

Loneliness in Older Persons

A Predictor of Functional Decline and Death

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Background: Loneliness is a common source of distress, suffering, and impaired quality of life in older persons. We examined the relationship between loneliness, functional decline, and death in adults older than 60 years in the United States.

Methods: This is a longitudinal cohort study of 1604 participants in the psychosocial module of the Health and Retirement Study, a nationally representative study of older persons. Baseline assessment was in 2002 and follow-up assessments occurred every 2 years until 2008. Subjects were asked if they (1) feel left out, (2) feel isolated, or (3) lack companionship. Subjects were categorized as not lonely if they responded hardly ever to all 3 questions and lonely if they responded some of the time or often to any of the 3 questions. The primary outcomes were time to death over 6 years and functional decline over 6 years on the following 4 measures: difficulty on an increased number of activities of daily living (ADL), difficulty in an increased number of upper extremity tasks, decline in mobility, or increased difficulty in stair climbing. Multivariate analyses adjusted for demographic variables, socioeconomic status, living situation, depression, and various medical conditions.

Results: The mean age of subjects was 71 years. Fifty-nine percent were women; 81% were white, 11%, black, and 6%, Hispanic; and 18% lived alone. Among the elderly participants, 43% reported feeling lonely. Loneliness was associated with all outcome measures. Lonely subjects were more likely to experience decline in ADL (24.8% vs 12.5%; adjusted risk ratio [RR], 1.59; 95% CI, 1.23-2.07); develop difficulties with upper extremity tasks (41.5% vs 28.3%; adjusted RR, 1.28; 95% CI, 1.08-1.52); experience decline in mobility (38.1% vs 29.4%; adjusted RR, 1.18; 95% CI, 0.99-1.41); or experience difficulty in climbing (40.8% vs 27.9%; adjusted RR, 1.31; 95% CI, 1.10-1.57). Loneliness was associated with an increased risk of death (22.8% vs 14.2%; adjusted HR, 1.45; 95% CI, 1.11-1.88).

Conclusion: Among participants who were older than 60 years, loneliness was a predictor of functional decline and death.

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IN OLDER PERSONS, HEALTH OUTCOMES, such as worsening disability and death, are influenced not just by biomedical factors but also by psychosocial distress.¹ The hypothesis that loneliness may be a risk factor for adverse health outcomes in older

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persons is supported by previous studies that show that other forms of psychosocial distress lead to adverse health outcomes. For example, several studies link depression to higher risks of disability and mortality.^{2,3} Other studies have shown that measures of social isolation—the number of social contacts and the amount of social engagement—are associated with poor health outcomes. Yet, these quanti-

tative measures of relationships may not adequately capture the distress that an individual may subjectively feel. The concept of loneliness is only starting to be recognized as a separate entity from social isolation and depression, and therefore few studies have examined it as an independent risk factor.

Loneliness is an important contributor to human suffering, especially in elderly persons, among whom prevalence

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rates may be higher.⁴ Loneliness is the subjective feeling of isolation, not belonging, or lacking companionship. While persons who are lonely are more likely to experience depressive symptoms, feelings of loneliness are only weakly associated with enjoyment, energy, and moti-

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vation—emotions that are central to a diagnosis of depression.^{5,6} Loneliness is also distinct from several quantitative measures of social isolation such as living alone, marital status, and number of relationships. For example, it is possible for persons who live alone to not feel lonely, while some who are married or living with others will still experience loneliness. Loneliness can be explained as the discrepancy between one's desired relationships and one's actual relationships.

The subjective distress of loneliness may be a more important measure of suffering and quality of life rather than objective measures of social isolation. Given the number of health and social issues that health care providers must prioritize, the identification and amelioration of loneliness may seem to be outside of the scope of medical practice. Yet, by separating suffering and distress into medical and nonmedical spheres, health care providers may be missing a key risk factor for poor health.

To quantify the prevalence of loneliness and determine whether older persons who are lonely are at risk for poor health outcomes, we used the Health and Retirement Study (HRS),⁷ a national, population-based study of community living older adults. After adjusting for common measures of medical risk, we examined the impact of loneliness on mortality and several measures of worsening disability that are of particular importance in older persons.

METHODS

PARTICIPANTS

This is a 6-year prospective study using participants in the 2002 HRS. The HRS is a population-based longitudinal study examining the relationships between health and wealth changes as people age.⁷ In addition to the primary survey, the HRS administers modules on additional topics to randomly selected participants. The Loneliness, Stress, and Social Support/Burden module was 1 of 12 modules administered in 2002.

Our analytic cohort was limited to participants older than 60 years. In 2002, 14 568 HRS participants (80.2%) were older than 60 years; 1792 (12.3%) participants were not eligible to participate in the modules because their interviews were either partial or were completed by a proxy. Of the remaining 12 776 eligible participants, 1963 (15.4%) were randomly selected to participate in the psychosocial module; 347 of the subjects declined to participate in the module; 10 participants did not complete the 3 loneliness questions; and 2 participants were lost to follow-up. Our final sample included 1604 participants (82% of eligible participants). The 359 subjects who were excluded were significantly older (72.3 vs 70.9 years) and were more likely to have a variety of health conditions including diabetes (22% vs 17%) and activities of daily living (ADL) difficulty (20% vs 12%) (all $P < .05$).

MEASURES

Loneliness

The primary predictor variable consisted of a 3-item loneliness questionnaire that measures 3 components of loneliness: whether subjects feel left out, feel isolated, or lack companionship. The 3-item questionnaire⁵ was adapted from the Revised UCLA Loneliness Scale (R-UCLA), after exploratory and

confirmatory factor analysis. Both the 3-item loneliness scales and the R-UCLA have been validated and are able to be self-administered.

For each component, subjects are asked if they feel that way hardly ever (or never), some of the time, or often. We classified subjects as "lonely" if they responded "some of the time" or "often" to any of the 3 components. We classified subjects as "not lonely" if they responded "hardly ever (or never)" to all 3 components. Our primary analysis used a dichotomous measure of loneliness because we believed each item in the scale better represented different ways a person might express loneliness rather than additive components of loneliness. However, we performed sensitivity analyses examining alternative definitions for the outcome. First, we classified the participants as "moderately lonely" if they responded "some of the time" to any component, and "severely lonely" if they responded "often" to any component. Next, participants were classified as "moderately lonely" if they responded at least "some of the time" to 1 component only, and they were classified as "severely lonely" if they responded at least "some of the time" to 2 or 3 components. Third, we analyzed the items as a continuous scale, giving 1 point for each component receiving an answer of "some of the time" and 2 points for each item receiving an answer of "often."

Outcomes

Outcomes studied included time to death, and among survivors, functional decline over 6 years on 4 measures. Time to death was determined from interviews with family members and the national death index. We used the following 4 measures of functional decline:

1. Difficulty in increased number of ADL. For ADL function, participants were asked if they had difficulty in any of the 5 ADL: bathing, dressing, transferring, toileting, and eating. A decline in ADL function was defined as difficulty in more ADL in 2008 compared with 2002.
2. Difficulty in increased number of upper extremity tasks. For upper extremity tasks, subjects were asked whether they had difficulty extending their arms above their shoulders, pushing or pulling large objects, or lifting or carrying weights heavier than 10 pounds (4.5 kg). A decline was defined as difficulty in more tasks in 2008 compared with 2002.
3. Decline in walking. For mobility, participants were asked about difficulty with 4 tasks: running or jogging a mile (1.6 km), walking several blocks, or walking 1 block. A decline was defined as a decrease in the distance able to jog or walk over the 6 years.
4. Increased difficulty in stair climbing. Lastly, for stair climbing, participants were asked whether they had difficulty climbing several flights of stairs, or 1 flight of stairs. A decline was defined as a decrease in the number of flights of stairs one was able to climb.

OTHER MEASURES

Demographic characteristic such as age, race, and education level were obtained by self-report. Income was measured by asking the subject to report the total household income in the previous calendar year. Net worth was measured by asking the subject to report assets and debts. Living arrangements were measured by assessing whether the subject lives in urban or rural area and whether the subject lives alone. Comorbid conditions, including hypertension, diabetes, cancer, chronic lung disease, cardiac disease, and stroke were assessed by asking the subjects if a physician had ever told them that they had the condition. Previous work with the HRS has provided evidence of

Table 1. Characteristics of 1604 Lonely and Not Lonely Subjects

Characteristic	Lonely (n=693)	Not Lonely (n=911)	P Value
Demographic			
Age, mean (SD), y	71.3 (7.9)	70.5 (7.2)	.04
Age category, %			
60-65 y	29.0	30.5	.06
65-75 y	42.0	45.7	
>75 y	29.0	23.8	
Female, %	67.1	53.5	<.001
Ethnicity, %			
White	76.2	85.8	<.001
Black	14.7	8.6	
Hispanic	7.8	4.8	
Other	1.3	0.8	
Married or partnered, %	62.5	83.9	<.001
SES measures			
<High school education, %	26.8	19.0	<.001
Income, median (IQR), \$ (in thousands)	28 (16-46)	39 (24-65)	<.001
Net worth, median (IQR), \$ (in thousands)	147 (46-375)	245 (88-554)	<.001
Working for pay, %	19.1	28.4	<.001
Living arrangements, %			
Living in urban area	66.6	70.9	.07
Living alone	26.7	10.5	<.001
Comorbidities, %			
Hypertension	55.6	52.5	.22
Diabetes	18.8	16.4	.21
Cancer	15.2	14.1	.53
Chronic lung disease	7.7	6.2	.23
Heart condition	27.6	22.3	.01
Stroke	7.5	6.5	.42
Other health, % ^a			
Depression	37.5	10.8	<.001
Current smoker	12.0	9.0	.052
Currently drinks alcohol	43.4	50.4	.006
BMI, mean (SD)	27.0 (4.8)	27.3 (5.4)	.24
Vigorous activity 3 times/wk	38.7	49.1	<.001
Hearing impairment	22.8	17.2	.005
Vision impairment	24.6	13.9	<.001
Currently driving	80.8	90.0	<.001

Abbreviations: BMI, body mass index (calculated as weight in kilograms divided by height in meters squared); IQR, interquartile range; SES, socioeconomic status.

^aData for "Other health" are reported as percentage of patients, except BMI, reported as mean (SD).

the validity of these comorbidity questions by demonstrating that they strongly predict mortality.^{8,9} Depression was assessed with the 8-item Center for Epidemiological Studies Depression Scale¹⁰ with depression defined as 3 or more symptomatic items. Body mass index was calculated from subjects' self-reports of current height and weight. Frequent physical activity was defined as engaging in light or vigorous exercise 3 or more times per week. If subjects reported ever smoking, they were classified as smokers, and if they reported currently drinking any quantity of alcohol, they were classified as drinking alcohol. Subjects were also asked to rate their hearing and vision, and those who rated the measure as fair or poor were classified as having an impairment.

The characteristics of subjects classified as "lonely" and "not lonely" were compared using χ^2 tests for categorical variables and *t* tests for continuous variables.

To determine whether loneliness was associated with a higher risk for death, we used proportional hazards model. The primary predictor was whether the subject was lonely and the outcome was time to death. To examine the association between 6-year functional decline and loneliness, modified Poisson regression analyses were conducted for each of the 4 functional decline outcomes.

Multivariate analyses for both the mortality and functional outcomes were adjusted for demographic variables (age, race, sex, and marital status), socioeconomic status (education, income, and net worth), working status, living arrangement, depression, the number of baseline ADL difficulties, and each of the medical conditions in **Table 1**. Our mortality analysis also adjusted for baseline upper extremity tasks, mobility, and stair climbing difficulties. We tested interactions for age, sex, and depression, but these were not significant. We also repeated our analyses excluding subjects with depression. These results were similar to our original analyses.

RESULTS

CHARACTERISTICS OF PARTICIPANTS

Baseline characteristics of the 1604 study participants are presented in Table 1. The mean age of the participants in the study was 70.9 years and 81.7% were white, 74.7% were married, and 59.4% were women. Of the participants, 43.2% reported feeling lonely, defined as reporting 1 of the loneliness items at least some of the time. In the 3-item loneliness questionnaire, 32% reported lacking companionship, 25% reported feeling left out, and 18% reported feeling isolated at least some of the time. Of the 43% classified as lonely, 30% reported feeling at least 1 of these symptoms some of the time, while 13% reported at least one of these items often. Twenty-one percent reported feeling 1 of these symptoms at least some of the time, while 22% reported feeling 2 or 3 of these symptoms at least some of the time.

Subjects who were lonely were slightly older (71.3 vs 70.5 years) and were less likely to be white. Subjects were also more likely to be female; had lower socioeconomic status (SES) across all measures; were more likely to smoke, have most comorbid conditions, have greater baseline functional impairment, and have sensory impairments; and were less likely to drink alcohol and less likely to engage in frequent physical activity. While lonely subjects were more likely to live alone, the majority of lonely persons lived with someone. Moreover, while lonely subjects were more likely to be depressed, most lonely subjects were not depressed.

RELATIONSHIP BETWEEN LONELINESS AND DEATH

Loneliness was associated with increased risk of death over the 6-year follow-up period (22.8% vs 14.2%; hazard ratio [HR], 1.70; 95% CI, 1.35-2.15) (**Table 2** and

Table 2. Incidence of Outcomes in Lonely vs Not Lonely Subjects

Functional Measure	Eligible for Outcome	Outcome Frequency, %		Risk Ratio (95% CI)	
		Lonely	Not Lonely	Unadjusted	Adjusted ^a
ADL	1233	24.8	12.5	1.98 (1.55-2.53)	1.59 (1.23-2.07)
Upper extremities tasks	1166	41.5	28.3	1.47 (1.25-1.72)	1.28 (1.08-1.52)
Mobility	1114	38.1	29.4	1.30 (1.10-1.53)	1.18 (0.99-1.41)
Climbing	1062	40.8	27.9	1.46 (1.23-1.73)	1.31 (1.10-1.57)
Death	1604	22.8	14.2	1.70 (1.35-2.15) ^b	1.45 (1.11-1.88) ^b

Abbreviation: ADL, activities of daily living.

^a Adjusted for age, sex, race/ethnicity, education level, income, net worth, working status, living arrangement, comorbid conditions (hypertension, diabetes, cancer, chronic lung disease, cardiac disease, and stroke), smoking and drinking habits, body mass index, physical activity, hearing and vision problems, depression, and baseline ADL status. Adjusted analysis for death was also adjusted for baseline upper extremities tasks, mobility, and climbing.

^b The association of loneliness with death is reported as a hazard ratio.

Figure). The association between loneliness and death remained significant even after adjusting for demographics, SES, depression, and other health and functional measures (HR, 1.45; 95% CI, 1.11-1.88).

RELATIONSHIP BETWEEN LONELINESS AND FUNCTIONAL DECLINE

Loneliness was associated with all measures of functional decline in unadjusted analysis and after adjusting for potential confounders including demographic variables, SES measures, depression, comorbidities, and other baseline health and functional measures (Table 2). For ADL decline (24.8% [lonely] vs 12.5% [not lonely]), the adjusted risk ratio [RR] was 1.59 (95% CI, 1.23-2.07); for difficulties with upper extremity tasks (41.5% [lonely] vs 28.3% [not lonely]), the adjusted RR was 1.28 (95% CI, 1.08-1.52); for difficulty in stair climbing (40.8% [lonely] vs 27.9% [not lonely]), the adjusted RR was 1.31 (95% CI, 1.10-1.57). The association between loneliness and decline in mobility (38.1% [lonely] vs 32.8% [not lonely]; adjusted RR, 1.18 [95% CI, 0.99-1.41]) was not statistically significant after adjustment.

ADDITIONAL ANALYSES

We conducted additional analyses in which we used different definitions of loneliness (**Table 3**). First, we classified subjects as moderately lonely if they reported having at least 1 of the loneliness items at least some of the time and severely lonely if they reported having at least 1 of the loneliness items often. The adjusted risk of mortality and of functional decline across all 4 measures was similar for those moderately or severely lonely. Second, we classified subjects as moderately lonely if they reported 1 symptom at least some of the time, and severely lonely if they reported 2 or more symptoms at least some of the time. In adjusted analyses, there was a stepwise increase in the risk of ADL decline with increasing loneliness. For the remaining outcomes, the adjusted risk for moderately and severely lonely were similar. When we scored loneliness as a continuous scale, stepwise increases in loneliness were associated with a higher risk on each outcome except mobility.

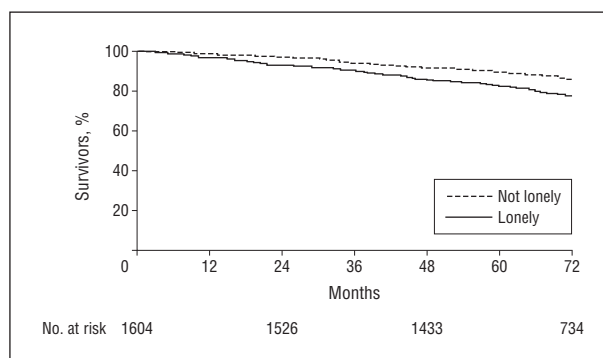


Figure. Kaplan-Meier survival curve for lonely vs not lonely subjects over 72 months.

COMMENT

Loneliness is a common source of suffering in older persons. We demonstrated that it is also a risk factor for poor health outcomes including death and multiple measures of functional decline. It persisted after accounting for a large number of confounders including illness severity and depression.^{11,12} With the increasingly large number of Americans aging and the high costs associated with disability (\$26 billion annually for those who lose their ability to live independently over the course of a year),¹³ it is necessary to identify and, if possible, modify the factors that place elderly persons at risk for functional decline and death.

This is one of the first studies in a nationally representative population to examine the relationship between loneliness and functional decline and death. There have been few studies examining loneliness as a predictor of specific health outcomes. Several smaller studies are consistent with our findings that loneliness in older persons is associated with poor health outcomes and may even be linked to nursing home admission.¹⁴

The mechanisms outlining the association between loneliness and health outcomes are not entirely clear, although several studies have aimed to further delineate potential mechanisms. Cacioppo et al¹⁵ suggest that perceived isolation or loneliness results in increased sympathetic tone, decreased inflammatory control, and decreased sleep. Other studies have also suggested a

Table 3. Adjusted Association Between Loneliness and Adverse Health Outcomes in Analyses Considering Alternative Definitions of Loneliness

Alternative Loneliness Definitions	Adjusted Hazard Ratio (95% CI)		Adjusted Risk Ratio (95% CI)		
	Death	ADL	UE	Mobility	Climbing
Severity definition, considering the severity of each item ^a					
Not lonely	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]
Moderately lonely	1.35 (1.02-1.78)	1.57 (1.20-2.07)	1.34 (1.12-1.59)	1.20 (0.99-1.45)	1.34 (1.11-1.62)
Severely lonely	1.76 (1.23-2.52)	1.65 (1.15-2.37)	1.10 (0.82-1.46)	1.12 (0.84-1.49)	1.20 (0.91-1.59)
Multi-item definition, considering loneliness on more than 1 component ^b					
Not lonely	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]
Moderate	1.45 (1.08-1.94)	1.44 (1.06-1.96)	1.35 (1.12-1.64)	1.22 (0.98-1.50)	1.38 (1.13-1.68)
Severe	1.45 (1.04-2.02)	1.78 (1.32-2.40)	1.20 (0.96-1.49)	1.14 (0.91-1.42)	1.23 (0.98-1.54)
Continuous score ^c	1.22 (1.05-1.43)	1.33 (1.15-1.54)	1.11 (1.00-1.22)	1.08 (0.98-1.20)	1.14 (1.02-1.26)

Abbreviations: ADL, activities of daily living; UE, upper extremity tasks.

^aSeverity definition: Loneliness was classified as a 3-level variable, in which those not lonely answered never to all 3 items, those moderately lonely answered some of the time to at least 1 item, and those severely lonely answered often to at least 1 item.

^bMulti-item definition: Loneliness was classified as a 3-level variable, in which those not lonely answered never to all 3 items, those moderately lonely answered "some of the time" or "often" to 1 item, and those severely lonely answered "some of the time" or "often" to at least 2 items.

^cContinuous score: Subjects were given 1 point for each loneliness item answered "some of the time" and 2 points for each item answered "often." Effect sizes are per point increase. Scores are truncated at 3 or more points because few subjects had higher scores.

correlation between cardiovascular disease and depression and loneliness.^{16,17} More recent studies by Buchman et al^{18,19} examined the correlation between loneliness and worse motor function, linking the relationship between loneliness and functional decline identified in our study. Additional studies have similarly found that those who are lonely have worse sleep and poor health behaviors (including poor medication adherence), suggesting that these behaviors may account for their poor health outcomes.²⁰⁻²³ While these findings are intriguing, the mechanisms are still not entirely clear and more investigations must be undertaken.

Reducing the risk of adverse health outcomes is dependent on much more than medical care. The present study demonstrates that loneliness is an identifiable and measurable risk factor for morbidity and mortality. Because loneliness is a subjective feeling of social distress that encompasses lacking companionship and a sense of not belonging, it is not adequately captured by quantitative measures of social isolation. This distinction between social isolation and loneliness is of importance because a large number of participants who reported feeling lonely were married or did not live alone. Furthermore, adjustment for these factors did not explain the association between loneliness and functional decline and death. On the basis of our findings, we hypothesize that health outcomes in older people may be improved by focusing on policies that promote social engagement and, more importantly, by helping elders develop and maintain satisfying interpersonal relationships. These findings suggest a need to look into interventions that explore strategies of mitigating loneliness, such as diverse living arrangements and telephone support.²⁴⁻²⁷

There are several limitations to this study. First, our functional outcome measures were based on self-

report. Also, those excluded in the study had worse baseline health than those included, potentially affecting the generalizability of our results. In addition, while we adjusted for many confounders, our study does not prove that loneliness is the cause of adverse outcomes. It is possible these outcomes are explained by an unmeasured confounder. In addition, we did not have repeated measurements of loneliness after the baseline measurement. Thus, it is possible the relationship between loneliness and functional decline is bidirectional, with poor functional status and disability leading to increased loneliness. Some may also question whether loneliness is just a proxy for depression. While symptoms of depression may overlap with feelings of loneliness, our study demonstrated that loneliness strongly predicted the outcomes even after adjusting for depression. Most persons who were lonely were not depressed. In addition, although we controlled for living situation and marital status, more comprehensive data on social relationships would have enhanced our analysis. Lastly, the mechanisms explaining the relationship between loneliness and morbidity and mortality are still in need of further investigation.

Our study may have important public health implications, since nearly 1 in 3 subjects reported loneliness, and the association between loneliness and disability and death was strong. Assessment of loneliness is not routine in clinical practice and it may be viewed as beyond the scope of medical practice. However, loneliness may be as an important of a predictor of adverse health outcomes as many traditional medical risk factors. Our results suggest that questioning older persons about loneliness may be a useful way of identifying elderly persons at risk of disability and poor health outcomes. While future work needs to study potential interventions, primary care providers may wish to consider referral of high-

risk patients to social workers or community agencies for consideration of social programs such as group meals, senior center activities, and volunteerism, which may ameliorate loneliness. Admittedly, with rising health care costs and limited time in primary care offices, it seems challenging to add 1 more item for health care providers to assess. Yet for many older patients, loneliness may be more distressing than their medical diagnoses.

The use of a brief loneliness screen may add value to the clinical encounter. Loneliness may be amenable to psychosocial interventions, and it is possible that it is more treatable than other determinants of functional decline such as age-associated chronic disease. Ultimately, by asking about psychosocial concerns important to patients, our treatment focus may shift, and we will likely enhance the physician-patient relationship. By identifying loneliness we will be better able to target interventions intended to prevent functional decline and disability.

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Loneliness and Living Alone

What Are We Really Measuring?



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Social Support—few concepts in epidemiology have proven more elusive to define. While the term is used loosely to describe the care and companionship we receive from family and friends, in epidemiology it refers to an abstract construct that has been linked to numerous health outcomes. As a result, social support has received considerable attention in the literature as an important disease prognosticator despite issues with measurement and lack of clear implications for applying this knowledge.

Studies have consistently shown an association between social support and improved health. This association persists regardless of the measure used or the population studied. In this issue of the *Archives*, Perissinotto et al¹ examine the effect of loneliness in a population of older adults. They find that lonely participants have a higher risk of mortality and are more likely to experience a decline in activities of daily living compared with participants categorized as not lonely. Similarly, Udell et al,² also in this issue, investigate the impact of living alone on cardiovascular risk and mortality in a study of outpatients at risk of, or with, atherothrombosis. They report an association between living alone and increased mortality, particularly among younger adults. In addition to mortality and functional decline, social support has been associated with readmission, quality of life, recovery time, and medical complications, making it an ostensibly useful variable to measure and track.

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The difficulty with using social support as an epidemiologic variable arises when trying to define it. Social support encompasses many concepts and can be defined several ways, making it difficult to capture as a whole. Generally, studies break social support into 4 categories including emotional, tangible, informational, and companionship support.³ However, it can also be divided into structural vs functional support as well as perceived vs received support. Measures can be objective, such as living arrangements, number of contacts, and the presence of caregivers, or subjective, such as feelings of belonging and perceived social support. Moreover, social support can come from a number of sources including family, friends, coworkers, neighbors, and pets. Despite the variety of measures and sources that characterize social support, most studies attempt to quantify it using a single self-reported variable. For example, Perissinotto et al¹ asked participants if they (1) felt “left out,” (2) felt “isolated,” or (3) “lacked companionship” and categorized subjects as “lonely” if they responded “some of the time” or “often” to any of the questions. Similarly, Udell et al² used a single dichotomized measure asking participants at baseline whether they lived alone (yes/

no). With the array of variables available, the choice of measure may seem arbitrary, and few authors explain their rationale for selecting particular measures. Ideally, the decision of which measure to use should be made a priority and rooted in some pretest hypothesis; however, this is not always clear either.

Validated scales for social support do exist, including the Multidimensional Scale of Perceived Social Support⁴ and the Medical Outcomes Study (MOS) Social Support Survey.⁵ In general, these scales focus on perceived support and the availability of supportive persons or services. While they capture a broader range of variables than studies using single measures, they still address only a few of the many concepts included under the umbrella term *social support*. Given the difficulty in defining and quantifying social support, this term has generated much debate in the literature. Whereas some consider it a key epidemiological variable, others discount its utility entirely.

Beyond the problem of simply defining social support, the question remains “what is it really measuring?” How does social support improve health outcomes? At present, the mechanisms behind this relationship are largely unknown; however, several theories have been postulated. Chief among these are the buffering hypothesis and the direct-effects hypothesis. Whereas the direct-effects hypothesis posits that social support is beneficial for the recipient at all times during the lifespan, the buffering hypothesis argues that social support is more beneficial in times of stress including illness. Evidence has shown that both hypotheses have some merit, but they represent very different processes through which social support affects well-being.⁶

Within these larger theories, numerous biopsychosocial pathways have been proposed. For example, poor social support may increase one’s risk of inadequate nutrition, medication noncompliance, or decreased mobility, all of which can produce worse health outcomes. Alternatively, social support may affect the subjective experience of one’s illness, thereby affecting one’s quality of life and stress response. Finally, poor social support may be intimately linked with depression, which has consistently been associated with worse physical and mental health outcomes. Of note, Perissinotto et al¹ looked at depression and found that although lonely subjects were more likely to be depressed, loneliness was an independent predictor of mortality and functional decline after controlling for depression. Beyond simply restating these theories in discussion sections, most studies examining social support make little or no effort to explore these mechanisms, perhaps because of the difficulties involved with measuring these variables and teasing out the multiple pathways involved.