


## RESEARCH ARTICLE

# Lonely older adults are more likely to delay or avoid medical care during the coronavirus disease 2019 pandemic

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## Abstract

**Objectives:** To examine the relationship between loneliness and self-reported delay or avoidance of medical care among community-dwelling older adults during the coronavirus disease 2019 (COVID-19) pandemic.

**Methods:** Analyses of data from a nationally representative survey administered in June of 2020, in COVID-19 module of the Health and Retirement Study. Bivariate and multivariable analyses determined associations of loneliness with the likelihood of, reasons for, and types of care delay or avoidance.

**Results:** The rate of care delay or avoidance since March of 2020 was 29.1% among all respondents ( $n = 1997$ ), and 10.1% higher for lonely ( $n = 1,150$ , 57.6%) versus non-lonely respondents (33.5% vs. 23.4%; odds ratio = 1.59,  $p = 0.003$  after covariate adjustment). The differences were considerably larger among several subgroups such as those with emotional/psychiatric problems. Lonely older adults were more likely to cite “Decided it could wait,” “Was afraid to go,” and “Couldn’t afford it” as reasons for delayed or avoided care. Both groups reported dental care and doctor’s visit as the two most common care delayed or avoided.

**Conclusions:** Loneliness is associated with a higher likelihood of delaying or avoiding medical care among older adults during the pandemic.

## KEYWORDS

delay of medical care, health and retirement study, loneliness, Los Angeles, older adults, social isolation, University of California

## Key points

### What is the primary question addressed by this study?

- What is the relationship between loneliness and self-reported delay or avoidance of medical care among community-dwelling older adults during the coronavirus disease 2019 (COVID-19) pandemic?

### What is the main finding of this study?

- Loneliness predicts a higher likelihood of delaying or avoiding medical care during the COVID-19 pandemic among older adults. This association is stronger among several high-risk groups such as those with emotional/psychiatric problems.

**What is the meaning of the finding?**

- Interventions to address loneliness among older adults have the potential to reduce unmet care needs and adverse health outcomes.

## 1 | INTRODUCTION

The COVID-19 disproportionately affects older adults and people with underlying health conditions. Since March of 2020, federal, state, and local governments implemented non-pharmaceutical public health interventions – such as shelter-in-place orders, closure of non-essential businesses, and bans on large and small-group gatherings – to contain virus transmission. These physical distancing restrictions effectively reduced COVID-19 cases, hospitalizations, and associated deaths.<sup>1-4</sup>

Prolonged physical distancing restrictions, however, also had negative effects. These restrictions disrupted in-person social activities and exacerbated social isolation and loneliness among older adults.<sup>5-7</sup> Social isolation is the objective state of having few social relationships or infrequent contact with family, friends, and the community, which may or may not be emotionally distressing. By contrast, loneliness is the subjective feeling of isolation due to deficits in a person's actual level of social connections compared to a person's desired level (i.e., in terms of both the number and the quality of such connections). Although loneliness overlaps with social isolation, it is distinct and negatively affects older adults' health and well-being, even among those with frequent social interactions.<sup>8-12</sup> Before the COVID-19 pandemic, social isolation and loneliness were recognized as significant public health concerns as they are associated with poor physical and mental health, increased morbidity and mortality, and reduced quality of life.<sup>8-10</sup>

Many older adults lack the ability or resources to manage the stress of COVID-19; in particular, 35% of adults with serious distress cited an inability to obtain health care as a contributing factor.<sup>6</sup> Disruptions in medical care access and delivery during the COVID-19 pandemic have been widespread.<sup>13-15</sup> Delay or avoidance of necessary medical care due to fears of infection and physical distancing restrictions present challenges to managing the health and well-being of older adults, especially those who are frail, have multiple conditions, or lack social supports.<sup>16</sup> Despite this widespread concern, little is known about the potential influence of loneliness on health care access and use during the pandemic.

The purpose of this study is to characterize loneliness in a nationally representative sample of community-dwelling older adults during the COVID-19 pandemic and the relationship between loneliness and self-reported delay or avoidance of care. We tested the hypothesis that those who experienced loneliness were more likely to delay or avoid medical care in the overall older adult population or in subpopulations defined by key demographic, diagnostic, or functional characteristics. We also compared reasons for and types of care delayed or avoided between lonely and non-lonely older adults.

## 2 | METHODS

### 2.1 | Data and sample

We analyzed data from the COVID-19 module of the 2020 wave of the Health and Retirement Study (HRS) conducted by the University of Michigan. The HRS is a nationally representative and multi-cohort biennial panel survey of US adults aged 50 and older that examines health conditions, family structure, economic status, and health care use.<sup>17</sup> The 2020 HRS COVID-19 module (early, version 1.0) included the subsample of households originally assigned to enhanced face-to-face interviewing and was administered separately to two random half groups of this subsample. The first publicly released data included 3266 respondents from the first group who were interviewed in June of 2020.<sup>18</sup> Similar to previous HRS waves,<sup>19</sup> a random subsample of these respondents ( $n = 2079$ ) completed the psychosocial and lifestyle questionnaire (Section LB, updated in February 2021) that assesses loneliness and social isolation. We excluded 82 respondents with a non-positive weight, resulting in a final sample of 1997 respondents who had data for all HRS sections, including a new COVID-19 section. We linked the sample to the most recent cross-wave tracker file<sup>20</sup> to obtain additional demographic information (e.g. respondents' race and ethnicity).

### 2.2 | Measures

#### 2.2.1 | Delay or avoidance of medical care

In the COVID-19 Section, respondents were asked "Since March 2020, was there any time when you needed medical or dental care, but delayed getting it, or did not get it at all?" Delay or avoidance of medical care was a binary outcome (1 = yes, 0 = no).

#### 2.2.2 | Loneliness

The key independent variable was a binary indicator for self-reported loneliness, assessed with a three-item version of the University of California, Los Angeles (UCLA) Loneliness Scale which measures how much of the time respondents feel left out, isolated from others, or lack companionship.<sup>21</sup> Possible answers for each item were "hardly ever or never" (scored 0), "some of the time" (scored 1), and "often" (scored 2). Respondents were classified as 'lonely' if they responded "some of the time" or "often" to any of the three items, and as "not lonely" if they responded "hardly ever or never" to all three items.<sup>12</sup> Our base analysis used the dichotomized measure of loneliness given

the assumption that the scale's three items gave respondents alternative ways to express their experience of loneliness rather than cumulatively quantifying the severity of loneliness.<sup>12</sup> Nevertheless, we performed sensitivity analyses in which loneliness was measured as a continuous scale with a range of 0 to 6 (i.e. sum of the scores of the three items), with higher scores indicating potentially more severe loneliness.

### 2.2.3 | Social isolation

We assessed social isolation based on contact across four types of relationships: spouse/partner, children, other immediate family members (e.g. brothers or sisters, parents, cousins or grandchildren), and friends.<sup>5,22-24</sup> In Section LB, participants were asked whether they lived with their spouse or partner; participants were assigned a score of 0 if they answered yes and one if they answered no. For the other three relationships, participants were first asked whether they had such a relationship (children, other immediate family, or friends) and, if yes, the frequency with which they met (including both arranged and chance meetings), spoke on the phone, wrote or emailed, and communicated by Skype, Facebook, or other social media. For each relationship, we assigned a score of 0 to respondents if they had any type of contact at least once or twice a month, and one if they did not have such a relationship or had a relationship with contact occurring less than once or twice a month. The total social isolation score of the four relationships ranged from 0 to 4 (higher scores indicating more severe social isolation).

### 2.2.4 | Covariates

Demographic and socio-economic covariates included age, gender, race and ethnicity (categorized as non-Hispanic white, black, Hispanic, and other), education level, marital status, and if the respondent was eligible for Medicaid. Comorbid conditions considered physician-diagnosed hypertension, diabetes, cancer (excluding skin cancer), chronic lung disease, heart disease, stroke, emotional/psychiatric problems, and arthritis (each coded as yes/no). Respondents needing assistance with bathing, dressing, eating, getting in or out of bed, and/or toilet use were defined as having impairment in activities of daily living (ADL). Self-reported health was coded as excellent, very good, good, fair, or poor. Depressive symptoms were assessed as the sum of seven yes/no items from the Center for Epidemiologic Studies Depression scale (CES-D), and categorized as low (CES-D score 0-2) versus high (CES-D score 3-7)<sup>25</sup>; an eighth item of the CES-D on loneliness, "Much of the time during the past week you felt lonely," was excluded from the CES-D total score because it overlaps with the UCLA Loneliness Scale. Anxiety was assessed using five items from the Beck Anxiety Inventory (BAI)<sup>26</sup> that includes "fear of the worst happening," "nervous," "hands trembling," "fear of dying," and "felt faint." Respondents rated the frequency of these symptoms from "never" (scored as 1) to "most of the time" (scored as 4). The

total BAI score ranged from 5 to 20 with higher scores indicating more severe anxiety symptoms; similar to other studies, we classified respondents in the highest decile of the total BAI scores (i.e. scores  $\geq 12$ ) as having elevated anxiety.<sup>27</sup> Finally, we defined a binary variable that characterized if a respondent was highly concerned about the coronavirus pandemic based on the question "Overall, on a scale from 1 to 10, where one is the least concerned and 10 is the most concerned, how concerned are you about the coronavirus pandemic?" Respondents with a score of 9 or 10 were categorized as being highly concerned.

## 2.3 | Analysis

In bivariate analyses, we compared individual characteristics by loneliness status and by whether the respondent reported any delay or avoidance of medical care during the pandemic. Comparisons were made based on *t*-tests for continuous variables and chi-square tests for categorical variables. Among those who reported any delay or avoidance of care, we further compared the reasons for care delay or avoidance and types of care delayed/avoided by loneliness status.

In multivariable analyses, we first fit a logistic regression model of delay or avoidance of medical care which had loneliness status as the key independent variable and controlled for other respondent covariates described before. Prior research has found that loneliness may be a particularly potent risk factor for health outcomes (e.g. mortality) among subgroups of adults such as those of younger ages.<sup>11</sup> To determine if similar variations exist on the association of loneliness with the likelihood of delayed/avoided care, we fit an additional set of logistic models that were stratified by age (<65 years or  $\geq 65$  years), gender (female/male), race/ethnicity (non-Hispanic white or other), education ( $\geq$ college or <college), marital status (married or not), Medicaid eligibility (yes/no), whether the respondent had each of eight chronic conditions or any ADL limitation, self-rated health (excellent, very good, or good vs. fair or poor), depressive symptoms (CES-D score 0-2 or 3-7), elevated anxiety (yes/no), extent of social isolation (score 0-2, 3-4, or missing), and whether the respondent was highly concerned about the coronavirus pandemic (score 9-10 or 0-8). Stratified models controlled for all covariates except for the covariate used for stratification.

We reported adjusted odds ratios (ORs) and associated *p* values estimated from each model. All statistical analyses were weighted to account for sample selection and non-response using preliminary weights provided by the HRS.<sup>18</sup>

## 3 | RESULTS

Table 1 presents the weighted estimates of individual characteristics by loneliness status. Among all respondents, 56.8% reported experiencing loneliness during the COVID-19 pandemic. Compared to those who were not lonely, lonely older adults were less likely to be married (55.5% vs. 74.4%) and more likely to qualify for Medicaid

**TABLE 1** Characteristics of respondents to the psychosocial and lifestyle questionnaire of the 2020 Health and Retirement Study (HRS) coronavirus disease 2019 (COVID-19) Project (survey conducted in June 2020)

Characteristic	Total (n = 1997)	Loneliness		p
		No (n = 847)	Yes (n = 1150)	
Age, y, %				
<65	38.6	36.1	40.5	0.205
65–74	37.6	40.2	35.6	
≥75	23.9	23.7	24.0	
Female gender, %	53.3	54.0	52.7	0.662
Race & ethnicity, %				
Non-hispanic white	79.2	77.5	80.5	0.225
Black	8.5	9.2	8.0	
Hispanic	7.3	8.7	6.2	
Other	4.9	4.5	5.3	
Education, college or higher, %	42.5	45.0	40.5	0.147
Married, %	63.6	74.4	55.5	<0.001
Medicaid eligible, %	8.7	7.0	10.0	0.036
Chronic condition, %				
Hypertension	58.8	57.3	59.9	0.387
Diabetes	24.2	21.6	26.2	0.060
Cancer (excluding skin cancer)	17.5	17.4	17.6	0.917
Lung disease	10.5	6.8	13.4	<0.001
Heart disease	23.0	19.4	25.8	0.009
Stroke	6.7	5.3	7.7	0.081
Emotional/psychiatric problems	19.7	12.4	25.2	<0.001
Arthritis	63.4	57.6	67.7	<0.001
Any ADL limitation, %	8.5	6.3	10.2	0.019
Self-rated health, %				
Excellent	8.3	12.3	5.2	<0.001
Very good	34.2	38.7	30.9	
Good	35.1	32.0	37.5	
Fair	17.9	14.0	20.9	
Poor	4.4	3.0	5.5	
CES-D 7, %				
0–2	87.7	95.1	82.0	<0.001
3–7	12.3	4.9	18.0	
Elevated anxiety (Beck anxiety inventory score ≥ 12), %	10.5	4.6	15.0	<0.001
Social isolation score, %				
0 (social integration)	3.0	5.6	1.0	<0.001
1	8.3	10.9	6.3	
2	15.2	17.1	13.8	
3	40.8	39.2	42.1	
4 (social isolation)	17.0	9.8	22.5	

TABLE 1 (Continued)

Characteristic	Total (n = 1997)	Loneliness		p
		No (n = 847)	Yes (n = 1150)	
Missing	15.6	17.4	14.3	
Highly concerned about the coronavirus pandemic (score 9 or 10)	44.6	43.7	45.3	0.595

Abbreviations: COVID-19, coronavirus disease 2019; HRS, health and retirement study; SE, standard error.

(10.0% vs. 7.0%). They also had more frequent chronic conditions, including lung disease (13.4% vs. 6.8%), heart disease (25.8% vs. 19.4%), emotional/psychiatric problems (25.2% vs. 12.4%), and arthritis (67.7% vs. 57.6%); and tended to report any ADL limitation (10.2% vs. 6.3%), worse self-rated health (5.5% vs. 3.0% poor), more depressive symptoms (15.0% vs. 4.9% with CES-D score 3–7), more anxiety (15.0% vs. 4.6% with BAI score  $\geq$  12), and a higher level of social isolation (22.5% vs. 9.8% with score of 4).

### 3.1 | Bivariate predictors

The overall rate of delay or avoidance of care was 29.1% (Table 2). Older adults with self-reported loneliness had a higher rate (33.5%) than those who did not report being lonely (23.4%; difference = 10.1%, relative difference = 43.2%,  $p < 0.001$ ). Younger age, college or higher education, having emotional/psychiatric problems, any ADL limitation, more depressive symptoms, elevated anxiety, and being highly concerned about the COVID-19 pandemic were also associated with an increased likelihood of delaying or avoiding medical care, while the presence of each chronic medical condition and being more socially isolated were not. The correlation between the continuous loneliness scale and social isolation scale was 0.23 ( $p < 0.001$ ).

### 3.2 | Independent association of loneliness with care delay or avoidance

After we controlled for individual covariates, loneliness remained a significant factor associated with the likelihood of care delay or avoidance in the overall sample (Table 2: adjusted OR 1.59,  $p = 0.003$ ). In sensitivity analyses, in which loneliness was measured with a continuous scale of 0–6, every one point increase in the loneliness scale was associated with an 8% increase in the likelihood of delayed or avoided care (adjusted OR = 1.08,  $p = 0.099$ ).

Appendix Table A1 summarizes the results of stratified multivariable analyses. In most of these stratified analyses, feeling lonely was associated with an increased likelihood of delaying or avoiding medical care, although statistical significance was not achieved in a few cases with particularly small samples. The association was particularly strong among several subgroups, such as those younger than 65 (adjusted OR = 2.18,  $p = 0.008$ ) versus older than 65

(adjusted OR = 1.28,  $p = 0.185$ ); college or higher education (adjusted OR = 1.95,  $p = 0.007$ ) versus lower education (adjusted OR = 1.36,  $p = 0.140$ ); those with cancer (adjusted OR = 3.86,  $p = 0.002$ ) versus those without (adjusted OR = 1.43,  $p = 0.036$ ); those with emotional/psychiatric problems (adjusted OR = 3.56,  $p = 0.004$ ) versus those without (adjusted OR = 1.45,  $p = 0.035$ ); and those with self-rated health as being fair or poor (adjusted OR = 3.73,  $p = 0.001$ ) versus being good, very good or excellent (adjusted OR = 1.37,  $p = 0.071$ ).

### 3.3 | Reasons for and types of care delayed or avoided

Table 3 shows that among those who reported delaying or avoiding care during the pandemic, the most common reason was “The clinic/hospital/doctor’s office cancelled, closed, or suggesting rescheduling” (reported as a reason by 63.4% of respondents), followed by “Decided it could wait” (26.7%), “Was afraid to go” (19.2%), “Couldn’t get an appointment” (14.0%), and “Couldn’t afford it” (9.1%). Lonely adults were less likely than non-lonely adults to report “The clinic/hospital/doctor’s office cancelled, closed, or suggesting rescheduling” as a reason (57.4% vs. 74.8%), but were somewhat more likely to report “Decided it could wait,” “Was afraid to go,” and “Couldn’t afford it” as the reason.

The most common type of care delayed or avoided was dental care (77.3%), followed by a doctor’s visit (60.6%), outpatient surgery (10.5%), filling a prescription (4.0%), and inpatient surgery (3.9%). The patterns of care delay or avoidance did not seem to differ considerably between those who felt lonely and those who did not.

## 4 | DISCUSSION

This study of a 2020 nationally representative survey of Americans 50 years or older demonstrated that 56.8% of respondents experienced loneliness during the COVID-19 pandemic. Although delay or avoidance of medical care was common (overall rate 29.1%) in the pandemic, feeling lonely was a significant factor associated with delaying or avoiding care in bivariate and multivariable analyses that accounted for many confounders. This association was stronger among those younger than 65, those with college or higher education, those with cancer or emotional/psychiatric problems, or those with fair or poor self-rated health. Compared to those who did not

**TABLE 2** Bivariate and multivariable predictors of self-reported delay or avoidance of medical care during coronavirus disease 2019 (COVID-19) pandemic

Characteristic	Unadjusted rate of delay or avoidance of medical care		Adjusted odds ratio <sup>a</sup>	
	Rate	<i>p</i>	Estimate	<i>p</i>
All	29.1			
Experiencing loneliness		<0.001		
Yes	33.5		1.59	0.003
No	23.4		Ref	
Age, y		<0.001		
<65	34.7		Ref	
65–74	28.5		0.72	0.997
≥75	21.1		0.52	0.005
Female gender, %		0.209		
Yes	30.8		1.10	0.549
No	27.3		Ref	
Race & ethnicity		0.215		
Non-hispanic white	30.5		Ref	
Black	24.5		0.58	0.591
Hispanic	24.8		0.61	0.786
Other	23.2		0.48	0.279
Education, college or higher		<0.001		
Yes	35.1		1.55	0.005
No	24.4		Ref	
Married		0.938		
Yes	29.1		1.21	0.385
No	29.3		Ref	
Medicaid eligible		0.835		
Yes	29.9		0.89	0.637
No	29.1		Ref	
Hypertension		0.204		
Yes	27.6		0.92	0.617
No	31.2		Ref	
Diabetes		0.614		
Yes	30.5		1.10	0.590
No	28.9		Ref	
Cancer (excluding skin cancer)		0.285		
Yes	25.9		0.88	0.520
No	29.8		Ref	
Lung disease		0.144		
Yes	34.9		1.14	0.617
No	28.5		Ref	

TABLE 2 (Continued)

Characteristic	Unadjusted rate of delay or avoidance of medical care		Adjusted odds ratio <sup>a</sup>	
	Rate	<i>p</i>	Estimate	<i>p</i>
Heart disease		0.784		
Yes	29.8		1.11	0.562
No	29.0		Ref	
Stroke		0.557		
Yes	26.4		0.83	0.514
No	29.4		Ref	
Emotional/psychiatric problems		<0.001		
Yes	41.8		1.89	0.001
No	26.0		Ref	
Arthritis		0.451		
Yes	28.2		0.77	0.111
No	30.5		Ref	
Any ADL limitation		0.053		
Yes	37.5		1.75	0.024
No	28.4		Ref	
Self-rated health		0.528		
Excellent	33.4		Ref	
Very good	26.3		0.74	0.541
Good	28.9		0.86	0.680
Fair	31.4		0.95	0.347
Poor	33.7		0.59	0.256
CES-D 7		<0.001		
0–2	27.9		Ref	
3–7	41.8		1.42	0.115
Anxiety (Beck anxiety inventory score $\geq 12$ )		0.046		
Yes	37.1		1.05	0.847
No	28.3		Ref	
Social isolation score		0.623		
0 (social integration)	35.4		1.47	0.422
1	27.8		0.76	0.383
2	28.2		0.70	0.212
3	26.3		0.70	0.157
4 (social isolation)	31.2		Ref	
Missing	34.7		1.07	0.800
Highly concerned about the coronavirus pandemic (score 9 or 10)		0.023		
Yes	32.6		1.56	0.004
No	26.3		Ref	

Abbreviations: COVID-19, coronavirus disease 2019; HRS, health and retirement study; SE, standard error.

<sup>a</sup>Multivariable logistic regression adjusted all respondent covariates and survey weight.

TABLE 3 Reasons for and types of delayed or avoided care, by loneliness status

	All reporting delayed/avoided care (n = 574), % <sup>a</sup>	Loneliness		p
		No (n = 193), %	Yes (n = 381), %	
Reason for delayed or avoided care				
The clinic/hospital/doctor's office cancelled, closed, or suggesting rescheduling	63.4	74.8	57.4	0.002
Decided it could wait	26.7	22.5	29.0	0.206
Was afraid to go	19.2	14.9	21.5	0.150
Couldn't get an appointment	14.0	13.3	14.3	0.820
Couldn't afford it	9.1	4.4	11.5	0.057
Other reason	16.2	15.3	16.6	0.738
Type of care delayed or avoided				
Dental care	77.3	79.8	76.0	0.414
Seeing a doctor	60.6	55.7	63.3	0.187
Outpatient surgery	10.5	9.3	11.1	0.607
Filling a prescription	4.0	5.5	3.2	0.388
Major surgery requiring hospital stay	3.9	4.4	3.6	0.694
Other care	21.0	16.5	23.4	0.141

<sup>a</sup>Percentage points do not sum to 100 because respondents might check multiple reasons or types of care delayed or avoided.

feel lonely, those who did were more likely to cite “Decided it could wait,” “Was afraid to go,” and “Couldn't afford it” as reasons for delayed or avoided care. Lonely and non-lonely people both reported dental care and doctor's visit as the two most common types of care delayed or avoided.

The COVID-19 pandemic poses an unprecedented threat to older adults. Since the first reported coronavirus case in Snohomish County, Washington on January 20, 2020<sup>28</sup> and in the wake of subsequent outbreaks in several other states, the Centers for Disease Control and Prevention (CDC) and other health authorities in the US issued guidelines and rules (e.g. frequent hand hygiene and staying home if sick) to mitigate virus transmission.<sup>29</sup> As COVID-19 continued to spread in the US, many state and local governments implemented more stringent physical distancing measures that restricted activities and social contact outside one's residence. These physical distancing restrictions, although effective in reducing COVID-19 related morbidity and mortality,<sup>1-4</sup> led to detrimental effects such as serious psychological distress,<sup>5,6</sup> disrupted access to care,<sup>13,14</sup> and excess mortality.<sup>30,31</sup>

For example, deaths in the US attributed to noninfectious causes among older adults, such as heart disease and dementia, increased throughout the 2020 spring and summer surges in COVID-19 cases.<sup>30,31</sup> This increase in deaths from non-infectious causes was likely caused, at least in part, by disrupted care routines subsequent to shelter-in-place orders. A study of more than 5 million individuals with employer-sponsored insurance in all 50 US states reported that relative to 2018 and 2019, there was a dramatic reduction in the use of preventive care (e.g. hemoglobin A1c tests, reduced by 60.0 to

118.1 per 10,000 population) and elective care (e.g. in-person office visits, reduced by 581.1 to 1465 per 10,000 population) in March and April of 2020<sup>14</sup>; in addition, the increased use of telemedicine in the first 2 months of the pandemic did not compensate for the reduced in-person primary care visits. Similarly, among a large sample of patients from a nationally representative hospitalist group, non-COVID-19 hospital admissions declined substantially from February to April of 2020 and remained below the pre-pandemic baseline even after hospital admissions rebounded in the summer of 2020.<sup>15</sup>

That three in 10 older adults in our study delayed or forwent medical care aligns with these declines in ambulatory and hospital care use since the start of the pandemic. The estimated rate of delaying or avoiding medical care (29.1%) and that younger age, higher education, presence of emotional/psychiatric problems, ADL limitation, and being highly concerned about the coronavirus pandemic were associated with a higher risk of care delay or avoidance were also consistent with recent findings.<sup>13,32</sup> Our finding that loneliness, a significant public health concern among older adults,<sup>8</sup> was associated with a 60% increased odds of delay or avoidance of care fills a gap in the literature. Moreover, this association persisted after an objective measure of social connectedness was controlled for, highlighting the key role subjective loneliness might have played in determining unmet medical care needs during the pandemic. To our knowledge, only one study has examined loneliness as a potential predictor of access to care or unmet care needs during the pandemic.<sup>5</sup> That study by Kotwal and colleagues surveyed a convenience sample of 151 community-dwelling older adults in the San



Francisco Bay Area and found that more than half of older adults reported worsened loneliness due to the COVID-19 pandemic. Among these older adults with worsening loneliness, 21% were very or extremely worried about their worsening health due to delayed medical care (compared to 5% having such worries among those not experiencing worsened loneliness).<sup>5</sup>

There are several plausible explanations for the increased care delay or avoidance among lonely people. First, lonely older adults were more likely to be socially isolated, which suggests they may have had lower levels of informal support available to assist with their physical and mental health needs. This potential lack of informal support may be a particularly salient barrier to medical care access during the pandemic given other pandemic-related stressors such as disruptions in public transit systems. In addition, lonely older adults might be more likely to experience worsened mental health and distress during the pandemic that may have affected their use of medical services. Indeed, lonely older adults in our study were more likely to have emotional/psychiatric problems, which was associated with an increased risk of delaying or avoiding medical care. Lastly, it is possible that lonely older adults had less access to technologies necessary for virtual social interactions or telemedicine services (more common during the pandemic), further limiting their ability to obtain needed medical care. These explanations may also explain the differences in self-reported reasons for care delay or avoidance between lonely and non-lonely people, that is, lonely older adults cited the clinic/hospital cancelling scheduled care as the reason less frequently, but were somewhat more likely to cite "Was afraid to go" and "Decided it could wait" as the reasons. It is also possible that, compared to others, lonely adults may have had financial hardships during the pandemic as they more frequently cited "Couldn't afford it" as the reason for delayed/avoided care (11.5% vs. 4.4%).

The prior study by Kotwal et al.<sup>5</sup> did not explore whether the association between loneliness and delayed care varied by demographic or diagnostic groups. That the association between loneliness and delayed or avoided care persisted in most subgroups of individuals examined in our stratified analyses suggests that loneliness interventions for older adults could be broadly targeted to address widespread unmet medical care needs. Meanwhile, the stronger associations found for people with certain diagnosis (e.g. cancer or psychiatric problems) or overall poorer health indicate that older adults with existing physical or mental health issues who are also experiencing loneliness during the pandemic represent doubly vulnerable subgroups that face substantial unmet care needs and potential adverse health outcomes including mortality.<sup>33</sup> Thus, interventions also could be targeted to these heavily tolled subgroups to identify and mitigate the social, financial, and medical issues of these subgroups of older adults; multi-component interventions may be most effective when they are designed to address simultaneously their loneliness, regular medical care needs, and unique vulnerabilities due to high-risk conditions. Lastly, loneliness was a potent

predictor for delaying or avoiding care among older adults of younger ages (<65) and those who had a college education or higher. More work is needed to understand these findings and to inform tailored interventions to these subgroups.

This study has several limitations. First, since the HRS is a nationally representative survey of US adults aged 50 and older, results of this study should be generalized to younger US adults or adults in other counties with caution. Second, delay or avoidance of medical care and the reasons for and types of care delayed or avoided were based on self-report and are subject to potential recall bias. Third, the cross-sectional analyses of the 2020 HRS data allowed for evaluations of associations and precluded examinations of causal effects. Although we controlled for many individual characteristics in multivariable analyses, the association of loneliness with care delay or avoidance may have been affected by unmeasured confounders. Finally, the lack of statistical significance in several estimated associations in stratified analyses may reflect insufficient power in these multivariable analyses.

In conclusion, loneliness was a significant public health problem before the COVID-19 pandemic and deteriorated during the pandemic for many older adults. This study reveals that loneliness is associated with a higher likelihood of delaying or avoiding medical care during the pandemic among a nationally representative sample of older adults, particularly several high-risk groups. Interventions to address loneliness among older adults have the potential to reduce unmet care needs and adverse health outcomes.

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#### CONFLICT OF INTEREST

No conflict of interest for any author.

#### AUTHOR CONTRIBUTIONS

Li, Cheng, Cai, Holloway, Simning: conception and design, acquisition of data, analysis or interpretation of data, critical revision for important intellectual content, and final approval of the version to be published. Maeng: analysis or interpretation of data, critical revision for important intellectual content, and final approval of the version to be published. Li: drafting of the article.

#### DATA AVAILABILITY STATEMENT

The data that support the findings of this study were derived from the following resources available in the public domain: <https://hrsdata.isr.umich.edu/data-products/2020-hrs-covid-19-project>.

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## SUPPORTING INFORMATION

Additional supporting information may be found in the online version of the article at the publisher's website.

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