiting inferences (Table 3; Supplementary Material Section 2).

One fair quality longitudinal study from Wang et al. (2019) found that baseline loneliness was not associated with self-reported utilization of any of the following services in the previous week (measured over three timepoints over 7 years): home help, community nurse, meals on wheels, or use of day center. Two poor quality cross-sectional studies examined the association of loneliness with community services, and both found loneliness was associated with the use of community care. The evidence from this review is not of sufficient quality to determine whether loneliness is associated with later community care in older adults.

Loneliness and General Medical Utilization (Not Specified)

Two studies examined loneliness and dental service use; however, these both cross-sectional and poor quality limiting inferences (Table 3 and Supplementary Material Section 2).

One study indicated loneliness was associated with a higher frequency of seeking medical advice, whereas the second reported no correlation between social or emotional loneliness with the receipt of any medical care over the previous month. The evidence from this review is not of sufficient quality to determine whether loneliness is associated with later general medical utilization.

Discussion

The lack of consistency in findings and study heterogeneity makes it difficult to robustly elucidate whether loneliness as an exposure predicts increased HSCU as an outcome in older adults. Of the 32 studies identified, 20 were cross-sectional and not adequate to infer temporality. Only nine longitudinal studies were of sufficient quality to determine if loneliness was associated with subsequent HSCU, and the only consistent finding was that loneliness at baseline increased the likelihood of being admitted to a residential care home (Hanratty et al., 2018; Russell et al., 1997). There was also notable heterogeneity between all examined studies in terms of indicators of HSCU, controlling for different confounders, different statistical methodologies, and measurement of both loneliness and the outcome HSCU.

Loneliness and HSCU: The Longitudinal Relationship

The only consistent finding from two good–fair quality studies was that loneliness predicted care home admission

even after adjusting for confounders (Hanratty et al., 2018; Russell et al., 1997). However, there are methodological issues with both studies that mean additional good quality prospective research is needed before reliable conclusions can be drawn. Interestingly, this finding has also been replicated in an additional study not eligible for inclusion in this review, which found that homecare service users who were lonely at baseline had an increased hazards of care home admission over 3 years (Jamieson et al., 2019). Russell et al. (1997) proposed this increased risk could be due to loneliness increasing the risk of worsened health and further proposed that care home placement was implemented to provide lonely older adults with social support. This has been supported by findings from a qualitative study which identified that social factors such as loneliness were key factors that influenced the decision of older adults to move into residential care (Heppenstall et al., 2014). However, one additional good quality study did not find an association of loneliness with subsequent use of skilled nursing facilities (Shaw et al., 2017). This emphasizes the need for future research to examine the association of loneliness with a range of long-term residential care options to determine whether loneliness could be associated with specific residential provision.

Of the seven good/good–fair quality studies that examined hospitalization, there was no consistency in findings with one study indicating decreased hospitalization (Shaw et al., 2017), one study indicating an increased likelihood of re-hospitalization but not hospitalization (Newall et al., 2015), one study indicating that being sometimes lonely (but not often lonely) was associated with hospitalization (Mosen et al., 2021), one study indicating an increased risk of hospitalization due to incident CVD (Bu, Zaninotto et al., 2020), and three studies indicating no association of loneliness with different kinds of hospitalization (Bu, Abell et al., 2020; Bu, Philip et al., 2020; Dahlberg et al., 2018). This lack of consistency could be due in large part to the measurement of hospitalization, as well as methodological and statistical heterogeneity. These are discussed in more detail in the section: *Critical Considerations for Design and Methods*.

There is some emerging evidence that examining the reason for hospitalization could uncover interesting nuances in hospitalization. In a series of studies utilizing data from the ELSA, the risk of in-patient hospitalization for lonely older adults differed based on the reasons for hospitalization, with a higher risk for CVD-related (Bu, Zaninotto et al., 2020) but not respiratory-disease-related (Bu, Philip et al., 2020) or falls-related (Bu, Abell et al., 2020) hospitalizations. There is further evidence from other studies conducted in populations referred for social care assessment that loneliness was associated with a higher risk of hospitalization due to general “geriatric symptoms” (i.e., malaise, dizziness, syncope; Rönnekkö et al., 2018). This emerging evidence indicates that a more

nuanced understanding of the link between loneliness and HSCU could be revealed by examining the reasons for hospitalization.

There was evidence from one longitudinal study that loneliness could be associated with later emergency department use in the United States (Mosen et al., 2021); however, this finding was not supported by included cross-sectional studies, though two studies not eligible for inclusion in this review have found a cross-sectional association of loneliness with emergency department use (Geller et al., 1999; Wee et al., 2019). Commentaries and physician surveys also both indicate that there is a belief that loneliness could be associated with increased use of emergency departments (Lederman, 2020), and that high rates of people presenting at emergency departments are lonely (Agarwal et al., 2019). This indicates that there is a need for more robust work to examine the association of loneliness with emergency department use before we can determine clinical implications.

We found no evidence for a prospective association of loneliness with subsequent use of physicians or primary care, despite the commonly held view that lonely older adults use primary care services more than nonlonely older adults. Examination of the broader loneliness and HSCU literature reveals an estimated 20%–26% of primary care service users report loneliness (Mullen et al., 2019; Zhong et al., 2018), suggesting a high proportion of people utilizing primary care services experience loneliness. Many of the risk factors for loneliness in older adults such as worsened health, experiencing major life events, and poorer functioning (Cohen-Mansfield et al., 2016) are also common reasons for utilizing primary care (Vedsted & Christensen, 2005). Therefore, it is plausible that loneliness is linked with the reasons that people visit primary care (i.e., worsened health), rather than being the reason that people visit primary care.

Loneliness and HSCU: Critical Considerations for Design and Methods

The majority of studies ($n = 20$) utilized a cross-sectional design where loneliness was measured at baseline, and HSCU was assessed retrospectively from baseline (or vice versa or at the same time). This meant that HSCU was assessed over a period that took place before the measurement of loneliness, limiting our ability to be able to ascertain whether loneliness could be associated with a change in HSCU.

The different modeling of loneliness and HSCU could have a direct impact on observed associations as illustrated by two studies examining hospitalization using data from the Health and Retirement Study (Gerst-Emerson & Jayawardhana, 2015; Shaw et al., 2017). One study examined loneliness as a chronic exposure, but looked at self-reported hospitalization cross-sectionally (Gerst-Emerson & Jayawardhana, 2015), whereas the second looked at loneliness at a single timepoint but examined hospitalization longitudinally using medical records (Shaw

et al., 2017). Gerst-Emerson and Jayawardhana (2015) found that loneliness was not associated with hospital visits, whereas Shaw et al. (2017) found that loneliness was associated with a decreased likelihood of hospitalization. Furthermore, two cross-sectional studies from Ireland found that associations between loneliness and HSCU were not always robust to different ways of classifying and categorizing loneliness (Burns et al., 2021, 2020). These studies all show directly the impact that heterogeneity in study design and measurement can have on results.

A further critical consideration is the measurement of loneliness. An expert working group recently published an article stating that there is no clear, common definition of loneliness and no consistently agreed-upon way to best measure loneliness (Fried et al., 2020). Even when studies have used a validated measure of loneliness there still remain questions about how valid these measures are. The lack of harmonization across studies for the measurement of loneliness also made synthesizing the evidence base difficult. Even where studies used the same measure (UCLA loneliness scale) there were differences in which version was used, and how these were scored with some studies using scales in a customized approach (Russell et al., 1997). There have also been suggestions that chronic loneliness is associated with worsened health; however, none of the studies we examined provided evidence that could be used to determine whether chronic loneliness is associated with a subsequent change in HSCU (Burns et al., 2020; Gerst-Emerson & Jayawardhana, 2015; Lim & Chan, 2017).

Beyond the notable differences in the kinds of HSCU assessed, there were also issues regarding the measurement and modeling of HSCU. The majority of studies measured this outcome subjectively and asked participants to retrospectively recall the number of visits they made to particular services. Previous work has demonstrated that recall of HSCU can be subject to error and bias (Ansah & Powell-Jackson, 2013), and that there can be errors in recall for periods of 1 year or more (Short et al., 2009). A further notable difference between studies for HSCU was how this outcome was measured. Some studies examined whether a service was used at all in a predetermined timeframe that varied from 2 weeks (Wang et al., 2019) to up to 9 years (Bu, Abell et al., 2020; Bu, Philip et al., 2020; Bu, Zaninotto et al., 2020; Hanratty et al., 2018). Other studies looked at the number of visits made over a prespecified period which ranged in duration from 1 week (Wang et al., 2019) to 2 years (Gerst-Emerson & Jayawardhana, 2015). Other measures included the length of stay in hospital (Denkinger et al., 2012; Newall et al., 2015) and the length of time since the last visit (Almind et al., 1991; Wang et al., 2019). These differences in timeframe and measurement all lead to differences in the likelihood of capturing the outcome of interest.

There were also notable differences in terms of statistical analysis and confounder control between studies, which had a major impact on the underlying quality of

evidence. Most studies did control for a range of important health and sociodemographic confounders and conducted an analysis that did account for the distribution of health care data; however, this was not done consistently.

Possible issues with this broader review include language bias (only English papers reviewed), publication bias (only published studies included), and the fact the review was conducted primarily by one researcher. Additional considerations include the fact that our review question meant that studies in existing service users could not be included, which included samples of people in the community using services such as home care. There is some interesting evidence from home care assessment databases that loneliness could be associated with later HSCU (Jamieson et al., 2019; Ronneiko et al., 2018), indicating that loneliness could be associated with HSCU in higher-risk populations. This could be an important avenue for future research to examine in more detail.

Implications of Findings

There is little evidence from this review that would currently suggest that lonely older people place an excess burden on health and social care. Based on our review and that of Valtorta et al. (2018), we feel it is important to change the narrative of debate about loneliness among older adults being a major factor in excess service use. Such discourse may deter older adults from seeking the services they need and contribute to them not enjoying “a good old age” (Victor, 2021).

However, being able to reliably determine whether loneliness is linked with HSCU is important for service provision and helping us know where we can orient extra support for older adults who are lonely. In order to do this, we suggest there is little point in repeating small-scale, cross-sectional studies with customized exposure measures and self-reported outcomes. We need to ensure that we gather the high-quality evidence needed to build up a compelling and robust evidence base. We suggest future research in this area must take a longitudinal approach, be sufficiently powered to detect effects if present, ensure representative sampling, and control for all important confounders. Only once we have this good quality evidence base will we be able to make implications about this work for health and social care.

Conclusions

The results from this systematic review suggest that more high-quality research examining loneliness as an exposure and HSCU as a longitudinal exposure is necessitated. There is some evidence that loneliness could be linked with an increased risk of care home admission, but no consistent replicated good quality evidence that links loneliness to an increased likelihood of using any other services. More high-quality longitudinal work that utilizes more homogenous methodologies is needed to

accurately determine whether loneliness causes a change in HSCU.

Supplementary Material

Supplementary data are available at *The Gerontologist* online.

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Conflict of Interest

None declared.

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